PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

MEMORANDUM

TO: ENVIRONMENTAL REVIEW COMMISSION
The Honorable Jimmy Dixon, Co-Chair
The Honorable Chuck McGrady, Co-Chair
The Honorable Trudy Wade, Co-Chair

HOUSE OF REPRESENTATIVES APPROPRIATIONS SUBCOMMITTEE ON AGRICULTURE AND NATURAL AND ECONOMIC RESOURCES
The Honorable Jimmy Dixon, Co-Chairman
The Honorable Pat McElraft, Co-Chairman
The Honorable Roger West, Co-Chairman

SENATE APPROPRIATIONS SUBCOMMITTEE ON NATURAL AND ECONOMIC RESOURCES
The Honorable Andrew Brock, Co-Chairman
The Honorable Bill Cook, Co-Chairman
The Honorable Trudy Wade, Co-Chairman

FISCAL RESEARCH DIVISION

FROM: Mollie Young, Director of Legislative Affairs

SUBJECT: Cape Fear Estuarine Resource Restoration Report

DATE: April 6, 2016

Attached for is the Department of Environmental Quality, Division of Coastal Management report on the implementation of Session Law 2015-241, Section 14.6(h), which states: "the Department shall report to the Environmental Review Commission, the chairs of the Senate Appropriations Committee on Natural and Economic Resources and the House Appropriations Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division regarding its implementation of this subsection, including a copy of the Request for Information required by subdivision (2) of this subsection and any responses received to the Request."

If you have any questions or need additional information, please contact me by phone at (919) 707-8618 or via e-mail at mollie.young@ncdenr.gov.

cc: Tom Reeder, Assistant Secretary for Environment, DEQ
Braxton Davis, Director of Coastal Management, DEQ

N.C. Department of Environmental Quality
Division of Coastal Management
Report on Cape Fear Estuarine Resource Restoration

Pursuant to Section 14.6.(h) of the 2015 Appropriations Act, the N.C. Department of Environmental Quality (DEQ) is directed by the General Assembly to conduct steps (1)-(4) as outlined in the attached legislation (Attachment 1) and paraphrased below (in bold). This report is organized by these steps as follows:

(1) Notify the U.S. Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam.

On Nov. 30, 2015, the Division of Coastal Management (DCM) sent a letter to Colonel Kevin P. Landers, Sr. of the U.S. Army Corps of Engineers (Corps; Attachment 2) to provide notice of the state's intent to study the removal of the Southern Component of the New Inlet Dam. DCM received a response to this letter from Mr. Justin McCorcle of the Corps dated Jan. 28, 2016 (Attachment 3).

The response letter includes the following:

a) a summary of the history of the New Inlet Dam and Swash Defense Dam construction;
b) an overview of the Wilmington Harbor Project;
c) the Corps' perspectives on Section 14.6.(h) of the 2015 Appropriations Act;
d) an overview of the regulatory processes that would be required for removal of the dam; and
e) a list of unresolved issues that should be addressed.

As described in the attached letter, the Corps outlines several "unresolved issues to address," including the identification of the purpose and need for the project, shoaling and the need for maintenance of the navigation channel, financing of the project and project maintenance, consideration of project alternatives, evaluation of environmental impacts (both direct and indirect) and cultural resource issues, and the need for clarity regarding which entities are speaking on behalf of the state as this study moves forward.

(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removing the Southern Component of the Dam, including necessary permits and approvals.

A Request for Information (Attachment 4) was published by DEQ on Jan. 8, 2016, and closed four weeks later on Feb. 4, 2016. No questions were received while the Request for Information was open. DEQ received two responses to the Request for Information, which are located in Attachment 5: Cardno, Inc. (Raleigh, N.C.) and Little Environments PLLC (Garner, N.C.). The responses provide information that should be considered if a costs and benefits analysis is pursued, including the types of permits and approvals that will likely be needed at the local, state, and federal levels, and studies and surveys that will likely be needed to inform permitting, environmental review, and assessment of navigation impacts. The responses also describe the approach the firms would take to conduct a costs and benefits analysis and provide examples of

relevant tools and projects. Information provided by the Corps in Attachment 3 and the National Oceanic and Atmospheric Administration in Attachment 7 (see below) should be considered if such an analysis is pursued. The historic nature of the Dam will also need to be taken into consideration.

(3) Request approval from the National Oceanic and Atmospheric Administration (NOAA) to adjust the boundary for the Zeke's Island component of the N.C. National Estuarine Research Reserve by moving the western boundary of the Zeke's Island Reserve 200 feet seaward and removing the area that lies between the current and new boundary from the Reserve, and adding equivalent acreage to the northern boundary of the Reserve from adjacent acreage at the Fort Fisher State Recreation Area.

On Nov. 30, 2015, DCM sent a letter to Ms. Erica Seiden of the National Oceanic and Atmospheric Administration (NOAA; Attachment 6) requesting information on the process and specific submission requirements the agency requires in order to consider a boundary change to a Reserve within the National Estuarine Research Reserve System. Ms. Seiden's response, dated Jan. 11, 2016, is found in Attachment 7.

Considering a boundary change is an involved, multi-step process as detailed in the NOAA response letter. NOAA requires information on why lands/waters are proposed for addition or deletion, how the change will benefit the Reserve ecologically and/or programmatically, and the implications the change may have for core and buffer designations and maintenance of Reserve site viability for its designated purposes. Additional information is required regarding ownership and management of the lands/waters to be included and potential uses.

Detailed information is needed to evaluate the ecological, research, education, and management implications that the proposed boundary change would have for the Zeke's Island Reserve in order to address the NOAA requirements. This information and evaluation is not currently available, and a detailed study would be required in order to justify and request a boundary change to NOAA that may result in significant changes to the Zeke's Island Reserve. As a result, DEQ has not submitted a boundary change request to NOAA at this time.

Although not required per the legislation, on Nov. 30, 2015 DCM also sent a letter to Mr. Mike Murphy, Director of the N.C. Division of Parks and Recreation (DPR; Attachment 8) to inform him of the legislation and declare DEQ's interest in working with DPR on any potential boundary changes at the Zeke's Island Reserve that may impact the Fort Fisher State Recreation Area. Mr. Murphy's response, dated Jan. 25, 2016, is located in Attachment 9 and requests more information on how the proposed removal may affect the Fort Fisher State Recreation Area and Bald Head Island State Natural Area. Specifically, the letter raises questions regarding potential water quality impacts on biological resources in the region, possible extensive erosion of the shoreline at Fort Fisher State Recreation Area and Bald Head Island State Natural Area potentially impacting recreation and natural resource values, and potential impacts to habitats that support a number of federally listed floral and faunal species.

(4) If NOAA approves the boundary adjustment described above, the NC Coastal Resources Commission is then required to amend the Reserve Components Rule (15A NCAC 07O .0105) as further described in the Act.

No action was taken on this step, as the boundary change described in #3 above was not requested from NOAA. In addition, it is DEQ's understanding that Coastal Reserve rules in 15A NCAC 07O are departmental rules per N.C. General Statute § 113A-129.2(b), and for this reason, the N.C. Coastal Resources Commission does not have the authority to amend 15A NCAC 07O .0105 in the event that a Reserve boundary adjustment is approved by NOAA in the future.

Response to the Proposal

Following the introduction of House Bill 97 proposing removal of the New Inlet Dam, eight local municipalities and one association passed resolutions in June and July 2015 opposing the dam's removal. These resolutions are located in Attachment 10 and include Boiling Spring Lakes, Carolina Beach, Caswell Beach, Oak Island, Ocean Isle Beach, Southport, Sunset Beach, Village of Bald Head Island, and N.C. Beach, Inlet, and Waterway Association. Additionally, the Town of Holden Beach sent a letter to Senator Rabon and Representative Iler expressing their support of the Village of Bald Head Island's opposition to this section of House Bill 97 (Attachment 10). DEQ is not aware of any resolutions passed in favor of this proposal.

Attachments

1. 2015 Appropriations Act Section 14.6.(h)
2. Letter from DCM Director Davis to Colonel Kevin P. Landers, Sr., U.S. Army Corps of Engineers 11.30.2015
3. Letter from Mr. Justin McCorcle, U.S. Army Corps of Engineers to DCM Director Davis 1.28.2016
4. Request for Information
5. Responses received to the Request for Information
    a. Cardno, Inc.
    b. Little Environments PLLC
6. Letter from DCM Director Davis to Ms. Erica Seiden, National Oceanic and Atmospheric Administration 11.30.2015
7. Letter from Ms. Erica Seiden, National Oceanic and Atmospheric Administration to DCM Director Davis 1.11.2016
8. Letter from DCM Director Davis to Mr. Mike Murphy, N.C. Division of Parks and Recreation 11.30.2015
9. Letter from Mr. Mike Murphy, N.C. Division of Parks and Recreation to DCM Director Davis 1.25.2016
10. Proposal Responses
    a. Boiling Spring Lakes
    b. Carolina Beach
    c. Caswell Beach
    d. Holden Beach
    e. Oak Island
    f. Ocean Isle Beach
    g. Southport
    h. Sunset Beach
    i. 1. Village of Bald Head Island
       2. Village of Bald Head Island Olsen White Paper
    j. N.C. Beach, Inlet, and Waterway Association

(22) The Secretary of Environment and Natural Resources for the waiver or modification of non-State cost-share requirements under G.S. 143-215.73G."

CAPE FEAR ESTUARINE RESOURCE RESTORATION

SECTION 14.6.(h) The General Assembly finds that the New Inlet Dam or "The Rocks" was constructed by the United States Army Corps of Engineers in the late 19th century. The New Inlet Dam is composed of two components, a Northern Component that extends from Federal Point to Zeke's Island and a Southern Component that extends southwestward from Zeke's Island and separates the New Inlet from the main channel of the Cape Fear River. The General Assembly further finds that the Southern Component of the New Inlet Dam impedes the natural flow of water between the Cape Fear River and the Atlantic Ocean that occurred prior to emplacement of the dam. The General Assembly further finds that it is necessary to consider removal of the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean. To this end, the Department of Environment and Natural Resources shall do all of the following:

(1) Notify the United States Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam.

(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam, including an inventory of all necessary State and federal permits and approvals needed to develop and implement a removal plan. Identification of a capable firm pursuant to this section shall be done in accordance with Article 8 of Chapter 143 of the General Statutes.

(3) Request approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island for both of the following changes:

a. Moving the current western boundary 200 feet seaward and removing the area that lies between the current boundary and the new boundary from the North Carolina National Estuarine Research Reserve.

b. Compensating for any loss of acreage pursuant to sub-subdivision a. of this subdivision by adding a corresponding amount of acreage to the northern boundary of Zeke's Island from adjacent acreage at Fort Fisher State Recreation Area.

(4) If the Department obtains approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island as described in subdivision (3) of this subsection, the Coastal Resources Commission shall amend 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) as follows:

a. Definitions. – "Reserve Components Rule" means 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) for purposes of this section and its implementation.

b. Reserve Components Rule. – Until the effective date of the revised permanent rule that the Coastal Resources Commission is required to adopt pursuant to sub-subdivision d. of this subdivision, the Commission and the Department of Environment and Natural Resources shall implement the Reserve Components Rule, as provided in sub-subdivision c. of this subdivision.

c. Implementation. – Notwithstanding the Reserve Components Rule, the Commission shall adjust the boundary established for Zeke's Island in conformance with any boundary change that is approved by the National Oceanic and Atmospheric Administration pursuant to subdivision (3) of this subsection.

d. Additional rule-making authority. – The Commission shall adopt a rule to replace the Reserve Components Rule. Notwithstanding G.S. 150B-19(4), the rule adopted by the Commission pursuant to this subdivision shall be substantively identical to the provisions of sub-subdivision c. of this subdivision. Rules adopted pursuant to this subdivision are not subject to Part 3 of Article 2A of Chapter 150B

of the General Statutes. Rules adopted pursuant to this subdivision shall become effective as provided in G.S. 150B-21.3(b1) as though 10 or more written objections had been received as provided by G.S. 150B-21.3(b2).

e. Effective date. – Sub-subdivision c. of this subdivision expires when permanent rules to replace sub-subdivision c. of this subdivision have become effective, as provided by sub-subdivision d. of this subdivision.

Notwithstanding any other provision of law, the Department of Environment and Natural Resources may use funds from the Deep Draft Navigation Channel Dredging and Maintenance Fund, established pursuant to G.S. 143-215.73G, as enacted by subsection (c) of this section, to implement this subsection. No later than April 1, 2016, the Department shall report to the Environmental Review Commission, the chairs of the Senate Appropriations Committee on Natural and Economic Resources and the House Appropriations Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division regarding its implementation of this subsection, including a copy of the Request for Information required by subdivision (2) of this subsection and any responses received to the Request. Neither the Department nor any State agency may proceed with the removal of the New Inlet Dam until (i) the Environmental Review Commission has reviewed the report required by this section and (ii) a bill expressly providing authorization for the removal becomes law.

CLARIFY COASTAL COUNTY AUTHORITY OVER ABANDONED VESSELS

SECTION 14.6.(n) Section 1 of S.L. 2013-182 is repealed.

SECTION 14.6.(o) G.S. 153A-132(i), as rewritten by S.L. 2013-182, reads as rewritten:

"(i) A county may by ordinance prohibit the abandonment of vessels in navigable waters within the county's ordinance-making jurisdiction, subject to the provisions of this subsection. The provisions of this section shall apply to abandoned vessels in the same manner that they apply to abandoned or junked motor vehicles to the extent that the provisions may apply to abandoned vessels. For purposes of this subsection, an "abandoned vessel" is one that meets any of the following:

(1) A vessel that is moored, anchored, or otherwise located for more than 30 consecutive days in any 180 consecutive-day period without permission of the dock owner.

(2) A vessel that is in danger of sinking, has sunk, is resting on the bottom, or is located such that it is a hazard to navigation or is an immediate danger to other vessels.

Shipwrecks, vessels, cargoes, tackle, and other underwater archeological remains that have been in place for more than 10 years shall not be considered abandoned vessels and shall not be removed under the provisions of this section without the approval of the Department of Cultural Resources, which is the legal custodian of these properties pursuant to G.S. 121-22 and G.S. 121-23. This subsection applies only to the counties set out in G.S. 113A-103(2)."

EROSION CONTROL STRUCTURES

SECTION 14.6.(p) The Coastal Resources Commission shall amend its rules for the use of temporary erosion control structures to provide for all of the following:

(1) Allow the placement of temporary erosion control structures on a property that is experiencing coastal erosion even if there are no imminently threatened structures on the property if the property is adjacent to a property where temporary erosion control structures have been placed.

(2) Allow the placement of contiguous temporary erosion control structures from one shoreline boundary of a property to the other shoreline boundary, regardless of proximity to an imminently threatened structure.

(3) The termination date of all permits for contiguous temporary erosion control structures on the same property shall be the same and shall be the latest termination date for any of the permits.

(4) The replacement, repair, or modification of damaged temporary erosion control structures that are either legally placed with a current permit or

Coastal Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

BRAXTON DAVIS
Director

November 30, 2015

Colonel Kevin P. Landers, Sr.
U.S. Army Corps of Engineers
69 Darlington Avenue
Wilmington, N.C. 28403

Colonel Landers,

The purpose of this letter is to inform you that the North Carolina Department of Environmental Quality intends to study the removal of the southern component of the "New Inlet Dam" along the Cape Fear River at Zeke's Island in accordance with Section 14.6(h) of the 2015 Appropriations Act (NC Session Law 2015-241), entitled "Cape Fear Estuarine Resource Restoration" (for full text, see http://www.ncleg.net/Sessions/2015/Bills/House/PDF/H97v9.pdf).

In summary, Section 14.6(h) instructs the Department of Environmental Quality to conduct the following (paraphrased):

(1) Notify the U.S. Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam;
(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removing the Southern Component of the Dam, including necessary permits and approvals;
(3) Request approval from the National Oceanic and Atmospheric Administration (NOAA) to adjust the boundary for the Zeke's Island component of the N.C. National Estuarine Research Reserve by moving the western boundary of the Zeke's Island Reserve 200 feet seaward and removing the area that lies between the current and new boundary from the Reserve, and adding equivalent acreage to the northern boundary of the Reserve from adjacent acreage at the Fort Fisher State Recreation Area; and
(4) If NOAA approves the boundary adjustment described above, the NC Coastal Resources Commission is then required to amend the Reserve Components Rule (15A NCAC 070 .0105) as further described in the Act.

The Division of Coastal Management is responsible for carrying out the steps outlined above. A report on the implementation of this Section is due to the NC General Assembly by April 1, 2016. Therefore, I would appreciate any initial comments that you may have concerning this study prior to February 1, 2016.

Please contact me at 252.808.2808 x202 or Braxton.Davis@ncdenr.gov if you would like to discuss further.

Sincerely,

Braxton Davis

Attachment

cc: Tom Reeder, Assistant Secretary, Department of Environmental Quality
Rebecca Ellin, Coastal Reserve Program Manager, Division of Coastal Management

(22) The Secretary of Environment and Natural Resources for the waiver or modification of non-State cost-share requirements under G.S. 143-215.73G."

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(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam, including an inventory of all necessary State and federal permits and approvals needed to develop and implement a removal plan. Identification of a capable firm pursuant to this section shall be done in accordance with Article 8 of Chapter 143 of the General Statutes.

(3) Request approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island for both of the following changes:

a. Moving the current western boundary 200 feet seaward and removing the area that lies between the current boundary and the new boundary from the North Carolina National Estuarine Research Reserve.

b. Compensating for any loss of acreage pursuant to sub-subdivision a. of this subdivision by adding a corresponding amount of acreage to the northern boundary of Zeke's Island from adjacent acreage at Fort Fisher State Recreation Area.

(4) If the Department obtains approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island as described in subdivision (3) of this subsection, the Coastal Resources Commission shall amend 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) as follows:

a. Definitions. – "Reserve Components Rule" means 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) for purposes of this section and its implementation.

b. Reserve Components Rule. – Until the effective date of the revised permanent rule that the Coastal Resources Commission is required to adopt pursuant to sub-subdivision d. of this subdivision, the Commission and the Department of Environment and Natural Resources shall implement the Reserve Components Rule, as provided in sub-subdivision c. of this subdivision.

c. Implementation. – Notwithstanding the Reserve Components Rule, the Commission shall adjust the boundary established for Zeke's Island in conformance with any boundary change that is approved by the National Oceanic and Atmospheric Administration pursuant to subdivision (3) of this subsection.

d. Additional rule-making authority. – The Commission shall adopt a rule to replace the Reserve Components Rule. Notwithstanding G.S. 150B-19(4), the rule adopted by the Commission pursuant to this subdivision shall be substantively identical to the provisions of sub-subdivision c. of this subdivision. Rules adopted pursuant to this subdivision are not subject to Part 3 of Article 2A of Chapter 150B

(22) The Secretary of Environment and Natural Resources for the waiver or modification of non-State cost-share requirements under G.S. 143-215.73G."

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DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

January 28, 2016

SUBJECT: Removal of Swash Defense Dam, Wilmington Harbor

Mr. Braxton Davis, Director
North Carolina Division of
Coastal Resources
400 Commerce Avenue
Morehead City, North Carolina 28557

Dear Mr. Davis,

This is in response to your letter to COL Kevin P. Landers, Sr., Wilmington District Commander, of November 30, 2015, referencing the State's study of removal of the Swash Defense Dam portion of the Wilmington Harbor Navigation Project. As you are aware, the Swash Defense Dam (SDD) and adjoining New Inlet Dam (NID) were constructed by the U.S. Army, Corps of Engineers (Corps) in the nineteenth century to close New Inlet and make the Cape Fear River more navigable. The two dams function together to protect the river from the creation of an inlet that could cause substantial shoaling in the river. You have been tasked by the North Carolina General Assembly to study the removal of a portion of this project "in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean." Your letter seeks our comment on such a study.

As more thoroughly described in a subsequent section of this letter, the State's proposal to remove the NID/SDD project, possibly in conjunction with an attempt to open an inlet in the area between Federal Point and Bald Head Island, would require at a minimum the following authorizations from the Corps:

- A permit from our Regulatory Division, under both Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §404) and Section 404 of the Clean Water Act (33 U.S.C. §1344), for the removal of the rocks and any associated dredging or shore stabilization.
- An engineering analysis provided by the State, which would be used by our Engineering Branch staff to seek Corps Headquarters approval, pursuant to Section 408 (33 U.S.C. §408), of the alteration of an existing Federal navigation project.
- A document prepared pursuant to the appropriate provisions of the National Environmental Policy Act (NEPA), to support the approvals identified above.

- Associated consultation and approvals under applicable Federal laws related to project-induced effects on Endangered Species, Essential Fish Habitat, cultural resources, marine and nuclear safety, and a variety of other resources potentially affected by the proposed project.
- An agreement between the State of North Carolina and the Corps to formalize the State's permanent commitment to maintain, at the State's sole expense, those portions of the Wilmington Harbor Federal Navigation Project adversely affected by its removal of the NID/SDD element of the navigation project and any associated work.

In this letter, I will explain the purpose and history of the New Inlet Dam and Swash Defense Dam federal navigation project element, identify the processes required for consideration of the dams' removal, and raise important issues that must be considered in any study the State undertakes to examine such removal.

History

The United States Army, Corps of Engineers (Corps) has actively maintained the navigability of the Cape Fear River since 1829. The Lower Cape Fear River, below Wilmington, had historically been navigable to a depth of nineteen feet, but over the first half of the nineteenth century, the river's depth had been reduced to twelve feet. In 1853, the Secretary of War empaneled a commission to study and recommend solutions for the chronic navigation problems encountered in the Lower Cape Fear River. That commission found that one of the clearest problems associated with navigability of the lower river was that the river essentially had two mouths – one between Fort Caswell and Smith (Bald Head) Island, and one at New Inlet several miles north, near what would become Fort Fisher. As New Inlet grew deeper, the depths over the river mouth continued to grow shallower. The commission recommended that efforts begin to reduce the flows through, and eventually to close, New Inlet in order to force the entire discharge of the river out of its southern mouth.

Approval to completely close New Inlet was not granted in 1853, and the Corps was instead directed to close two smaller inlets that had opened up south of New Inlet in the vicinity of Zeke's Island. Between 1853 and 1857, stones were placed south of Zeke's Island in an attempt to close these inlets. The effort was initially successful, but was overwhelmed by a hurricane in 1857, and no further efforts were made until after the Civil War. The Corps received authority to close New Inlet in 1870, and began the process by building a wooden structure connecting Zeke's Island with Smith (Bald Head) Island to the south, and by adding sand to the seaward side of the structure. This process completed in 1877. Meanwhile, the process of building a jetty southward from Federal Point (near the current ferry landing) and across New Inlet itself had begun, beginning with wooden mattresses covered with rip-rap, and finally resulting in a completed stone structure 4,800 feet long. The New Inlet Dam, completed in 1881, was 37 feet from base to top, ranged from 75 to 120 feet wide at the base, and was composed of 181,000 cubic yards of stone. Before work on the New Inlet Dam was complete, a storm breached the Zeke's Island-Smith Island structure in 1877. The Corps began efforts to close the breach in

1881, and eventually was able to complete a more secure structure made of brush and rip-rap overlain with stone. This southern dam, known as the Swash Defense Dam, was completed in 1891, and extends 12,800 feet south from Zeke's Island. Please see Attachment A for more historical information.

Both of these stone features remain today, and serve to protect the navigation channel from the shoaling associated with a major inlet re-opening in the area. For several decades spanning from approximately 1940 until 1998, a small inlet, known as Corncake Inlet, did open adjacent to the Swash Defense Dam, providing regular flushing of the sound behind the dams and a sandier substrate than currently exists. That small inlet closed as a result of Hurricanes Bonnie and Floyd in 1998 and 1999, respectively, and the beach from Fort Fisher to Bald Head Island has remained intact since.

The Wilmington Harbor Project

The current Wilmington Harbor Project connects the Port of Wilmington with the Atlantic Ocean through the Cape Fear River, and also extends upstream of the Port at shallower depths to other commercial shipping terminals. The Project consists of the maintained channel, other related channel improvements, and dredged material disposal facilities along the length of the river and out into the ocean. The channel itself is 44 feet deep across the ocean bar, 42 feet through the Cape Fear River up to the Memorial Bridge in Wilmington, and 32 feet or less upstream of the Bridge. The more recent improvements of the channel, including its deepening to the current depth of 42 feet, have been accomplished pursuant to Project Partnership Agreements between the State of North Carolina and the Corps, who cost share new construction for Federally-authorized project improvements. Operations and Maintenance of the project, which consists primarily of maintenance dredging and improvements to disposal facilities, is paid for by the Federal government. Federal funding for maintenance of the Project was $18 million in 2014, and $14 million in 2015. The mid-river portion of the project, adjacent to the NID/SDD element, is an area of minimal shoaling under current conditions, and is maintained infrequently as shoaling occurs. Please reference the map in Attachment B for a project overview. Current channel conditions are available on our website, at: http://www.saw.usace.army.mil/Missions/Navigation/HydrographicSurveys/WilmingtonHarbor.aspx.

The New State Law

The 2015 North Carolina Appropriations Act (NC Session Law 2015-241, at Section 14.6(h)), seeks removal of a portion of this Federally-constructed navigation improvement. The stated purpose of the law is as follows:

> The General Assembly finds that the New Inlet Dam or "The Rocks" was constructed by the United States Army Corps of Engineers in the late 19th century. The New Inlet Dam is composed of two components, a Northern Component that

> extends from Federal Point to Zeke's Island and a Southern Component that extends southwestward from Zeke's Island and separates the New Inlet from the main channel of the Cape Fear River. The General Assembly further finds that the Southern Component of the New Inlet Dam impedes the natural flow of water between the Cape Fear River and the Atlantic Ocean that occurred prior to emplacement of the dam. The General Assembly further finds that it is necessary to consider removal of the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean.

The law then proceeds to direct three main activities: 1) notification of the Corps that the State intends to study the removal of a portion of this project; 2) the hiring of a firm to study costs, benefits, and processes for permitting such removal; and 3) requesting approval from the National Oceanic and Atmospheric Administration (NOAA) to realign the boundaries of the Zeke's Island Estuarine Research Reserve to remove the area now occupied by the New Inlet Dam and Swash Defense Dam.

The statement of purpose found in the law does not match our understanding of the New Inlet Dam/Swash Defense Dam (NID/SDD) project. It is important to note the differences between the law's stated purpose and our understanding of the project.

- The Southern Component (Swash Defense Dam) is neither the only, nor the primary portion of the NID/SDD project that separates the historic New Inlet from the Cape Fear River. As described above, it is actually the Northern Component (New Inlet Dam) portion of the project that closed off New Inlet itself. The Swash Defense Dam closed smaller inlets that had emerged in the nineteenth century, partially as a result of the closure of New Inlet to the north.

- It is also clear that *both* components of the NID/SDD project have worked together to keep New Inlet and associated smaller inlets from re-opening south of Federal Point. It is not just the Southern Component of the project that impedes flow between the river and the ocean.

- The phrase "natural flow of water between the Cape Fear River and Atlantic Ocean" implies a natural and stable condition of the river that historical records do not indicate existed for any length of time. Due to the very narrow nature of the peninsula at this point, it is probably safe to assume that several inlets have appeared and closed over the centuries at this location, due to both storm effects and human-induced effects such as boat haul-over.

- If the State's goal is to "reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean" that existed immediately prior to the Corps' efforts to close the inlets in 1853, it is important to remember the conditions as they existed at that time. Specifically, this would entail a New Inlet with a navigable depth of approximately 12-15 feet, and two smaller inlets south of Zeke's Island with depths considerably less than 12 feet throughout. These inlets existed, however, alongside a Cape Fear River that was chronically shoaled between New Inlet and Southport, and was navigable to only a depth of approximately 12 feet across its ocean bar. The introduction of one or more inlets between Federal Point and Bald Head Island would have a substantial, but currently unknown effect on the hydrodynamics and navigability of the current 42-foot navigation project in the Cape Fear River. Please consult the map at Attachment C for an illustration of the river conditions immediately prior to construction of the dams.

Lack of a Clear Proposal

In order for the State to move forward in its efforts to obtain the permits, authorizations, and agreements necessary to alter this project in such a substantial manner, our Regulatory permit process requires that a clear purpose and need for the project be identified. As set forth below, a reasonable analysis of costs or benefits cannot be performed without a clearer understanding of the State's purpose for the removal, or the needs that it will meet. The Corps does not presume to understand the intent of the State when it mandates consideration of "removal of the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean." Without further clarification, this statement could be interpreted to mean one of the following actions, each of which would entail a very different analysis.

A. **Removal of the Swash Defense Dam (and/or the New Inlet Dam) with no other action contemplated.** While this action would seem to comply most strictly with the State law mandate, it would not actually "reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean," as the beach between Federal Point and Bald Head Island would remain, and no flow would be created. We would presume that the removal of one or both dams would create a condition where erosion or storm action would make the opening of an inlet in this area much more likely, but that re-establishment of flow would occur, if at all, at an uncertain time in the future. Regardless of the lack of immediate flow, the Corps would expect that removal of one or both dams would alter the shoaling patterns in this portion of the Federal navigation project, and substantially increase the potential for storm-induced effects on the river and surrounding lands. The purpose for this effort would need to be articulated, as it has no identifiable navigation benefits, would likely reduce access to recreational beaches, and environmental benefits are uncertain.

B. **Removal of the Swash Defense Dam (and/or the New Inlet Dam) with a modest effort to re-establish a small, non-navigable inlet.** Under this scenario, we would presume that in addition to removing the dams, the State would actually attempt to "reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean," in a manner similar to how an inlet might be formed subsequent to a storm. We would anticipate the historic location of either New Inlet or Corncake Inlet to be the site of this effort, which would entail some amount of dredging to re-establish flow. Under this scenario, we would anticipate that the State does nothing further to maintain the newly-formed inlet, and simply allows it to exist, widen, close, or move as a result of natural forces. We would anticipate that this action would cause immediate and measurable shoaling effects along the Lower Cape Fear River. The purpose for this effort would need to be articulated, as it has no identifiable navigation benefits, would likely reduce access to recreational beaches, and environmental benefits are uncertain.

C. **Removal of the Swash Defense Dam and the New Inlet Dam with establishment of a maintained shallow-draft (14 feet or less) inlet.** Under this scenario, both dams would be removed (as removing only one dam would be ineffective and dangerous for navigation). A navigation channel would be opened in the location of historic New Inlet or Corncake Inlet, and maintained to a consistent depth of somewhere between 6 and 14 feet. Jetties or shoreline armoring may or may not be a part of this proposal, or may become necessary over time. Initially, this scenario would most closely mimic the condition of this area before construction of the two dams. We would therefore expect shoaling in the Lower Cape Fear River similar to that experienced in the early nineteenth century, with immediate and substantial effects to the navigability of the Wilmington Harbor Project. The presumed primary purpose of this project would be recreational and light commercial navigation.

D. **Removal of the Swash Defense Dam and the New Inlet Dam with establishment of a maintained deep-draft navigation channel.** Under this scenario, both dams would be removed (as removing only one dam would be both ineffective and dangerous for navigation). A navigation channel would be opened in the location of historic New Inlet or Corncake Inlet, and maintained to a consistent depth of at least 42 feet, replacing (or, possibly pairing with) the current channel to establish a new deep-water route to the Atlantic Ocean. Jetties or shoreline armoring would almost certainly be necessary, as would a substantial amount of removal of rock, relic forest, or other unknown subsurface conditions along a path several miles long to natural deep water. Current conditions in the Lower Cape Fear River would be altered to the extent that extensive investigation, modeling, and analysis would be required before we could even predict project-induced

effects. The purpose under this scenario would clearly be to support commercial shipping; the need for an alternate or altered channel is unclear.

A clear purpose and need statement would direct the investigation and analysis that will be required of the State and its consultant as it considers moving forward with this proposal. Only with a clearly-defined purpose, and a general idea of the project's scope (possibly similar to that outlined in one of the four scenarios above), may the Corps move forward with the permitting or authorization processes that would be required.

Regulatory Processes

The removal of the rock dam at NID/SDD requires a Department of the Army (DA) permit issued pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §404). As part of the permit review process, the Corps would also need to conduct a review pursuant to Section 408 of U.S.C. Title 33, as the project contemplates the physical alteration of an existing navigation project. No meaningful review can begin without a clearly identified project purpose and need, with an associated scope of work for the permit action. Once the proposed project and its purpose are described clearly enough to warrant agency review, the pre-application process can begin, which will also serve as the beginning of the scoping process under the National Environmental Policy Act (NEPA).

Evaluation of your proposed project's effect on the human environment may ultimately warrant NEPA – Environmental Impact Statement (EIS) review procedures. Please refer to 33 C.F.R. Part 325, Appendix B, for a thorough discussion of those procedures. For Regulatory purposes, if the EIS is meant to support a permit decision, we would use our third-party EIS process, with the Corps' involvement in the selection of the appropriate third-party contractor to write the document under our direction, and the State bearing the financial responsibility for the work. Please see Attachment D, Regulatory Guidance Letter 05-08, for more information. The Corps would be the lead Federal Agency for such a document, and NOAA, as a major stakeholder in the reserve property on which the project sits, is likely to be a cooperating agency. Other cooperating agencies may be identified as well, to potentially include the Coast Guard, U.S. Army, and Nuclear Regulatory Commission, as the proposed project may substantially affect the Military Ocean Terminal at Sunny Point (MOTSU), the Brunswick Nuclear Plant, and major shipping lanes. The EIS process would provide a thorough review of your proposal, and would be predicated upon consideration of a reasonable range of practicable alternatives (including the no action alternative) to meet the project purpose.

As part of this process, we would ultimately identify the least environmentally damaging practicable alternative (LEDPA) that meets the project purpose and need, considering costs, logistics, and technology. Additionally, all alternatives would be evaluated for the compliance with various aspects of the regulatory program to include a balancing of the detrimental and beneficial effects of the project on the public interest, as well as compliance with the Section 404(b)1 Guidelines (used to implement Section 404 of the Clean Water Act), and relevant related Federal laws such as the Endangered Species Act, National Historic Preservation Act, Magnuson

Stevens Fisheries Conservation and Management Act, and the Fish and Wildlife Coordination Act, and several Executive Orders governing energy and invasive species. The secondary and cumulative effects of the project on the human and aquatic environment would be thoroughly evaluated. Engineering analysis would likely be required to study the effects of the project on coastal resources. Resource agency coordination would likely result in requests for detailed information on these effects. Significant detrimental effects on aquatic resources, or the identification of a LEDPA that is substantially different from the State's proposed action, would likely result in permit denial.

The decision whether to issue a permit will be based on an evaluation of the probable impacts, including cumulative impacts, of the proposed activity and its intended use on the public interest. Among those are: conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, consideration of property ownership, and the needs and welfare of the public. To the extent appropriate, the public interest review will include consideration of additional policies as described in 33 CFR 320.4(b) through (r).

Removal of all or part of the NID/SDD project will physically alter, and substantially influence, the Wilmington Harbor Navigation Project, and therefore requires an engineering analysis under Title 33 of the U.S. Code, Section 408. Depending on the ultimate purpose and design of the proposed project, those effects could be substantial and far-reaching. The result of the Section 408 process could result in a denial of your request, or Regulatory permit conditions requiring specific actions, or, as this is a cost-shared Navigation project entered into between the Army and the State, a modification of the existing Project Partnership Agreement to allow the State to assume financial responsibility for the continued navigability of the Lower Cape Fear River. Please refer to the Attachment E, Section 408 Guidance (EC 1165-2-216, Change 1), for more information about this required analysis.

As mentioned briefly above, the Regulatory processes involved in studying your proposal would necessarily involve evaluation of the resources (natural, cultural, economic, and human) that would be affected by your proposed project. As an integral part of our Regulatory permit process, and in consideration of your project's potential effect on the existing Navigation channel, we would expect, at a minimum, the following analyses to be conducted:

- Coastal Engineering analysis of wave and current patterns in the Lower Cape Fear River
- River discharge and tidal hydraulic analyses for existing and any new inlet configurations
- Shoaling analysis for the Wilmington Harbor project indicating likely project-induced effects
- Analysis of the likelihood for inlet creation and movement

- Discussion of the need for hardened structures
- Appropriate assessment of the Project's effect on military, commercial, and recreational navigation, to include safety considerations, effect on the State Port and MOTSU, as well as any environmental or property considerations associated with boat traffic and boat wake.
- Identification of potentially affected utilities, infrastructure, and subsurface obstructions, and a discussion of the project's potential effects on those features
- Discussion of any potential effects on the nearby nuclear power facility
- Subsurface Geotechnical analysis of any excavated area
- Discussion of anticipated effects of sea level rise on the project and project area, in compliance with the most recent Federal guidance (the Corps' guidance, ER 1100-2-8162, is enclosed as Attachment F)
- Endangered Species Biological Assessment, for terrestrial and aquatic species potentially affected
- Essential Fish Habitat Assessment
- An assessment of project effects on fish and wildlife resources required by the Fish and Wildlife Coordination Act
- An assessment of project effects on water quality and salinity levels
- Cultural Resources investigations and analyses
- Discussion of the project's consistency with CAMA Regulations
- Coastal Barrier Resources Act considerations, as appropriate
- Consideration of the loss of Coastal Reserve property or resources
- Analysis of the potential project's effect on recreational resources
- Discussion of the project's effect on real estate interests, including secondary effects associated with erosion or inlet creation

Unresolved Issues to Address

As your proposal is still presumably being considered and developed, I have enclosed in Attachment G an outline of questions and issues that we would like you to consider as you move forward with any study. The attachment is not a comprehensive list, but rather a brief outline of the issues that raise immediate questions that will be important for our further review. The issues

include those associated with the navigation, environmental, engineering, cultural resource, recreation, coastal resources, and governmental effects of your proposal. Please consider these issues, and use them as a guide for the analysis and answers that we would expect your study to cover.

There are a few items in the outline that I would like to highlight as needing specific attention:

- A matter of importance to our agency is the State's understanding and acknowledgement that, as non-federal sponsor for the Wilmington Harbor Project, North Carolina would need to take responsibility for funding and maintaining the navigable capacity of the Project to the extent that this proposed project might alter such capacity. Please refer to our Section 408 Guidance at Attachment E for more discussion of this issue.

- We understand that at this point, the NC Division of Coastal Management is following the direction of the NC General Assembly as described in the referenced State law. As the State moves forward with this study, we would like to have a clear understanding of which entities are speaking for the State. We are particularly concerned that the State's Executive Branch will be participating in several capacities in this effort:

  1) As the entity carrying out the General Assembly's mandate to study the NID/SDD removal and change Reserve boundaries;
  2) As the Corps' cost-sharing partner in the Wilmington Harbor Project;
  3) As the owner and operator of the State Port at Wilmington;
  4) As the property owner of much of the land affected by the proposed action; and
  5) As the regulatory agency assigned to protect the State's water, fisheries, wildlife, cultural, and coastal resources.

  As such, it will be very important for entities communicating on behalf of the State to clarify which roles they are filling, and which of these interests they represent (and which they do not).

- We trust that DCM understands that the State, even through legislative mandate, cannot constrict reasonable alternatives and approaches that would potentially meet the project purpose and need under applicable Federal law, including CWA and NEPA. A full range of reasonable alternatives and options will need to be studied, to include the "no action" alternative.

Thank you for the opportunity to provide comment on your proposal. As I believe our letter has made clear, the State has much work to do if it is to seriously consider the removal of the New Inlet Dam and/or Swash Defense Dam. Identification of a clear purpose and need is a necessary first step to any meaningful permit review. Please feel free to call or email me at (910) 251-4699,

or justin.p.mccorcle@usace.army.mil, with any questions regarding this comment letter. Questions regarding our Regulatory permit process may be directed to Mr. Tyler Crumbley at (910) 251-4170, or tyler.crumbley@usace.army.mil.

Sincerely,

Justin P. McCorcle
Assistant District Counsel

ATTACHMENTS

A. Excerpts from To Great and Useful Purpose

B. Wilmington Harbor Project Map

C. Copy of 1857 Cape Fear River map

D. Regulatory Guidance Letter 05-08, Subject: Environmental Impact Statements – Third Party Contracting

E. Engineering Circular (EC) 1165-2-216, Change 1, Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 U.S.C. 408

F. Engineering Regulation (ER) 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs

G. Outline of Unresolved Issues

H. ER 1165-2-124, Construction of Harbor and Inland Harbor Projects by Non-Federal Interests

CHAPTER V

Best Ever

It is certain that he commanded those who scourged the waters to utter, as they lashed them, these barbarian and wicked words: "Thou bitter water, thy lord lays on thee this punishment because thou hast wronged him without a cause, having suffered no evil at his hands. Verily King Xerxes will cross thee, whether thou wilt or no. Well dost thou deserve that no man should honour thee with sacrifice; for thou art of a truth a treacherous and unsavoury river." While the sea was thus punished by his orders, he likewise commanded that the overseers of the work should lose their heads. Then they, whose business it was, executed the unpleasing task laid upon them; and other master-builders were set over the work, who accomplished it in the way which I will now describe.

—Herodotus

At the end of the Civil War, North Carolina was defeated, ravaged, and economically desolate. The state's financial system faced collapse. More than 40,000 North Carolina men had lost their lives during the war and were no longer a part of the work force. Slavery no longer existed. The state's transportation system lay in shambles, with millions of dollars worth of railroads, bridges, and roads destroyed. North Carolina's most important rivers were blocked by artificial obstructions planted to deter Yankee vessels. Again, North Carolinians looked to the federal government for assistance in improving the state's waterways.

When the Corps of Engineers resumed work in North Carolina in 1870, the engineers there were under the supervision of Major William P. Craighill, head of the Corps office in Baltimore. A Virginia native, Craighill served with the Union Army during the Civil War, building defensive works in Tennessee, Pennsylvania, and Baltimore. After the war, he remained in Baltimore as District Engineer for most of a quarter-century. Ultimately, he rose to the rank of brigadier general and served as Chief of Engineers, 1895 to 1897. One of the leading engineers of the late 19th century, Craighill oversaw river and harbor work in North Carolina during the critical period following the Civil War.[1]

The engineers supervising the work on the Cape Fear River maintained an office at Smithville (now Southport), rather than Wilmington, in order to be close to the work and in a healthier climate. Captain Charles B. Phillips, Assistant Engineer under Craighill, opened a second office in New Bern in 1878, better to supervise work on the Neuse River and other river and harbor projects in the northern part of the state. Both civilians and military officers oversaw individual projects or groups of projects under the purview of the Corps of Engineers.[2] In the 1870s and 1880s, the most important project in North Carolina was the improvement of the Cape Fear River below Wilmington, in particular the erection of two structures that came to be known as the Rocks—New Inlet Dam and Swash Defense Dam.

Wilmington had played a key role during the Civil War. President Abraham Lincoln proclaimed a blockade of southern ports in 1861, and the Union fleet maintained an effective screen throughout the war, covering most southern harbors. Almost the only vessels that could successfully enter and leave southern ports were swift, shallow-draft blockade runners. Those privately owned vessels sailed between the Confederate states and the British Bahamas, bringing food

and weapons in exchange for southern cotton. Wilmington—one of the blockade runners' favorite ports because the Cape Fear River's two mouths proved difficult to blockade—remained open until late in the war. It was one of the last avenues for supplies available to Robert E. Lee's Army of Northern Virginia. Blockade runners sailed in and out of the river's mouths under the protection of stout defensive works.[3]

Four positions protected the Cape Fear River—Forts Caswell, Johnston, Anderson, and Fisher. The bulwark of the river's defense was the imposing structure of Fort Fisher, an L-shaped earthwork located on Federal Point (renamed Confederate Point during the war), north of New Inlet. Stretching from the river across the peninsula half a mile and then south down the beach for a mile, the fort took its Confederate builders nearly three years to complete. A land-and-sea attack by Union forces on 23-25 December 1864 ended with Fort Fisher intact, still garrisoned by Confederates. About two weeks later, an armada of 60 warships and a detachment of 8,000 men, under the command of Admiral David Dixon Porter and Brigadier General Alfred Terry, launched the heaviest land-and-sea attack of the war. Fort Fisher fell on 15 January 1865 after receiving over 40,000 rounds of Union artillery during the two attacks, which also involved bloody hand-to-hand combat. Union forces entered Wilmington on 22 February, cutting off Lee's last major source of supplies.[4]

New Inlet had been invaluable to Wilmington and the South during the Civil War. When the firing stopped, however, it again became a liability. The depth over the bar continued to decrease, and Wilmington, a busy port during the war, suffered a loss of commerce. Wilmington businessmen again sought assistance from the Army Corps of Engineers. Their leading spokesman was Henry Nutt.

Nutt, a Wilmington businessman, worked with the city's Chamber of Commerce nearly all of his adult life, serving as chairman of the chamber's Committee on River and Harbor Improvements. In 1868, he forwarded a memorial from Wilmington residents to Senator Joseph C. Abbott, who introduced it in Congress. Abbott, labeled a carpetbagger by his political enemies, had fought for the North and was cited for gallantry in the capture of Fort Fisher. He settled in Wilmington after the war to edit the *Wilmington Post*, a Republican weekly. In Congress, Abbott pushed for appropriations to improve the Cape Fear.[5]

Plan of Fort Fisher, 1865

Closing New Inlet

In 1869, Congress authorized a preliminary examination of the river, conducted by Colonel James H. Simpson in August 1869. He concurred with the 1858 commission's findings, "That the first important step in any further attempt to improve the entrance of Cape Fear River is to renew the works for the closing of the small inlets in Zeke's Island and the jetties for the preservation of the outer beach of that island."[6] According to Simpson, those inlets weakened the force of the currents through the original mouth. In that manner they allowed sand from the sea to wash over into the river, to be carried down by the ebb tide and deposited on the bar. He believed that the remains of the works constructed by Woodbury in the 1850s could be used in building the breakwater, and he rather

precisely estimated the breakwater's cost at $256,415.53. The Chief of Engineers approved the project and Congress appropriated $100,000 in 1870. The work on the river proceeded in three phases: closing New Inlet and nearby swashes, removing natural and artificial obstructions, and dredging a channel 12 feet deep.[7]

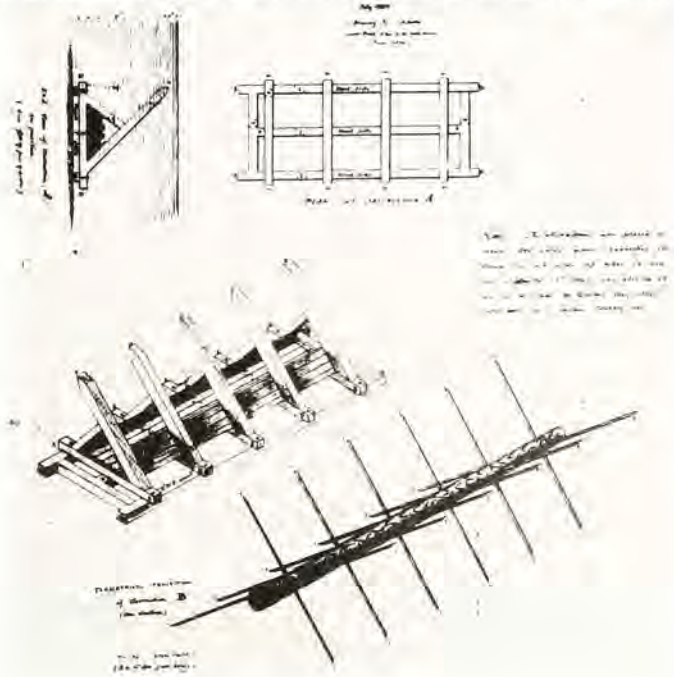
The breakwater, a wooden crib-work, was built across the breach along the same lines as Woodbury's structure of 1855. On 30 June 1873, the final spike was driven, completing 4,403 feet of works connecting Smith's and Zeke's islands. As the breakwater was built, a sand spit followed along on the sea side of the work, always remaining a little behind the superstructure's leading point. The sand spit lay from 40 to 200 feet away from the work, running parallel to the breakwater and leaving between the sand and the structure a body of water that rose and fell with the tides. To fill in the space with sand and protect the crib-work from shipworms, several worn-out flats were sunk at the narrow points of the water and sandbags placed on both sides of the structure. By 1877, the name Zeke's Island was a misnomer because the sand had connected the two islands and closed the breach.[8]

In 1871, Major Craighill asked that a Board of Engineers assemble to discuss the improvement of the Cape Fear. Meeting in Wilmington and New York, the board issued a report recommending the dredging of Bald Head Channel and the closing of New Inlet. At Bald Head, the extreme western point had suffered severe abrasion from the increased flow through the channel as the breach was closed. The jetty built by Woodbury had been completely turned, and a channel more than 200 yards wide had formed between it and the shore. The board advised that nothing be done to protect or repair the jetty.[9]

The main obstacle in the river by 1872 was the "logs," a shoal of relict timber about eight miles below Wilmington. The work done according to Hamilton Fulton's plan forced the river's main channel to seek a new passage over the "logs." But it never managed to find more than a nine-foot channel. A cut through the obstruction seemed to offer the most practical method of deepening the channel.

Phillips chartered a large dredge boat equipped with grappling apparatus to remove the trees. In March 1874, the boat began pulling stumps from the riverbed, but the process took much longer than anticipated. Instead of a shoal with trees washed down by the river, the "logs" was the site of an old cypress swamp. The dredge pulled up stumps as much as eight feet thick. Many of the taller stumps had apparently been hit by the keels of passing vessels. Nonetheless, by 1875 the dredge had cut a channel 245 feet wide and 12 feet deep at low water through the "logs."[10]

The Engineers also removed a set of Confederate man-made obstructions in the river three miles below Wilmington, placed there during the Civil War. Most of them were in rows of grillages, loaded with stone to anchor them in position,



Yankee Catchers were obstructions to navigation placed by the Confederates in parts of the Cape Fear, Neuse, Pamlico and Roanoke rivers.

with ten-by-ten-inch timbers pointing downstream at a 45-degree angle. Mounted on the upstream sides of the grillages and armed with iron points, the timbers lurked just below the low-water mark. As a boat crossed the hazard, the timbers would turn as on a hinge until, as they approached a vertical position, they punctured the vessel's hull. The Confederates had placed 500 yards of the grillages in two rows on the western side of the channel and one row on the eastern side. Scattered around the end of the rows lay a number of other obstructions made of railroad iron, leaving only a narrow passageway. The Engineers removed the hazards in July and August 1875, breaking off the pointed timbers with a hawser attached to a tug pulling upstream, and tackling attached to the temporary yardarm of a chartered schooner.[11]

Besides clearing wartime obstructions, the Corps of Engineers oversaw the dredging of the river by contract and by the Corps' own hopper dredge. The 1873 project for the Cape Fear called for the purchase of a steamer to be fitted out as a suction hopper dredge for work at Bald Head Channel. The following year, the engineers bought a 145-ton, propeller-driven steamer. They equipped her with a nine-inch centrifugal pump and hoppers on the main deck with a total capacity of 40 cubic yards. They also renamed the dredge *Woodbury* in honor of Captain Daniel P. Woodbury.[12]

The *Woodbury* and a dredge belonging to Curtis & Fobes began work on Horseshoe Shoal in 1874. Horseshoe Shoal, on the western side of the river opposite and below New Inlet, was once the site of the river's main channel, which the current from New Inlet gradually drew eastward. The shoal was formed there by the constant meeting and separating of contrary currents. The two dredges cut a nine-foot channel with a bottom width of 100 feet, removing 95,000 cubic yards of material by May 1875.[13]

The *Woodbury* worked on Bald Head Channel in 1874 and 1875, when not engaged at the Horseshoe cut. Not well adapted to working in rough water, the dredge was able to remove, carry over the bar, and dump only 160 cubic yards per day, under good conditions. In June 1875, soundings showed a depth of 11.5 feet at low water at Bald Head, an increase of just 18 inches. But dredging and removal of obstructions were only supplemental to the principal work for the river's improvement—closing New Inlet.[14]

The Board of Engineers had said that the closure of New Inlet was "very desirable and should be attempted as soon as funds are available."[15] The first step in closing the inlet was the erection of a jetty from Federal Point on the northern side of New Inlet, following a line of shoals in a southwesterly direction. Under the supervision of Phillips, a crib-work similar to that used between Smith's and Zeke's islands, loaded with stone to the high-water level, slowly extended out into the inlet. By the time 200 linear feet had been built, a serious deepening had developed ahead of the jetty. Cribs 12 feet deep were required where originally there had been just six feet of water. In November 1873, crews sank the last crib-work in 20 feet of water, only 500 feet from the shore. Phillips decided to halt at that point to determine the effect of the work already completed.[16]

Lower Cape Fear River--area where New Inlet and Swash Defense dams would be constructed.

Henry Bacon, wearing derby and white whiskers, directed the construction of mattresses used as foundations for a rubble stone dam. New Inlet was cut by storm in 1761 and was a convenient passage for blockade runners during the Civil War. The dam closed the inlet to provide a deeper channel in the Cape Fear River, 1876.

Captain Phillips called for proposals for the construction of a foundation or apron across New Inlet. None of the bids opened on 21 June was accepted, but the proposals did provide valuable information on the views of the contractors willing to take on such a risky project. Phillips estimated the cost of closing the inlet at $300,000.[17]

The following August, new proposals were opened and the Corps of Engineers awarded the contract to Bangs & Dolby of New York, for $120,000, to build an apron across the inlet. Bangs & Dolby laid a wood, brush, and stone apron across New Inlet beginning at the end of the 500-foot deflector jetty already in place. The apron comprised a layer of round timbers one foot thick, closely tied, carrying from 8 to 12 inches of brush, and enough stone to make the apron's aggregate thickness four feet. Each section of the "mattress"—the wood-and-brush part of the apron—was 36 feet wide and 36 feet long and was floated out to the proper position and held in place by anchors. Workmen placed stone on the mattress until it sank, after which the required amount of stone was dumped on the mattress to a height of four feet. Bangs & Dolby laid the total length of the apron, 4,352 feet, between 7 October 1875 and 17 June 1876. The apron's width varied from 40 to 70 feet, with an average of 53 feet. The contractor guaranteed the work for one year.[18]

Initially, the structure showed little sign of settlement, but scouring occurred just ahead and on both sides of the apron as it was laid. The scouring formed an irregular channel parallel to the apron and three feet below the original bottom. That caused little concern, however, because sand was also accumulating over the apron, protecting it. The engineer in charge of the work at New Inlet, Henry Bacon, was satisfied with the results.[19]

Bacon, a civilian, replaced Captain Phillips on 1 February 1876. Born in Natick, Massachusetts, in 1822, Bacon had spent most of his life working on railroad construction, in particular the Illinois Central and Boston and Maine lines throughout the Midwest and New England. He moved to Smithville in January 1876 to supervise the construction of the New Inlet Dam and the dredging of the river, and to conduct surveys. He later moved to Wilmington and lived there until his death in 1891.[20]

For the completion of the portion of New Inlet Dam above high water, the Corps awarded Bangs & Dolby a contract for the delivery of 45,000 cubic yards of stone. The first load of stone, from the Magnolia Quarry on the Cape Fear, 14 miles above Wilmington, was dumped on the dam in January 1877. The dumping proceeded from both ends of the apron, working toward the middle. By June 1878, the dam had reached the low-water mark but still lacked a proper width and slope.[21]

Henry Bacon (upper right), *engineer in charge, observed workers using hand tools to uncover stone for use in building the rock dam to close New Inlet. To his right is Colonel Craighill (in civilian clothes) who directed operations in North Carolina from the Baltimore office, c. 1884.*

As the height and width of the dam increased, the scouring on each side also advanced. The overfall of the water formed channels parallel to the dam to a depth of 30 feet below low water and 8 to 12 feet below the dam's original foundation. In addition, the middle sections of the mattress began to settle. The water worked its way between and under the logs of the mattress and gradually lowered the foundation so that for nearly the entire length of the dam the base was 12 feet below low water. Little or no settlement occurred where the mattress lay 14 feet or deeper at low water. As a result of the scouring and settlement, the dam rested on a ridge with deep channels on either side.[22]

Bacon believed the scouring and subsidence left the dam in a more secure state and promised a better chance for the ultimate security and permanence of the structure. But the subsidence also required more stone riprap than had been expected. Bacon decided against widening the mattress foundation or building jetties perpendicular to the dam after crews constructed an experimental 100-foot jetty, without producing any apparent effect.

He proposed merely filling out the slopes with more stone. On the completion of the apron in June 1876, Captain Phillips had estimated that 85,000 cubic yards of stone would be required to bring the closing work to the high-water mark. In a special report in March 1878, he estimated that 62,000 cubic yards already had been placed on the dam and that an additional 80,000 cubic yards would be required to finish the work to high water.[23]

During the dam's construction, a gap had been left to enable light-draft vessels to pass in and out as they had been accustomed to doing for over a century. For "corn crackers," a fleet of small coastal schooners carrying grain to Wilmington from Albemarle Sound, the distance was 64 miles longer by way of the Bald Head mouth than by New Inlet, because of Frying Pan Shoals. The longer route was also more dangerous, forcing the corn crackers to navigate the

hazardous waters off Cape Fear. In spite of protests from the owners of vessels using New Inlet, Bacon decided he could no longer leave the dam unfinished. On 14 June 1879, the Corps of Engineers officially closed New Inlet, and Henry Nutt received the honor of being the first person to walk across it with dry feet.[24]

Once the dam was completed to the project height of two feet above high water, workmen continued to deposit riprap on the dam where it fell onto the slopes. That formed a slope of two to one on the sea side and one and one-half to one on the river side.[25]

A severe gale swept off the top of the dam to the low-water level in August 1879, demonstrating that, as previously supposed, it would be necessary to cover the dam with large stones to assure its permanence. Heavy stones were shipped to Wilmington from Columbia, South Carolina, by rail, then transferred to two large lighters built especially for the task. A steam hoist placed the rock on the dam with the assistance of two hand-worked floating derricks. Workers fitted the stones together to form a smooth surface.[26]

Bacon finished the work on New Inlet Dam in July 1881. As oysters and barnacles solidified the riprap below half tide, the completed structure appeared to be one solid rock 4,800 feet long. The central portion had an average height of 37 feet and a width at the base ranging from 75 to 120 feet. The more than 181,000 cubic yards of stone used to complete the dam was equivalent to a wall eight feet high, four feet thick, and 100 miles long. Occasionally a storm damages the structure, but only minor repairs have been necessary over the past century. The dam continues to separate the waters of the Cape Fear River from the Atlantic.[27]

Swash Defense Dam

Before Bacon and the Corps of Engineers could close New Inlet, a storm opened a breach between New Inlet and the closed Smith's-Zeke's islands swash on 13 April 1877. Because of the fears of many Wilmingtonians that a new inlet had broken through, Bacon wrote a letter, published in the *Wilmington Star*, promising that the Corps of Engineers would not allow a new inlet to develop.[28]

The first attempt to close the new breach by artificial means was made in February 1881. Bacon tried scantling and sheet piling driven by hand, but that proved inadequate. About 35 men had nearly completed the work when the tides caused a difference in level of more than 15 inches on either side. The sheet piling suddenly gave way, and all materials and labors were lost.[29]

Bacon made a second attempt to build a sturdier structure during the spring and summer of 1881. A machine with a 2,000-pound hammer drove over 400 heavy piles eight feet apart in two lines nine feet apart. An accretion of sand on the sea side, the real defense, followed the work as it progressed, and it appeared that the structure would be a success. However, a succession of storms in August and September 1881 broke through the beach on the north side of the breakwater, flanking the defense and forcing its abandonment. To save the work would require contending directly with the ocean, at enormous cost and substantial risk.[30]

Bacon recommended a line of defense extending from Zeke's Island over the shoal water, as nearly as practicable to the line of the neutral currents, thus reducing the tidal differences. After the dam's completion, Bacon anticipated the closing of the swashes by natural processes. The closure of New Inlet tended to increase the tidal currents through the swashes, preventing the natural closure that had occurred before with other swashes.[31]

Following a trip to Galveston, Texas, with Craighill to examine the Corps of Engineers' harbor improvement there, Bacon proposed a mattress similar to that used in Galveston Harbor. Composed entirely of small brush, the mattress would be strong, yet pliable enough to conform to the foundation in all conditions. Bacon hoped that settlement from overfall scouring would be prevented by a mattress of that type. The plan of operations called for a row of mattresses, 40 to 60 feet wide, to be laid along the line earlier proposed, with riprap covering the mattresses to the ordinary high-water mark.[32]

Before a crew of 40 men could complete the mattresses, a major storm, with an average wind velocity of 81 miles per hour for 24 continuous hours, opened a new swash just north of the other two and nearer New Inlet Dam. That forced Bacon to lengthen and adjust the line of mattresses. After several delays Ross and Lara, contractor for the stone, began delivering in December 1884, bringing it from a quarry on Gander Hall plantation, about 12 miles below Wilmington.[33]

The men placed the stone on the mattress to a depth of about ten feet and then waited for the structure to settle. However, the dam settled only 4 to 12 inches. The work proceeded slowly but smoothly over the next few years, hampered only by an occasional storm. By 1891, the entire 12,800 feet of the Swash Defense Dam had been finished to the proper height and width.[34]

The 1870s and 1880s were a period of transition for Wilmington shipping interests. Closing New Inlet drastically reduced the number of coastal vessels docking at Wilmington. Yet, the improvement of the river allowed increasing numbers of larger ships involved in foreign trade to use Wilmington Harbor, as the accompanying table demonstrates.

TABLE

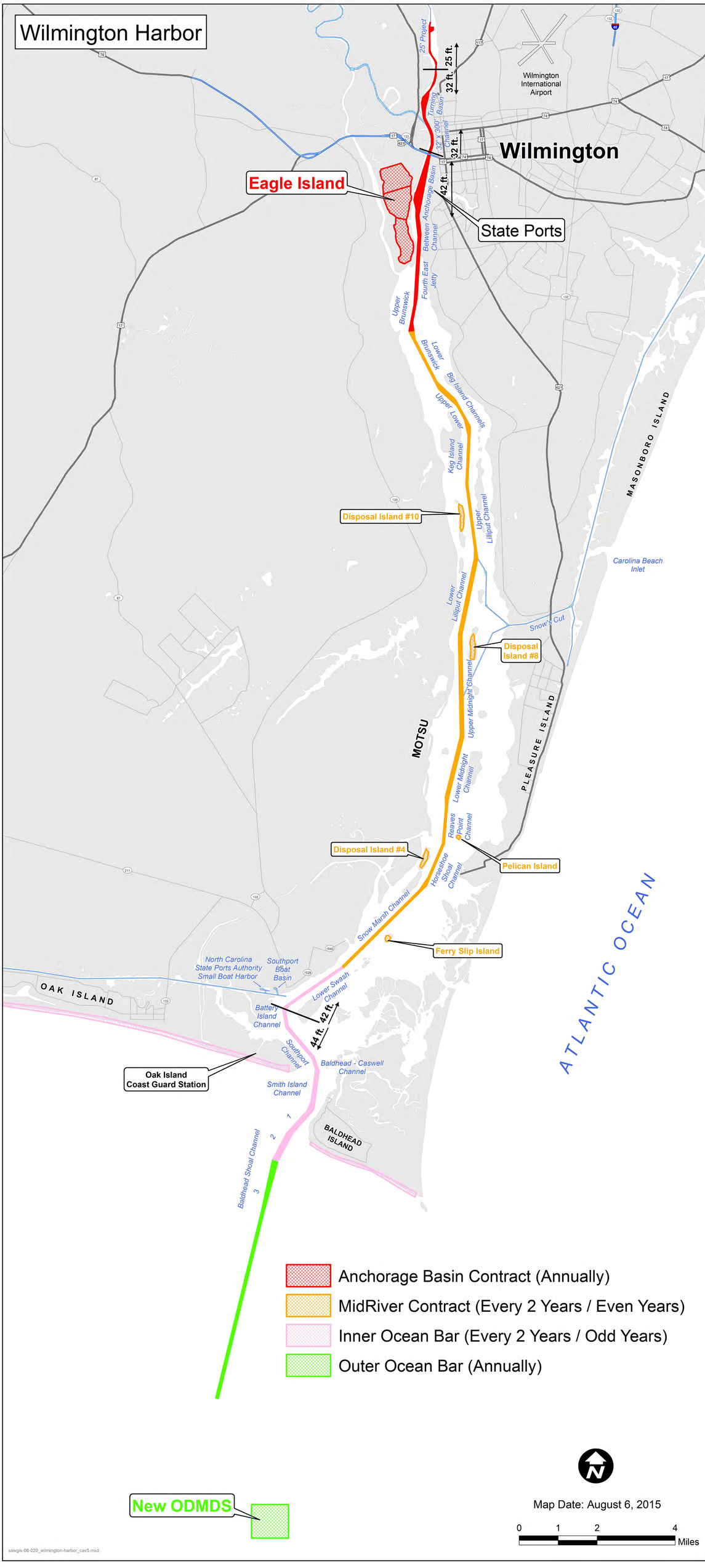
Number of Vessels Over 60 Tons Register Departing Wilmington

Year	Coastwise	Foreign
1870	532	40
1873	446	144
1880	272	316
1885	268	230

[Source: *Annual Report of the Chief of Engineers, 1885.*]

The real magnitude and difficulties of the task of building the dams were not fully appreciated at the outset. Both were much larger and more expensive than originally planned. New Inlet Dam cost $540,000 and Swash Defense Dam $226,000. (Although nearly three times longer than New Inlet Dam, Swash Defense Dam cost less because materials were available nearby, and a smaller volume of stone was used.) Both structures have served their purpose well and still protect the beach in the area. Long after they had proved their value, the Wilmington District received an award in the "Best Ever" category of the 1975 Chief of Engineers Distinguished Design Awards Program, South Atlantic Division, for the design and construction of the "Rocks."[35]

The Rocks today. In commemoration of the 200th anniversary of the U.S. Army Corps of Engineers, the 1975 Chief of Engineers Awards Program was expanded to include special recognition of an outstanding project from each division. South Atlantic Division submitted the New Inlet Dam or "The Rocks" as the best project developed in the Division's history.


Wilmington Harbor
25 Project
25 ft.
32 ft.
Turning Basin
32' Channel
32 ft.
42 ft.
Between Anchorage Basin Channel
Wilmington International Airport
Wilmington
Eagle Island
State Ports
Fourth East Jetty
Upper Brunswick
Lower Brunswick
Big Island Channels
Upper Lower
Keg Island Channel
Upper Lilliput Channel
Disposal Island #10
MASONBORO ISLAND
Carolina Beach Inlet
Lower Lilliput Channel
Snow's Cut
Disposal Island #8
Upper Midnight Channel
MOTSU
PLEASURE ISLAND
Lower Midnight Channel
Reaves Point Channel
Disposal Island #4
Pelican Island
Horseshoe Shoal Channel
Snow Marsh Channel
Ferry Slip Island
ATLANTIC OCEAN
North Carolina State Ports Authority Small Boat Harbor
Southport Boat Basin
OAK ISLAND
Lower Swash Channel
Battery Island Channel
42 ft.
44 ft.
Southport Channel
Baldhead - Caswell Channel
Oak Island Coast Guard Station
Smith Island Channel
1
2
3
Baldhead Shoal Channel
BALDHEAD ISLAND
Anchorage Basin Contract (Annually)
MidRiver Contract (Every 2 Years / Even Years)
Inner Ocean Bar (Every 2 Years / Odd Years)
Outer Ocean Bar (Annually)
New ODMDS
Map Date: August 6, 2015
0
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2
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Miles
sawgis-06-020_wilmington-harbor_cav5.mxd

US Army Corps of Engineers®

REGULATORY GUIDANCE LETTER

No. 05-08 **Date: 7 December 2005**

SUBJECT: Environmental Impact Statements – Third Party Contracting

1. Purpose and Applicability

a. **Purpose.** To issue guidance regarding the use of the third party contracts for preparing Environmental Impact Statements. This guidance consolidates elements of expired Regulatory Guidance Letters 87-05 and 88-15.

b. **Applicability.** This guidance applies to all permit applications that require preparation of an EIS.

2. General Considerations

a. **Background.** 40 CFR 1506.5(c) provides for use of third party contracts in the preparation of agency Environmental Impact Statements (EISs). In its "Forty Questions" issued in the Federal Register on 23 March 1981, CEQ indicated the term "third party contract" referred to contractors paid by the applicant but selected by the agency. 40 CFR 1506.5(c) further stipulates that the contractor must execute a disclosure statement prepared by the agency to avoid any conflict of interest. If the document is prepared under contract, the responsible agency must participate in the preparation and shall independently evaluate the statement prior to its approval. The agency must also take full responsibility for the scope and contents of the document.

Corps Headquarters (HQUSACE) issued Regulatory Guidance Letters (RGLs) 87-05 and 88-15 to address questions about applicant costs, information, and third party contracts for preparing EISs. In 1988, HQUSACE also published its *NEPA Implementation Procedures for the Regulatory Program* (Appendix B, 33 CFR 325) addressing “contracting” and information needs. More recently, in a memorandum dated 17 December 1997, to Commanders, MSCs and District Commands, Subject: *Guidance on Environmental Impact Statement Preparation, Corps Regulatory Program*, the HQUSACE Director of Civil Works established third party contractors as the primary method for EIS preparation.

b. **Practice.** While RGLs 87-05 and 88-15 have expired, HQUSACE has instructed Corps districts that the guidance provided therein remains generally valid since neither of the expired RGLs has been superseded by regulations or other RGLs. Districts currently use these expired RGLs, Appendix B, and the 1997 memorandum as guidance for third party contracting to prepare EISs.

3. Guidance.

a. Third party contracting is the primary method for preparing all or part of our project-specific EISs. Programmatic EISs may involve a third party contract; however, any decision to a programmatic EIS must be reviewed and approved by CECW-OR before a commitment is made.

b. The district will identify the required information for the EIS and specify the necessary qualifications of the third-party contractor. However, a district will not become involved in the specifics of non-federal contracting procedures. For example, a district should not review a bid list, specifying requirements for competition, or choose the actual method of procurement (i.e. bidding vs. negotiation). Using the applicant's order of preference, the district will select from the applicant's list the first contractor that is fully acceptable to the District.

c. The district will approve in writing the third-party contractor and a scope of work. Approval of the contractor and scope of work should occur before the award of the third-party contract. To avoid any conflict of interest, and before the selected third party contractor can work on the EIS, the contractor must also execute a disclosure statement, prepared by the district, specifying that the contractor has no financial or other interest in the outcome of the project.

d. The district is responsible for ensuring that the information provided by the contractor is consistent with Corps statutory requirements to take a hard, objective look at the public interest and environmental factors. The district will also take full responsibility for the scope and contents of the EIS, directing the contractor as necessary to make certain that its work is acceptable. The district will regularly participate in the preparation of the document and independently evaluate the information to ensure that it is technically adequate and not biased. The district has the final determination whether the data provided is adequate and accurate.

e. This guidance replaces RGLs 87-05 and 88-15 and is to be used in conjunction with 40 CFR 1500-1508, Appendix B of 33 of CFR 325, and the Memorandum to Commanders, MSCs and District Commands, Subject: *Guidance on Environmental Impact Statement Preparation, Corps Regulatory Program*, dated 17 December 1997.

4. Duration. This guidance remains in effect unless revised or rescinded.

for DON T. RILEY
Major General, US Army
Director of Civil Works

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

EC 1165-2-216
Change 1

CECW-CP

Circular
No. 1165-2-216

30 September 2015

EXPIRES 31 JULY 2016

Water Resource Policies and Authorities

POLICY AND PROCEDURAL GUIDANCE FOR PROCESSING REQUESTS TO ALTER US ARMY CORPS OF ENGINEERS CIVIL WORKS PROJECTS PURSUANT TO 33 USC 408

1. This Change 1 to EC 1165-2-216, 30 September 2015, revises Appendix G, "Use of Section 214 of WRDA 2000, as amended, for 33 U.S.C. 408" and references to Appendix G in the main text of the EC, to incorporate changes as a result of Section 1006 of the Water Resources Reform and Development Act of 2014 (WRRDA 2014).

2. The changed information is annotated as follows:

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8. f	19
Appendix G	G-1 through G-10

FOR THE COMMANDER:

STEVEN L. STOCKTON, P.E.
Director of Civil Works

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DEPARTMENT OF THE ARMY
US Army Corps of Engineers
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Water Resource Policies and Authorities

POLICY AND PROCEDURAL GUIDANCE FOR PROCESSING REQUESTS TO ALTER US ARMY CORPS OF ENGINEERS CIVIL WORKS PROJECTS PURSUANT TO 33 USC 408

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Water Resource Policies and Authorities

POLICY AND PROCEDURAL GUIDANCE FOR PROCESSING REQUESTS TO ALTER US ARMY CORPS OF ENGINEERS CIVIL WORKS PROJECTS PURSUANT TO 33 USC 408

1. Purpose.

a. The purpose of this Engineer Circular (EC) is to provide policy and procedural guidance for processing requests by private, public, tribal, or other federal entities, to make alterations to, or temporarily or permanently occupy or use, any US Army Corps of Engineers (USACE) federally authorized civil works project, referred to as "USACE project" within this document, pursuant to 33 USC 408 (Section 408). Proposed alterations must not be injurious to the public interest or affect the USACE project's ability to meet its authorized purpose.

b. The main body of this EC contains policy applicable to all types of Civil Works projects and an overall step-by-step procedural guide to be tailored at the district level to the appropriate level of detail for a specific Section 408 request. Supplemental guidance including additional procedural, decision-making and coordination detail related to specific infrastructure types (i.e. dams, hydropower, levee systems, channels, and navigation) can be found in Appendices B-E.

c. This EC supersedes the previous policy memoranda on this subject as identified in Appendix A.

2. Applicability. This circular is applicable to all headquarters USACE elements, divisions, districts, laboratories, and field operating activities having civil works planning, engineering, design, construction, and operations and maintenance (O&M) responsibilities. Note that for use in this EC, "district" refers to a USACE district office and "division" refers to a USACE division office. This EC applies to requests for alterations received by districts on or after the date of issuance.

3. Distribution Statement. Approved for public release; distribution is unlimited.

4. References. References for the main EC are in Appendix A.

5. Authority. The authority to grant permission for temporary or permanent alterations is contained in Section 14 of the Rivers and Harbors Act of 1899 and codified in 33 USC 408, titled *Taking possession of, use of, or injury to harbor or river improvements*, and states the following: "*It shall not be lawful for any person or persons to take possession of or make use of for any purpose, or build upon, alter, deface, destroy, move, injure, obstruct by fastening vessels*

thereto or otherwise, or in any manner whatever impair the usefulness of any sea wall, bulkhead, jetty, dike, levee, wharf, pier, or other work built by the United States, or any piece of plant, floating or otherwise, used in the construction of such work under the control of the United States, in whole or in part, for the preservation and improvement of any of its navigable waters or to prevent floods, or as boundary marks, tide gauges, surveying stations, buoys, or other established marks, nor remove for ballast or other purposes any stone or other material composing such works: Provided, That the Secretary of the Army may, on the recommendation of the Chief of Engineers, grant permission for the temporary occupation or use of any of the aforementioned public works when in his judgment such occupation or use will not be injurious to the public interest: Provided further, That the Secretary may, on the recommendation of the Chief of Engineers, grant permission for the alteration or permanent occupation or use of any of the aforementioned public works when in the judgment of the Secretary such occupation or use will not be injurious to the public interest and will not impair the usefulness of such work."

6. Policy.

a. Alteration. Section 408 authorizes the Secretary of the Army to grant permission for the alteration or occupation or use of the project if the Secretary determines that the activity will not be injurious to the public interest and will not impair the usefulness of the project. Unless otherwise stated, for ease of reference, the use of the term "alteration" in this document also includes "occupation" and "use." For purposes of this document, the words "alteration" or "alter" refers to any action by any entity other than USACE that builds upon, alters, improves, moves, occupies, or otherwise affects the usefulness, or the structural or ecological integrity, of a USACE project. Alterations also include actions approved as "encroachments" pursuant to 33 CFR 208.10.

b. Other Authorizations. A requester has the responsibility to acquire all other permissions or authorizations required by federal, state, and local laws or regulations, including any required permits from the USACE Regulatory Program (Section 10/404/103 permits). In addition, an approval under Section 408 does not grant any property rights or exclusive privileges.

c. Alterations within Project Boundaries. This EC only applies to alterations proposed within the lands and real property interests identified and acquired for the USACE project and to lands available for USACE projects under the navigation servitude.

d. Requesters. A request for Section 408 permission can originate from a non-federal sponsor or an independent requester. For USACE projects with a non-federal sponsor as described in paragraph 6.e., the requester must either be the non-federal sponsor or have the endorsement of the non-federal sponsor prior to a written request, reference paragraph 7.c.(2), being submitted to USACE.

e. Non-Federal Sponsors. The district will provide a hardcopy or electronic copy of this EC to each non-federal sponsor described below:

(1) A non-federal sponsor that has provided assurances pursuant to Section 3 of the Flood Control Act of 1936, as amended (33 USC 701c), or Section 221 of the Flood Control Act of 1970, as amended (42 USC 1962d-5b), is responsible for ensuring that a USACE project is operated and maintained in accordance with requirements prescribed by USACE. Any proposed alteration that would require permission from USACE under Section 408 must be requested by or come through the non-federal sponsor. Accordingly, for improvements, excavations, construction, or changes to local flood protection works referenced in 33 CFR 208.10(a)(4) and (5), approval from USACE under Section 408 (and in accordance to procedures in this EC) must be obtained by the non-federal sponsor. If a USACE project has multiple non-federal sponsors in this category, concurrence in writing must be obtained by all non-federal sponsors prior to USACE approval of a Section 408 request.

(2) For USACE projects that were constructed in whole or in part pursuant to a cost-share agreement with a non-federal sponsor, but are operated and maintained by USACE, the district will obtain written concurrence by each of the non-federal sponsors for the proposed alteration prior to USACE approval of a Section 408 request.

(3) For requested alterations located in inland and intracoastal waterways, the district will issue a public notice to notify users of the waterways, navigation stakeholders, and other interested parties as the district deems appropriate.

f. Routine Operations and Maintenance Activities. Routine operations and maintenance (O&M) activities specified in the O&M manual and performed by the non-federal sponsor or USACE do not require permission from USACE under Section 408.

g. USACE Shoreline Management and Master Planning Programs. Activities contained in 36 CFR 327 do not require review for purposes of Section 408. The processes in 36 CFR 327 ensure that the requested activity will not be injurious to the public interest and will not impair the usefulness of the project. Engineer Regulation (ER) and Engineer Pamphlet (EP) 1130-2-550, Chapter 3, provides the procedures for the USACE Master Plan Program. ER 1130-2-406 provides the procedures for the USACE Shoreline Management Program.

h. Real Estate Outgrants.

(1) Real Estate outgrants are defined in ER 405-1-12, Chapter 8, or subsequent regulation.

(2) Outgrants issued to implement an approved Project Master Plan, including the Shoreline Management Plan or Operational Management Plan, do not require review for purposes of Section 408. See ER/EP 1130-2-550, Chapter 3.

(3) Outgrants issued pursuant to the procedures in ER/EP 1130-2-550, Chapters 16 or 17 ensure the requested alteration in the outgrant request will not be injurious to the public interest and will not impair the usefulness of the project; thus, meeting the intent of Section 408.

However, the USACE team evaluating the outgrant requests involving an alteration to project structures and projects as discussed in Appendices B – E of this EC must consider the additional criteria and factors discussed in those appendices. In addition, the team evaluating outgrant requests will determine if HQUSACE review is required by following the process described in paragraph 6.t. of this EC. If the determination is that HQUSACE review is required, then the outgrant request will require a documented Section 408 decision in accordance with this EC. When a Section 408 decision is required, the Real Estate Contracting Officer will not issue such outgrant unless the appropriate USACE decision maker with delegated authority grants permission for the alteration pursuant to Section 408. Any special conditions included pursuant to Section 408 must be included in the outgrant. If HQUSACE review is not required, then districts may follow procedures in ER/EP 1130-2-550, Chapters 16 or 17 for issuing the outgrant decision.

(4) Outgrant requests not included in ER/EP 1130-2-550, Chapters 16 or 17 require a Section 408 determination in accordance with this EC. The Real Estate Contracting Officer will not issue such outgrant unless the appropriate USACE decision maker with delegated authority grants permission for the proposed alteration pursuant to Section 408. Any conditions included in the grant of permission pursuant to Section 408 must be included in the outgrant.

i. Previously Approved Alterations. All previous approvals granted for alterations, including “encroachments” approved pursuant to 33 CFR 208.10 prior to the date of this EC are not invalidated by this EC.

j. Unauthorized Alterations. The policy of USACE is to pursue enforcement and correction of unauthorized alterations of covered projects. If an unauthorized alteration is discovered, the district, after consulting with the Offices of Counsel and Real Estate, should take the appropriate steps to remedy the unauthorized alteration. The Chief of Regulatory should be notified of any unauthorized alterations so the appropriate course of action can be taken with respect to Section 10/404/103 permits. Specific enforcement steps the district takes will depend on the particular nature of the unauthorized alteration and whether the unauthorized alteration is located on project boundaries where a non-federal sponsor holds the land rights for operations and maintenance. Non-federal sponsors with operations and maintenance responsibilities for the USACE project, reference paragraph 6.e.(1), remain responsible for ensuring no unauthorized alterations are occurring within the project boundaries.

k. Authorized Project Purpose. No granting of permission is allowed under Section 408 for a proposed alteration that would have an effect of deauthorizing a project or eliminating an authorized project purpose.

l. Completeness. Requests must be for complete alterations. A proposed alteration is considered complete if it results in a fully functional element once construction is completed.

m. Design and Construction Standards. A proposed alteration pursuant to Section 408 must meet current USACE design and construction standards. However a requester is not required to bring those portions or features of the existing USACE project that are not impacted by the alteration up to current USACE design standards.

n. Hydrologic and Hydraulics Impacts. As a general rule, proposed alterations that will result in substantial adverse changes in water surface profiles will not be approved.

o. Type I Independent External Peer Review (IEPR). Per EC 1165-2-214, because Section 408 requests are not planning studies, Type I IEPRs are not required.

p. Regulatory Program Coordination.

(1) The granting or denial of permission pursuant to Section 408 is not a permit action handled by the Regulatory Program.

(2) If a proposed alteration also requires authorization pursuant to Section 10 of the Rivers and Harbors Act of 1899, Section 404 of the Clean Water Act, and/or Section 103 of the Marine Protection, Research, and Sanctuaries Act of 1972 (Section 10/404/103), district Regulatory and Section 408 personnel must coordinate throughout their respective evaluations.

(3) The decision on a Department of the Army permit application pursuant to Section 10/404/103 cannot and will not be rendered prior to the decision on the Section 408 request.

(4) Regulatory funds can only be used for a Section 10/404/103 action, which may include those actions with an associated Section 408 request. Regulatory staff can use Regulatory funds to participate in joint meetings and internally coordinate portions of shared documents when a Section 408 request also requires a Section 10/404/103 action. Regulatory funds cannot be used to develop or coordinate any components of the Section 408 request independent of a Section 10/404/103 action.

(5) Processing Department of the Army permit applications pursuant to Sections 10/404/103 will be accomplished in accordance with current regulations and guidance.

(6) In cases when a Section 408 request requires division or HQUSACE coordination and/or review, no Section 10/404/103 permit decision documentation will be forwarded to the division or HQUSACE in order to preserve the independent decision-making authority of the District and Division Commanders. The district, however, should ensure that the Section 408 documentation clearly articulates if Section 10/404/103 authorization is required.

q. In-kind Contribution Credit under Section 221 of the Flood Control Act of 1970, as amended (Section 221).

(1) Alterations of a USACE Project with an Ongoing Feasibility Study. There may be cases where a non-federal sponsor wishes to undertake alterations to an existing USACE project for which there is an ongoing USACE feasibility study and seek credit eligibility for those alterations toward its cost share for the not-yet authorized USACE project (under Section 221 of the Flood Control Act of 1970). In such cases, any proposed alteration for which the non-federal sponsor is seeking credit cannot be initiated until the draft feasibility report is released for public review, an in-kind memorandum of understanding (MOU) for the work is executed, and Section 408 permission is issued. Additional authorizations, such as those required pursuant to Section 10/404/103 under the USACE Regulatory Program, may also be required before the non-federal sponsor can initiate any work.

(2) In Kind Contributions for an Authorized USACE Project. In those cases where a non-federal sponsor is undertaking work as an in-kind contribution on an authorized USACE project pursuant to an executed project partnership agreement that provides credit for such work, Section 408 permission is not required.

(3) Detailed guidance on crediting can be found in ER 1165-2-208.

r. Sharing of Sensitive Information. Requesters seeking sensitive information about an existing USACE project to develop a proposed alteration will submit requests for that information in writing. Sensitive information includes information that could pose a security risk or aid those intending to do harm to a USACE project. Examples include but are not limited to design analyses, as-builts or other drawings, specifications, location of deficiencies, operational information, and contingency plans. The office that generated or is responsible for the information requested will review the request in coordination with the district operational security officer, to determine whether it is sensitive. Districts should limit the distribution of sensitive information to only the information that is necessary for the proposed alteration. Districts will advise requesters that the information to be provided is sensitive and direct requesters to provide a list of individuals with whom the information will be shared. Districts will advise requesters that the sensitive information will not be shared with individuals not on the list. Reviewers should work with their District Office of Counsel to determine if a non-disclosure statement is needed. Districts may in some cases have to withhold sensitive information regardless of its necessity for the development of a proposed alteration. Requests for data submitted to USACE by other agencies will not be provided and will be referred to the other agency for a release determination.

s. Categorical Permission. The district, division, and/or HQUSACE have the ability to create a categorical permission for Section 408 that would cover potential alterations that are similar in nature and that have similar impacts. Categorical permissions should be established by providing public notice of the activities covered by the categorical permission. There should be appropriate documentation and analysis developed to determine that the impacts of activities covered by the categorical permission are permissible and that environmental compliance for those activities has been met. Once established, a simplified process to validate application of

the categorical permission and specify any special conditions that may apply on a site-specific basis may be used.

t. Section 408 Decision Level. Certain proposed alterations, once recommended by the district and division, will require a final decision by the Director of Civil Works at HQUSACE. All other decisions on proposed alterations may be rendered by the District Commander unless a Division Commander establishes a regional process that requires that the decision be made by the Division Commander. If the answer to any of the following questions is "yes" and the district and division recommend approval, then the Section 408 request requires HQUSACE level review and decision, reference paragraph 7.c.(7):

(1) Does the proposed alteration require a Type II IEPR, reference EC 1165-2-214?

(2) Does the proposed alteration require an Environmental Impact Statement (EIS) in which USACE is the lead agency?

(3) Does the proposed alteration change how the USACE project will meet its authorized purpose? An example would be a proposed alteration to permanently breach a levee system for ecosystem restoration purposes but raise all structures behind the levee to achieve the same flood risk management benefits. This project still meets the authorized flood risk management purpose, but in a different manner.

(4) Does the proposed alteration preclude or negatively impact alternatives for a current General Investigation (GI) or other study?

(5) Is the non-federal sponsor for a USACE project proposing to undertake the alteration as in-kind contributions eligible for credit under Section 221 of Flood Control Act of 1970, as amended?

(6) Is the proposed alteration for installation of hydropower facilities?

(7) Is there a desire for USACE to assume operations and maintenance responsibilities of the proposed navigation alternation pursuant to Section 204(f) of Water Resources Development Act (WRDA) of 1986?

If the district is unsure, the district should engage the division and HQUSACE, reference Paragraph 9 of this EC, Vertical Teaming.

7. Procedures.

a. District Section 408 Coordinator. The District Commander will designate a Section 408 Coordinator responsible for ensuring processes in this EC are met and to ensure the proper coordination occurs among all the necessary district elements, including but not limited to,

regulatory, real estate, counsel, planning, engineering, programs and project management, and/or operations. The Section 408 Coordinator will also ensure proper coordination among other districts if the USACE project crosses more than one district's area of responsibility. In addition the Section 408 Coordinator will track district expenditures, including funding provided by any non-federal interests, for processing Section 408 requests on a fiscal year basis by funding source.

b. Description. In order to grant permission under Section 408, USACE must determine that the proposed alteration does not impair the usefulness of the USACE project, which includes retaining the project's authorized purpose, and is not injurious to the public interest. Because proposed alterations vary in size, level of complexity, and potential impacts, the procedures and required information to make such a determination are intended to be scalable. Based on the proposed alteration, districts will determine data, analyses and documentation necessary in order to make a determination regarding whether or not the proposed alteration does not impair the usefulness of the project and is not injurious to the public interest. Requirements for data, analyses and documentation may be subject to change as additional information about the Section 408 proposal is developed and reviewed.

c. Step-by-Step Procedures. The procedures have been grouped into nine steps: pre-coordination, written request, required documentation (including environmental compliance, if applicable), district-led Agency Technical Review (ATR), Summary of Findings, division review, HQUSACE review, notification, and post-permission oversight. Not all the steps will be applicable to every Section 408 request. In simple cases, steps may be combined or occur simultaneously. For more complex cases, there may be the need for extensive coordination between the district and requester throughout the process. Supplemental information for these steps specific to dams and reservoirs, hydropower, levees and floodwalls, flood risk management channels, and navigation can be found in the appendix appropriate to the type of infrastructure (Appendices B-E). At any time in the process if the district determines that the requirements will not or cannot be met, the district may deny the request prior to completing all the required steps. If a request is denied, the requester will be advised in writing as to the reasons for denial.

(1) Step 1: Pre-Coordination. Early coordination between USACE, the requester and/or non-federal sponsor, if applicable, is strongly recommended because it will aid in identifying potential issues, focusing efforts, minimizing costs, and protecting sensitive information. Districts shall ensure requesters are provided a hardcopy or electronic copy of this EC.

(2) Step 2: Written Request. The purpose of this step is to document the initiation of the Section 408 process. Information from this step will be used by the district to determine documentation and approval requirements.

(a) All requests for Section 408 permission must be submitted in writing to the District Commander of the appropriate USACE district office having jurisdiction over the USACE

project that would be impacted by the alteration. Each district has the flexibility to determine the format in which this written request is submitted; however,

(b) The written request must include:

i. a complete description of the proposed alteration including necessary drawings, sketches, maps, and plans that are sufficient for the district to make a preliminary determination as to the location, purpose and need, anticipated construction schedule, and level of technical documentation needed to inform its evaluation. Detailed engineering plans and specifications are not required at Step 2, but could be submitted at the same time if available;

ii. a written statement regarding whether the requester is also pursuing authorization pursuant to Sections 10/404/103 and, if so, the date or anticipated date of application/pre-construction notification submittal;

iii. information regarding whether credit under Section 221of the Flood Control Act of 1970, as amended, or other law or whether approval under Section 204(f) of WRDA 1986 is being or will be sought;

iv. a written statement of whether the requester will require the use of federally-owned real property or property owned by the non-federal sponsor; and,

v. a written statement from the non-federal sponsor endorsing the proposed alternation, if applicable.

(3) Step 3: Required Documentation. The purpose of this step is to outline the documentation necessary for the district to determine whether the proposed alteration would impair the usefulness of the project or be injurious to the public interest. The list below is meant to provide an overview of the general requirements, but requirements are scalable to the nature of the proposed alteration.

(a) Technical Analysis and Design. The district should work closely with the requester to determine the specific level of detail necessary to make a decision for a particular alteration request. The minimum level of detail will be 60% complete plans and specifications and supporting technical analysis.

(b) Hydrologic and Hydraulics System Performance Analysis. The purpose of a hydrologic and hydraulics system performance analysis is to determine the potential hydrologic and hydraulics impacts of proposed alterations. Districts will determine if such an analysis is needed and, if so, the appropriate scope of analysis based on the complexity of the proposed alteration. The requester will be responsible for the analysis. Hydrologic and hydraulic system performance analyses will be applied to alterations that alter the hydrologic and/or hydraulic conditions (e.g., reservoir operations, bridge constrictions, hydropower installation, etc.) See Appendix F for

more details regarding the requirements of a hydrologic and hydraulics system performance analysis.

(c) Environmental Compliance.

i. A decision on a Section 408 request is a federal action, and therefore subject to the National Environmental Policy Act (NEPA) and other environmental compliance requirements. While ensuring compliance is the responsibility of USACE, the requester is responsible for providing all information that the district identifies as necessary to satisfy all applicable federal laws, executive orders, regulations, policies, and ordinances. NEPA and other analysis completed to comply with other environmental statutes (e.g. Endangered Species Act) should be commensurate with the scale and potential effects of the activity that would alter the USACE project. The district will work with the requester to determine the requirements, which will be scaled to the likely impacts of the proposed alteration and should convey the relevant considerations and impacts in a concise and effective manner.

ii. The NEPA compliance process should be completed in an efficient, effective and timely manner consistent with guidance issued by the Council on Environmental Quality on March 6, 2012 entitled *Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act.* NEPA compliance should follow the process set forth in 40 CFR Parts 1500-1508 and the USACE civil works NEPA implementing regulations found in 33 CFR Part 230. Documentation for Section 408 requests do not require the same level of analysis or documentation needed for planning studies and, therefore, Appendix A and other portions of Part 230 specific to planning studies do not apply. However, in some cases, documentation from studies may be used to inform a Section 408 decision, such as a report that would be required for Section 204(f) of the Water Resources Development Act of 1986.

iii. For any final Environmental Impact Statement (EIS) or Environmental Assessment (EA) or other environmental compliance document, the requester's proposal will be identified as the "requester's preferred alternative."

iv. USACE has jurisdiction under Section 408 only over the specific activities or portions of activities that have the potential to alter a USACE project. Therefore, if a proposed alteration is part of a larger project (and/or its associated features) that extends beyond the USACE project boundaries, the district should determine what portions or features of the larger project USACE has sufficient control and responsibility over to warrant their inclusion in the USACE environmental review. The scope of analysis for the NEPA and environmental compliance evaluations for the Section 408 review should be limited to the area of the alteration and those adjacent areas that are directly or indirectly affected by the alteration. For example, a pipeline can extend for many miles on either side of the USACE project boundary. In this example, the scope of analysis would likely be limited to the effects of the pipeline within the USACE project boundary, but would not address those portions of the pipeline beyond the USACE project boundary. In contrast, a proposal to alter a levee system might require USACE to examine that

proposal's potential effects on the reliability of the levee system to provide flood risk reduction to the area behind the levee system itself. As a general rule, if there are features of a larger project occurring outside of the USACE project boundaries that are so intimately connected to the features of the larger project altering a USACE project that they cannot be meaningfully distinguished (e.g., a setback levee that is located outside of the original project boundary of the levee being replaced), the USACE Section 408 NEPA document should be broad enough to address all those effects. Generally, elements of the larger project that are not intimately connected to the features that would alter the USACE project (e.g., concessions being constructed off USACE property by the same entity requesting permission to construct boat access to a USACE reservoir) should not be included in the USACE environmental review.

v. Only reasonable alternatives need to be considered in detail, as discussed in the CEQ NEPA regulations at 40 CFR Part 1502.14. Reasonable alternatives must be those that are feasible, and such feasibility must focus on the accomplishment of the underlying purpose and need (of the requester) that would be satisfied by the proposed federal action (granting of permission for the alteration). For Section 408 requests, reasonable alternatives should focus on two scenarios: 1) no action (i.e., no proposed alteration in place) and 2) action (i.e. proposed alteration in place). Thus, examination of alternative forms of a proposed alteration that the requester has not proposed should only be included to the extent necessary to allow a complete and objective evaluation of the public interest and informed decision regarding the alteration request.

vi. Districts must make diligent efforts to involve the public in the decision-making process, including soliciting appropriate information from the public to inform the environmental analysis and public interest determination. For the purposes of Section 408 requests that are expected to have less than a significant effect on the human or natural environment, a public notice soliciting input will serve as the method of advising all interested parties of the proposed alteration for which permission is sought and by which information necessary to inform USACE's evaluation and review is solicited. As such, this public notice must be circulated to the public as early in the evaluation of a proposed alteration as possible to generate meaningful public and agency input to inform the evaluation and decision-making processes. Generally, Section 408 EAs should not be circulated for public comment. In circumstances where a proposed alteration is associated with a current study or other uncommon circumstances, the decision to circulate the Section 408 component of that EA will be approved by the Division Commander or the Division Commander's designee. Any decision to circulate an EA/Finding of No Significant Impact (FONSI) for a Section 408 request that also requires a Section 10/404/103 permit decision must be coordinated with the Regulatory Program to ensure that only information pertinent to non-Regulatory Program matters is included in the documented to be circulated.

vii. A number of categorical exclusions that allow completion of the NEPA process in an efficient manner for those activities that individually and cumulatively would not result in significant effects on the environment are included in 33 CFR 230.9. For example, categorical exclusions in 33 CFR 230.9(b) and (i) may have applicability to some of the smaller scale

activities that may be encountered under Section 408. Real estate grants for rights-of-way as referenced in 33 CFR 230.9(i) should be broadly interpreted to include grants of rights-of-way by either USACE or the non-federal sponsor. A categorical exclusion may be used for Section 408, provided that care is taken to ensure that the proposed alteration is within the intended scope of the specific categorical exclusion used and extraordinary circumstances that may require the preparation of an EIS or EA have been taken into consideration. It is recommended that the applicability and use of the categorical exclusion be documented in accordance with recent CEQ guidance, *Establishing, Applying and Revising Categorical Exclusions under the National Environmental Policy Act.*

viii. The district should use, to the extent possible, any NEPA documentation that may already exist for the federal project. In some cases NEPA documentation has already been completed through an existing or ongoing civil works study. The districts should use the information to the extent feasible and supplement the existing information as needed.

ix. If the proposed alteration is covered by an EIS in which USACE is a cooperating agency, the district may adopt or supplement that EIS and develop a Record of Decision (ROD) that is specific to the proposed alteration. For hydropower alterations, USACE and FERC have entered into an MOU for meeting NEPA requirements (see Appendix C).

(d) Real Estate Requirements. A list of all real property interests required to support the proposed alteration must be provided, including those in federally managed lands and those owned by the requester. If a non-standard estate is proposed, the district must follow the normal approval requirements outlined in EC 405-1-11 and Chapter 12, ER 405-1-12 or subsequent regulation. Maps clearly depicting both existing real estate rights and the additional real estate required must also be provided. If the lands are under the control of the Army, the applicant will work with the district to determine lands impacted. Additional information may be needed. If it is determined that an outgrant of Army land is required, a *Report of Availability and Determination of Availability* must be completed by the district in accordance with AR 405-80 and Chapter 8, ER 405-1-12 or subsequent regulation.

(e) Discussion of Executive Order 11988 Considerations. The district may require the requester to submit sufficient data in order that the district may conduct its analysis in accordance with ER 1165-2-26 to ensure that the proposed alteration is compliant with EO 11988. The request should be assessed as to whether there would be induced development in the floodplain as a result of the proposed alteration and address the positive and negative impacts to the natural floodplain functions.

(f) Requester Review Plan Requirement. The district has the flexibility to decide whether or not the requester must prepare a review plan for the alteration for district approval. A review plan is required when a Type II Independent External Peer Review (IEPR) is required. If the district determines, by following procedures in EC 1165-2-214, a Type II IEPR is required, then at minimum the requester is required to submit a Type II IEPR review plan. The Risk

Management Center (RMC) will be the Review Management Organization (RMO) and is required to endorse in writing all review plans for Type II IEPRs to ensure that the review plans reflect a level of review commensurate with the scope and scale of the proposed alterations. All requester-generated review plans for Type II IEPRs will be approved by the Division Commander.

(g) Operations and Maintenance. Requesters must identify any operations and maintenance requirements needed throughout the life of the proposed alteration and the responsible entity for the operations and maintenance into the future. For instances when there may be a desire for USACE to assume or incorporate operations and maintenance of the proposed alteration as part of its responsibilities for the USACE project being modified, a justification must be provided. See Appendix E for federal assumption of maintenance associated with navigation features. Any alteration to a project operated and maintained by a non-federal sponsor and for which an update to the operations and maintenance manual is required, the non-federal sponsor will provide USACE with sufficient information to update the O&M manual. The modified O&M manual will be subject to environmental compliance in the same manner as the requested alteration. The non-federal sponsor will acknowledge in writing their continued responsibility to operate, maintain, repair, rehabilitate and replace the USACE project at no cost to the government and will hold and save the government free from all damages arising from construction, operation, maintenance, repair, rehabilitation, and replacement of the project.

(h) Other Information. Based on the alteration request, the district may require the requester to provide additional information to complete its evaluation.

(4) Step 4: District-Led Agency Technical Review.

(a) District Review Plans. The purpose of the district review plans is to define the requirements, procedures, and specific details of how the district-led Agency Technical Review (ATR) will be conducted for Section 408 proposals. In addition, district decisions about required documentation, Type II IEPRs and approval level should be documented in the review plans. Districts have the option to develop an overarching review plan, called a Procedural Review Plan, that establishes the review procedures to be used for Section 408 requests similar in nature and that have similar impacts. Procedural Review Plans must be endorsed in writing by the Risk Management Center and approved by the Division Commander. Otherwise, the district will develop an alteration-specific review plan to be approved by the Division Commander.

(b) District-led Agency Technical Review. For the purposes of Section 408, the purpose of a district-led ATR is to determine if requirements set forth in this EC have been met. Reviewers can be from the home district. If lacking the appropriate expertise, the district should supplement their staff with outside subject matter experts through appropriate communities of practice, centers of expertise, or other offices. Review teams should be comprised of reviewers with the appropriate independence and expertise to conduct a comprehensive review in a manner commensurate with the complexity of the Section 408 proposal. It should be noted, DrChecks

can be used for Section 408 ATRs, but it is not required. The ATR team will make the following determinations:

i. Impair the Usefulness of the Project Determination. The objective of this determination is to ensure that the proposed alteration will not limit the ability of the project to function as authorized and will not compromise or change any authorized project conditions, purposes or outputs. All appropriate technical analyses including geotechnical, structural, hydraulic and hydrologic, real estate, and operations and maintenance requirements, must be conducted and the technical adequacy of the design must be reviewed. If at any time it is concluded that the usefulness of the authorized project will be negatively impacted, any further evaluation under 33 USC 408 should be terminated.

ii. Injurious to the Public Interest Determination. Proposed alterations will be reviewed to determine the probable impacts, including cumulative impacts, on the public interest. Evaluation of the probable impacts that the proposed alteration to the USACE project may have on the public interest requires a careful weighing of all those factors that are relevant in each particular case. The benefits that reasonably may be expected to accrue from the proposal must be compared against its reasonably foreseeable detriments. The decision whether to approve an alteration will be determined by the consideration of whether benefits are commensurate with risks. If the potential detriments are found to outweigh the potential benefits, then it may be determined that the proposed alteration is injurious to the public interest. This determination is not the same as the "contrary to the public interest determination" that is undertaken pursuant to Sections 10/404/103. Factors that may be relevant to the public interest depend upon the type of USACE project being altered and may include, but are not limited to, such things as conservation, economic development, historic properties, cultural resources, environmental impacts, water supply, water quality, flood hazards, floodplains, residual risk, induced damages, navigation, shore erosion or accretion, and recreation. This evaluation should consider information received from the interested parties, including tribes, agencies, and the public.

iii. Legal and Policy Compliance Determination. A determination will be made as to whether the proposal meets all legal and policy requirements. District Office of Counsel concurrence is required. The compliance determination for any Section 10/404/103 permit decision associated with the proposed alteration is separate from and will not be included in this compliance determination.

(5) Step 5: Summary of Findings. Upon completion of the district ATR and demonstration of environmental compliance, the district will develop a Summary of Findings (content and format scalable to the alteration) to summarize the district rationale and conclusions for recommending approval or denial. The Summary of Findings will serve as the basis for the final decision on the proposed alteration. If the district determines that HQUSACE approval is required, the district will submit the Summary of Findings to the division for review. The Summary of Findings will be signed by the District Commander (or designee) and contain the following, if applicable:

(a) Summary of rationale and conclusions for recommending approval or denial;

(b) Written request;

(c) A physical and functional description of the existing project, including a map;

(d) Project history and authorization;

(e) Impact to the usefulness of the USACE project determination;

(f) Injurious to the public interest determination;

(g) Policy Compliance certification;

(h) Certification of Legal Sufficiency from District Office of Counsel;

(i) Certification by the Chief of the District Real Estate Division that the real estate documentation is adequate;

(j) A description of any related, ongoing USACE studies (if applicable), including how the proposed alteration may impact those studies;

(k) Summary of any changes to the O&M manual. If the district has determined that USACE would assume O&M responsibilities as part of its responsibilities for the USACE project, include the rationale and any anticipated increase in USACE O&M costs.

(l) Summary of any changes to a project partnership agreement (PPA) or local cooperation agreement (if applicable);

(m) Applicable environmental compliance documentation including but not limited to NEPA documentation, Endangered Species Act (ESA) documentation, and other necessary documentation;

(n) Finding of No Significant Impact (FONSI) or Record of Decision (ROD) (These will be signed concurrently with the Section 408 decision. If HQUSACE approval is required, these will be draft and will be signed by the Director of Civil Works);

(o) Summary of the acceptance and use of funds pursuant to Section 214 *or Section 139(j)*, if applicable, as outlined in Appendix G; and,

(p) Any additional final conclusions or information, including any associated controversial issues.

(6) Step 6: Division Review (if required).

(a) Upon receipt of the district prepared Summary of Findings for HQUSACE review and decision, the division will review the submittal and provide comments to the district within 30 days unless the division notifies the district that additional review time is needed. The division will review the Summary of Findings for policy compliance and legal sufficiency; quality assurance and completeness; identification of conflicts with ongoing studies; and confirmation of the need for HQUSACE review and decision. The district is responsible for addressing division comments prior to submission to HQUSACE. The timeline required to address comments may vary depending on significance of the division comments. If the division decides the district may approve the Section 408, that rationale should be documented as part of the administrative record.

(b) The Division Commander will either deny the Section 408 request or recommend approval to HQUSACE. If the division denies the request, this decision will be transmitted to the district. If the division recommends approval, the division will forward an electronic copy of the Summary of Findings and the Division Commander's recommendation to the appropriate HQUSACE Regional Integration Team (RIT). This may be forwarded to HQUSACE during the publication period of the final EIS (if an EIS is required for the alteration).

(7) Step 7: HQUSACE Review (if required).

(a) Upon receipt of the Section 408 submittal from the division, the RIT will forward the Summary of Findings and division recommendation to the HQUSACE Office of Water Project Review (CECW-PC) for a policy compliance review. The RIT will ensure that the appropriate reviewers include engineering and other appropriate subject matter experts such as navigation, levee safety, dam safety, real estate and environmental. HQUSACE will review and provide comments within 30 days, unless HQUSACE notifies the division that additional review time is needed. The timeline required to address comments will vary depending on significance of the HQUSACE comments. The RIT will coordinate the results, as needed, to correct or improve the package as necessary to address concerns. The district is responsible for addressing HQUSACE comments or coordinating with the requester for comment resolution.

(b) The RIT will draft the final HQUSACE decision memorandum for the Director of Civil Work's signature.

(c) If the Summary of Findings contains a draft FONSI, the Director of Civil Works will sign the FONSI concurrently with the Section 408 decision, if permission is granted.

(d) If the Summary of Findings contains a draft ROD, HQUSACE will not finalize the Section 408 decision sooner than 30 days after the publication of the final EIS and the district has transmitted an updated draft ROD. HQUSACE will finalize the ROD concurrently with the Section 408 decision.

(e) The RIT will provide the final HQUSACE decision memorandum and signed FONSI or ROD, if applicable, to the division that will in turn provide the decision to the district.

(8) Step 8: Notification. The District Commander is responsible for providing a written notification to the requester for all Section 408 requests, regardless of the decision level. Appendix H contains an example letter.

(a) If the final decision is to deny the request, the requester will be advised in writing as to the reason(s) for denial.

(b) If the final decision is to approve the request, the District Commander will provide a written approval document. In situations where the district also is evaluating a Section 10/404/103 permit application, the district may forward the Section 408 decision letter with the Section 10/404/103 permit decision, once it is made. For cases involving a categorical permission, the written approval will be validation that the categorical permission is applicable.

(c) Special Conditions. For approved alterations, the District Engineer may include special conditions. Examples of special conditions may include:

i. The requester must obtain approval by the district of 100% plans and specifications prior to construction.

ii. The requester must have both the Section 408 permission and appropriate real estate document prior to construction.

iii. The requester must obtain the appropriate Section 10/404/103 permits prior to construction.

iv. The requester must be responsible for implementing any requirements for mitigation, reasonable and prudent alternatives, or other conditions or requirements imposed as a result of environmental compliance.

v. Note, in the event of any deficiency in the design or construction of the requested activity, the requestor is solely responsible for the remedial corrective action, and any permission granted under Section 408 should explicitly state this responsibility.

(9) Step 9: Post-Permission Oversight.

(a) Construction oversight. The district should develop procedures for monitoring construction activities. The purpose is to ensure the Section 408 permittee is constructing the alteration in accordance with the permission conditions. Any concerns regarding construction should be directed to the Section 408 permittee (and the non-federal sponsor if the Section 408

permittee is not the non-federal sponsor) for resolution. Oversight should be commensurate with the level of complexity of the alteration.

(b) As-builts. Drawings showing alterations as finally constructed will be furnished by the Section 408 permittee to the district after completion of the work. As-builts must be provided within 180 days of construction completion.

(c) Operations and Maintenance (O&M) Manual Updates. The Section 408 permittee and/or non-federal sponsor is required to provide the district with sufficient information to update the O&M manual, as required. O&M manual updates may range from simple removal and replacement of paragraphs or entirely new manuals depending on the scope and complexity of the alteration. The district is responsible for reviewing and approving or developing any updates needed to the O&M manual as a result of the alteration. At a minimum, the update should include a description of the new features, reference to the Section 408 approvals, as-builts, and instructions regarding O&M of any new features not included in the existing manual. Reference ER 1110-2-401 or ER 1130-2-500 for information on O&M manuals.

(d) Post Construction Closeout. Post construction closeout requires an on-site inspection of the completed alteration. The district may coordinate post construction closeout with the other federal, state or local agency. Where projects require an update to the O&M manual or PPA, the USACE district must conduct the post construction inspection and provide notification to the applicant and non-federal sponsor regarding acceptance or any corrective actions that are required. Notification that the alteration was constructed in accordance with the permit conditions must include a copy of the updated O&M manual.

(e) Administrative Record. The district will keep an administrative record for each Section 408 proposal. The administrative record should include all documents and materials directly or indirectly considered by the decision maker and should be ordered chronologically. It should include documents, materials, and a record of the offices and staff that are pertinent to the merits of the decision, as well as those that are relevant to the decision-making process.

8. Funding. Potential available sources of funds for review activities include:

a. Applicable project-specific appropriated funds in investigations, construction, operations and maintenance, or flood control - Mississippi River and Tributaries may be used for Section 408 reviews that are specific to the applicable project. Vertical team concurrence through division and HQUSACE RIT must be obtained prior to use of investigations or construction funds.

b. For federally authorized levee systems, channels, and dams operated and maintained by a non-federal sponsor, district Inspection of Completed Works funds may be used. In addition, on a case by case basis, for Section 408 requests critical to the functioning of these levee systems,

channels, and dams and for reducing risk to life safety, requests for funding may be submitted to the HQUSACE Levee Safety Program Manager;

c. For federally authorized navigation projects, district project condition surveys funds may be used if the navigation projects do not have funding within their operations and maintenance account;

d. Funding for district coordination on Federal Energy Regulatory Commission (FERC) Activities. The funding for district coordination regarding FERC activities related to non-federal hydropower development will be provided by HQUSACE. Districts should request funding from HQUSACE through their respective division in coordination with their designated FERC Hydropower Coordinators. The request will be processed at HQUSACE through their respective regional integration team and forwarded to the HQUSACE Hydropower Business Line Manager, CECW-CO-H, for final approval and processing;

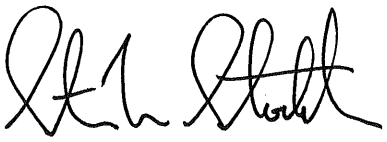
e. Funding to Process Section 408 Requests under Section 214. Funds may also be accepted under the authority of Section 214 of WRDA 2000, as amended, to expedite the review and evaluation of a Section 408 request. Funds may only be accepted from non-federal public entities. Examples of acceptable uses include, but are not limited to Agency Technical Review, real estate evaluation, copying or other clerical/support tasks, site visits, travel, coordination activities, additional personnel (including support/clerical staff), contracting support for technical services and environmental review and filing the environmental compliance documents. The processes applicable to accepting funds under the authority of Section 214 of WRDA 2000, as amended, are contained in Appendix G.

f. Federal Transportation Projects. In certain circumstances for alterations necessary for federal transportation projects, USACE may accept and expend funds provided by a state DOT agency pursuant to section 6002(j) of Public Law 109-59 (codified at 23 USC 139(j)) provided the Secretary of Transportation finds such review activities directly and meaningfully contribute to an underlying transportation project. In such cases, USACE only may accept funds in amounts necessary for USACE to meet the time limits for environmental review established for the project and may only accept funds for activities beyond the normal and ordinary capabilities permitted by USACE's general appropriations. *The processes applicable to accepting funds under the authority of 23 USC 139(j) are contained in Appendix G;* and,

g. Funding to Process Section 408 Requests under Section 204(b). Water Resources Development Act of 1986, as amended, Section 204(b) allows non-federal interests to contract with USACE to provide technical assistance in obtaining all necessary permits, which includes Section 408 permission, associated with non-federal improvements to navigation features pursuant to Section 204(a) of WRDA 86.

9. Vertical Teaming. Vertical teaming between the district, division, and HQUSACE is encouraged when there is doubt as to the appropriate course of action related to the application of this guidance. Vertical teaming is also recommended to promote early coordination of potential alterations that may have Congressional interest or policy implications. Please coordinate through the appropriate HQUSACE's RIT.

FOR THE COMMANDER:



9 Appendices
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STEVEN L. STOCKTON, P.E.
Director of Civil Works

APPENDIX A

References

This appendix is a list of USACE engineer documents (regulations, manuals, and technical letters) and other USACE and non-USACE appropriate references. The intent is to provide a comprehensive listing of appropriate guidance referenced in the main EC. Appendices B-G each list references specific to that appendix.

Rivers and Harbors Appropriation Act of 1899

Flood Control Act of 1970

Clean Water Act of 1972

Marine Protection, Research, and Sanctuaries Act of 1972

Endangered Species Act of 1973

Water Resources Development Act of 1986

Water Resources Development Act of 2000

Public Law 109-59
Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users

Executive Order 11988
Floodplain Management

33 USC 408
Taking possession of, use of, or injury to harbor or river improvements

33 USC 701c
Rights-of-way, easements, etc.; acquisition by local authorities; maintenance and operation; protection of United States from liability for damages; requisites to run-off and water-flow retardation and soil erosion prevention assistance

42 USC 1962d-5b
Written agreement requirement for water resources projects

33 CFR 208.10
Local flood protection works, maintenance, and operation of structures and facilities

33 CFR 230
Procedures for Implementing NEPA

36 CFR 327
Rules and regulations governing public use of water resource development projects administered by the Chief of Engineers

40 CFR 1500-1508
Council on Environmental Quality (NEPA)

AR 405-80
Management of Title & Granting Use of Real Property

ER 405-1-12
Real Estate Handbook

ER 1110-2-401
Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual for Projects and Separable Elements Managed by Project Sponsors

ER 1130-2-406
Shoreline Management at Civil Works Projects

ER 1130-2-500
Partners and Support (Work Management Policies)

ER 1130-2-550
Project Operations - Recreation Operations and Maintenance Policies

ER 1165-2-26
Implementation of Executive Order 11988 on Floodplain Management

ER 1165-2-208
In-Kind Contribution Credit Provisions of Section 221 of the Flood Control Act of 1970, as Amended

EC 405-1-11
Real Estate Acquisition

EC 1165-2-214
Water Resources Policies and Authorities (Civil Works Review)

EP 1130-2-550
Recreation Operations and Maintenance Guidance and Procedures

Council on Environmental Quality (2010)
Establishing, Applying and Revising Categorical Exclusions under the National Environmental Policy Act

Council on Environmental Quality (2012)
Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act

US Army Corps of Engineers 2006 (This EC supersedes this memorandum.)
Policy and Procedural Guidance for the Approval of Modification and Alteration of Corps of Engineer Projects, CECW-PB Memorandum, 23 October 2006

US Army Corps of Engineers 2008 (This EC supersedes this memorandum.)
Clarification Guidance on the Policy and Procedural Guidance for the Approval of Modifications and Alterations of Corps of Engineers Projects, CECW-PB Memorandum, 17 November 2008

US Army Corps of Engineers 2010 (This EC supersedes this memorandum.)
Implementation Guidance for Utilizing Section 214 of the Water Resources Development Act of 2000, as amended, to Accept Funding from Non-Federal Public Entities to Expedite the Evaluation of Permits pursuant to 33 USC 408, CECW-PB Memorandum, 18 June 2010

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APPENDIX B

Dams and Reservoirs (including Navigation Dams)

B-1. Purpose. The purpose of this appendix is to provide supplemental guidance to be used in conjunction with guidance in the main EC for alterations proposed by others to federally authorized dams and reservoirs, including dams associated with navigation locks. This appendix is also applicable to all associated appurtenances to include lands required to ensure reservoir integrity up to the project probable maximum flood (PMF), in addition to structures and canals where failure would release pool. Federally authorized dams include those operated and maintained by USACE. Also included are dams constructed by USACE, but which are operated and maintained by non-federal sponsors and may also be included under the jurisdiction of a State Dam Safety Agency defined by the National Dam Safety Program. For reservoirs, this appendix is applicable to water intake structures and pump stations constructed on USACE-managed lands. See Appendix C for additional information concerning hydropower facilities.

B-2. References. The main USACE reference document is Engineer Regulation (ER) ER 1110-2-1156, Safety of Dams, Policy and Procedures, which includes details on various dam safety activities, including inspections and risk assessments. ER1110-2-1156 also provides a comprehensive list of references for dams for consideration in review of dam design, construction, and operations and maintenance.

a. Section 6 of the Flood Control Act (FCA) of 1944 (P.L. 78-534), Contracts for sale of surplus water at Army projects – Disposition of revenues

b. Water Supply Act (WSA) of 1958 (P.L. 85-500, as amended)

c. EO 11988, Floodplain management

d. 44 CFR 65.10, Mapping of areas protected by levee systems

e. ER 1110-2-1156, Safety of Dams, Policy and Procedures

f. EC 1165-2-214, Civil Works Review

g. See Appendix A for other applicable references

B-3. Policy. The information below supplements policy in Paragraph 6 of the main EC.

a. Coordination with State Dam Safety Agencies. When the request is for the alteration of a dam operated by a non-federal sponsor, the alteration will be reviewed by the State Dam Safety Agency. In these cases the requester must obtain written concurrence of the proposed alteration from the State Dam Safety Agency be required prior to USACE issuing the final Section 408 decision.

b. National Flood Insurance Program (NFIP). The FEMA criteria related to NFIP mapping purposes (44 CFR 65.10, Mapping of areas protected by levee systems) are not USACE design standards and should not be a consideration for the technical analysis or design review. However, the impacts associated with mapping levee, floodwall, or channel projects for the NFIP, such as influences on floodplain management, should be discussed as part of compliance with EO 11988, reference Paragraph 7.c.(3)(e) in the main EC and considered when discussing potential impacts to associated risks.

c. Design and Construction Standards. Paragraph 6.m. in the main body of the EC specifies that a proposed alteration itself must meet current USACE design and construction standards. However, a requester is not required to bring the remaining existing USACE project up to current USACE design standards. An example might be if a requester submitted a proposed alteration for a landside seepage berm, but the dam has erosion issues on the waterside at the same location. The seepage berm would need to meet USACE design and construction standards, but the proposed alteration would not have to also address the waterside erosion if the district has determined that the seepage berm was a complete alteration that is not influenced by the erosion issue.

d. Additional Considerations for Municipal and Industrial (M&I) Water Supply.

(1) Water supply users entering into an agreement under Section 6 of the Flood Control Act (FCA) of 1944 (PL 78-534) or the Water Supply Act (WSA) of 1958 (PL 85-500, as amended) generally will not need a separate Section 408 permission.

(2) For currently authorized M&I water supply storage, Section 408 considerations will be taken into account in the drafting of a M&I water storage agreement and associated real estate instruments. Any requirements related to the user's facilities (intake structures, etc.) will be included in the agreement and related real estate instruments.

(3) For reallocated M&I water supply storage under the 1958 WSA authority, the water supply user must be advised that the reallocation study itself will not specifically address the Section 408 considerations but that Section 408 considerations will be taken into account in the drafting of a water storage agreement and associated real estate instruments. Any requirements for water supply user's facilities (intake structures, etc.) will be included in the agreement and associated real estate instruments.

(4) For surplus water under the authority of Section 6 of the 1944 FCA, Section 408 considerations will be taken into account in the drafting of the surplus water agreement and associated real estate instruments and any requirements for water supply user's facilities (intake structures, etc.) will be included in the agreement and associated real estate instruments.

(5) For M&I water supply intakes of any size to be placed in projects that do not include specifically authorized water supply storage, Section 408 permission will be required. Intakes with fixed infrastructure placed in impoundments without authorized conservation storage will

require Section 408 permission. Section 408 review should include consideration of physical and operational impacts to the project.

B-4. Procedures. The information below corresponds to and supplements the steps in Paragraph 7 of the main EC.

a. Step 1: Pre-Coordination. Ensure involvement of the District Dam Safety Officer (DSO) and Dam Safety Program Manager (DSPM). In addition, the district should inform the requester of any current dam safety modification studies that are ongoing or are being considered that may have compatible objectives with the potential proposed alteration.

b. Step 2: Written Request. Follow procedures in Paragraph 7 of the main EC.

c. Step 3: Required Documentation.

(1) Technical Analysis and Design. The list below is only a guide for information and/or analyses that may be needed to review alterations to dams and reservoirs. It is not intended to list every item that may be needed to make a final Section 408 decision, nor is it intended that every type of analysis be required for all proposals.

(2) Civil. Each submittal should clearly identify the existing condition of the dam and/or appurtenant structures to include plan, profile and design details of the proposed alteration in relation to the existing USACE project. Below are examples of information necessary to understand the existing and proposed conditions.

(a) Alteration location (Vicinity map and specific alteration location)

(b) Applicable datum

(c) Real estate interests, existing and to be acquired, needed for the proposed alteration

(d) Grading plans

(e) Layout plan, profiles, and cross-sections of the proposed alternation

(f) Previous inspection reports to assist in identifying existing deficiencies and their proximity to the proposed alteration

(g) Sections and details

(h) Temporary measures required during construction (bypasses, cofferdams, etc.)

(3) Geotechnical. The following is a list of analyses or information that may be necessary to consider in evaluating geotechnical impacts if proposed alterations alter the dam embankment or penetrate the natural blanket or foundation.

(a) Erosion control (changes in erosive forces on a slope)

(b) Liquefaction susceptibility

(c) Material usage/borrow/waste/transport/hauling

(d) Placement of stockpiles, heavy equipment, or other surcharges

(e) Results of subsurface investigation – boring logs, test pit logs, laboratory test results, etc.

(f) Seepage analysis

(g) Settlement analysis

(h) Stability analysis

(i) Vegetation

(4) Structural. The following is a list of analysis or information that may be necessary to evaluate the impacts of proposed alterations to concrete, sheetpiling, or drainage structures.

(a) Bridges and related abutments

(b) Design analysis for retaining walls and excavation support system

(c) Design of shallow or deep foundations, including bearing capacity and settlement analysis if the construction is located within the line of protection or right-of-way and creates potential seepage problems

(d) Design recommendations for foundations on expansive soils

(e) Diaphragm walls

(f) Gates or other operable features

(g) Other structural components integral to the project

(h) Pier penetrations of levee embankments

(i) Stability analysis including sliding, overturning, bearing, flotation, uplift and any seismic load effects for any alteration to the channel walls and/or flood walls

(j) Structural drainage control methods

(k) Water stops and contraction/expansion joints

(5) Hydrology and Hydraulics. Refer to Appendix F for details on when and how a hydrology and hydraulics system performance analysis should be conducted. Refer to the list below for examples of factors that should be considered when evaluating hydrology and hydraulics impacts.

(a) Changes in inflow

(b) Changes in velocity

(c) Changes in water surface profiles and flow distribution

(d) Consideration of impacts to energy dissipation measures; hydropower generation; sedimentation; or navigation

(e) Scour Analysis

(f) Sediment transport analysis

(g) Upstream and downstream impacts of the proposed alterations

(6) Water Control Management Plan. Alterations may have impacts on how water control structures are operated. In these cases, the alterations should consider any impacts or changes to water control plans that may be necessary. If a change to a water control manual is required, the NEPA document developed for the Section 408 alteration should incorporate appropriate analysis for updating the water control manual. Alterations that will work in conjunction with an existing federal Water Control Manual (WCM) should be documented and incorporated into that WCM. Items to be considered are:

(a) Effects on existing Biological Opinions, Water Quality Certifications, Coastal Zone Management Concurrences, etc. should evaluate project impacts on any legal document, agreement, or requirement that informs water control management by USACE

(b) Impacts/revisions to the operation of USACE facilities or other projects within the basin

(7) Operations, Maintenance and Flood Fighting. Alterations may change operation, maintenance or require special flood fighting procedures.

(a) Effects on existing maintenance access

(b) Effects on maintenance practices

(c) Flood contingency plan during construction, measures proposed to protect area under construction, monitoring of river level, river stage at which plan will be activated, materials and equipment to be used to activate plan, and personnel contact and telephone number to activate plan.

(d) Flood fighting requirements and practices

(e) Special inspection requirements

(8) Potential Failure Mode Analysis. Depending on the proposed alteration, the requester may be required by the district to provide a potential failure mode analysis with the proposed alteration in place.

(9) Requester Review Plan Requirement. If the district determines a Type II Independent External Peer Review (IEPR) is required for the proposed alteration, the Risk Management Center (RMC) will determine based on information provided in the Requester Review Plan for the Type II IEPR if the dam senior oversight group (DSOG) will review the dam alteration. If it is determined that the DSOG review is required, the RMC will inform the division, which will include the requirement for the DSOG review within the approval memorandum, as required in EC 1165-2-214, for the Requester Review Plan to the district. The district should contact the HQUSACE Dam Safety Program Manager to schedule a briefing with the DSOG as soon as possible. Information to be presented should include available risk assessment (Screening for Portfolio Risk Analysis (SPRA) or higher level risk assessments) information and a description of the proposed alteration. The DSOG briefing can occur concurrently with other steps, but should occur before the request is submitted for division review. The RMC will consider the following in determining whether DSOG review is required:

(a) whether the benefits of the alteration are generally commensurate with the risks

(b) whether the alteration potentially worsens or creates new failure modes or risk drivers for the USACE project; and

(c) whether the alteration is exceptionally complex or high risk.

d. Step 4: District-led Agency Technical Review (ATR).

(1) Risk. For dams with SPRA or higher level risk assessment information, districts should take this information into account to determine whether the proposed alteration may increase the risk associated with the project. If a dam does not have a SPRA or a higher level

risk assessment completed, a risk assessment is not required to be conducted prior to making a Section 408 decision.

(2) Alterations Within the Reservoir Area. These proposed alterations require the same level of technical review as alterations to dams. Generally alterations within the reservoir areas will be requested by the water supply non-federal sponsor for intake facilities. These alterations should be reviewed for impacts to life safety, inundation, and intake levels. When reviewing the intake levels, consideration will be given to drought conditions and also to lake level drawdowns for dam safety water control purposes. When alterations are proposed along the reservoir, the alteration will be reviewed for constructability and for potential failure modes related to misoperation, overtopping, foundation failures, alteration-induced subsidence, and other possible incidents that could cause the uncontrolled loss of pool.

(3) The district Dam Safety Program Manager and Dam Safety Officer are required to review and endorse approval or recommend denial of any Section 408 request that modifies a dam.

e. Step 6. Division Review. For dam alterations requiring HQUSACE approval as determined by answering the questions in Paragraph 6.t. of the main EC, the division Dam Safety Program Manager (DSPM) and Dam Safety Officer (DSO), in addition to any additional division reviewers, are required to review and endorse approval or recommend denial.

f. Step 7. HQUSACE Review. For dam alterations requiring HQUSACE approval as determined by answering the questions in Paragraph 6.t. the main EC, the HQUSACE DSPM or designee review, in addition to the Office of Water Project Review, are required to endorse approval or recommend denial.

g. Step 8: In addition to the other notification procedures in Paragraph 7.c.(8) of the main EC, for alterations related to mapping for the National Flood Insurance Program (NFIP), the written approval document will specify that approval does not constitute, nor should it be construed as, an evaluation to determine if NFIP criteria have been met.

h. Step 9: Post – Permission Oversight.

(1) Inspections. Inspections conducted by USACE should document whether approved alterations are being operated and maintained in accordance with the Section 408 approval and O&M manual.

(2) National Inventory of Dams. Districts should ensure that the National Inventory of Dams is updated for USACE dams and appurtenant structures as applicable to capture new or changed features constructed as part of a Section 408 permission.

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Appendix C

Non-Federal Hydropower Development at USACE Facilities

C-1. Purpose. The purpose of this appendix is to provide supplemental guidance to be used in conjunction with guidance in the main EC and Appendix B for requests for alterations of USACE projects by adding conventional and/or non-conventional hydroelectric power generating facilities. Conventional hydroelectric generating facilities are facilities that have a turbine and generator unit combination contained in a powerhouse adjacent to a USACE non-powered dam that provide the potential energy for the powerhouse. A non-conventional facility, such as a hydrokinetic hydroelectric generating unit, typically is not contained in a powerhouse and not adjacent to a dam but could be attached to other USACE civil works structures such as jetties, levees, and navigation channels. This appendix is applicable to requests received from non-federal entities which have been granted a preliminary permit or license by the Federal Energy Regulatory Commission (FERC).

C-2. References.

a. Federal Power Act, as amended

b. ER 1110-2-401, Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual for Projects and Separable Elements Managed by Project Sponsors

c. ER 1110-2-1150, Engineering and Design for Civil Works Projects

d. ER 1110-2-1454, Corps Responsibilities for Non-Federal Hydroelectric Power Development under the Federal Power Act

e. ER 1110-2-1462, Water Quality and Water Control Considerations for Non-Federal Hydropower Development at Corps of Engineers Projects

f. ECB 2008-8, Sharing Technical Information in Support of Non-Federal Hydropower Development

g. US Army Corps of Engineers, Charging and Retaining Fees Charged to FERC Licensees, CECC-G memorandum, 6 June 2006

h. Memorandum of Understanding Between the United States Army Corps of Engineers and the Federal Energy Regulatory Commission on Non-Federal Hydropower Projects, 25 March 2011

i. See Appendix A and B for other applicable references.

C-3. Policy. This information supplements policy in Paragraph 6 of the main EC and Appendix B.

a. USACE and FERC Coordination. USACE and FERC have agreed to work with each other and with other participating agencies or entities, as appropriate to ensure that timely decisions are made and that the responsibilities of each agency are met. Specifically, subject to the availability of resources and in accordance with applicable laws, regulations, Army policies and FERC policies, each agency agrees to: commit to early involvement; participate proactively; share data; communicate informally; attend public meetings; and coordinate on studies of hydropower potential.

b. Sharing of Technical Information. See reference in Paragraph C-2.f. of this appendix.

C-4. Procedures. The information below corresponds and supplements the steps in Paragraph 7 of the main EC.

a. Step 1: Pre-Coordination. When a USACE district receives a written request to modify a USACE civil works project for the addition of hydroelectric generation, the district will confirm that the requester has a valid FERC preliminary permit or license to investigate the potential for adding hydroelectric power facilities to the civil works project. Once validated, the district will initiate coordination with the requester and FERC. Initial coordination should consist of a meeting to discuss the proposed project and inform the requester of any known issues that would impact their proposal, such as any dam safety issues.

b. Step 2: Required Documentation.

(1) National Environmental Protection Act (NEPA) Requirements. Districts should follow NEPA procedures as described in the main EC. In most cases where a requester requests approval for alteration of a USACE civil works structure for the purpose of adding hydroelectric generating facilities, USACE typically acts as a cooperating agency to a lead agency, FERC. Under Section V of the reference in paragraph C-2.g, "…As the agency with the approval/disapproval authority for the licensing of hydropower projects, the FERC shall serve as the lead Federal agency for the preparation of the environmental document" (for non-federal hydropower development at USACE water resources projects). As appropriate, and as resources allow, USACE will assist FERC in the preparation of relevant sections of the environmental document to the extent that the information is necessary for USACE to adopt the document/incorporate portions by reference to support its independent Section 408 decision and/or any other required USACE permit decision (e.g. Section 10/404/103).

c. Step 3: Remaining Procedures. Districts should follow remaining procedures outlined in the main EC and Appendix B.

Appendix D

Levee, Floodwall or Flood Risk Management Channel Projects

D-1. Purpose. The purpose of this appendix is to provide supplemental guidance to be used in conjunction with guidance in the main EC for proposed alterations by others to federally authorized USACE civil works' levee, floodwall, or flood risk management channel projects, including their associated features. Supplemental information for alterations to navigation channels is in Appendix E. If a levee, floodwall, or flood risk management channel is associated with a dam project, Appendix B should be consulted. Common associated features for levee, floodwall, or channel projects include sheetpile walls, berms, relief wells, cutoff walls, foundation, drainage structures, ponding areas, closure structures, pump stations, transitions, and erosion protection.

D-2. References. The following is a list of references containing evaluation processes, design standards, and operations and maintenance procedures that may be relevant to consider for alterations to levee, floodwall, or channel projects.

a. P.L. 84-99, as amended, flood emergencies; extraordinary wind, wave, or water damage to federally authorized hurricane or shore protective structures; emergency supplies of water; drought; well construction and water transportation

b. 33 CFR 208.10, Local flood protection works; maintenance and operation of structures and facilities

c. 44 CFR 65.10, Mapping of areas protected by levee systems

d. ER 500-1-1, Civil Emergency Management Program

e. ER 1110-2-1806, Earthquake Design and Evaluation of Civil Works Projects

f. ER 1110-2-1942, Inspection, Monitoring, and Maintenance of Relief Wells

g. EM 1110-1-1005, Control and Topographic Surveying

h. EM 1110-1-1804, Geotechnical Investigations

i. EM 1110-1-1904, Settlement Analysis

j. EM 1110-2-1418, Channel Stability Assessment for Flood Control Projects

k. EM 1110-2-1601, Hydraulic Design of Flood Control Channels

l. EM 1110-2-1902, Slope Stability

m. EM 1110-2-1906, Laboratory Soils Testing

n. EM 1110-2-1913, Design and Construction of Levees

o. EM 1110-2-1914, Design, Construction, and Maintenance of Relief Wells

p. EM 1110-2-2002, Evaluation and Repair of Concrete Structures

q. EM 1110-2-2007, Structural Design of Concrete-Lined Flood Control Channels

r. EM 1110-2-2100, Stability Analysis of Concrete Structures

s. EM 1110-2-2104, Strength Design for Reinforced-Concrete Hydraulic Structures

t. EM 1110-2-2502, Retaining and Flood Walls

u. EM 1110-2-2504, Sheet Pile Walls

v. EM 1110-2-2902, Conduits, Culverts, and Pipes

w. EC 1110-2-6066, Design of I-Walls

x. ETL 1110-2-583, Engineering and Design: Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures

y. ETL 1110-2-575, Evaluation of I-Walls

z. U.S. Army Corps of Engineers, Policy for Development and Implementation of System-Wide Improvement Frameworks (SWIFs), CECW-HS memorandum, 29 November 2011

aa. U.S. Department of Interior Bureau of Reclamation and US Army Corps of Engineers, Best Practices in Dam and Levee Safety Risk Analysis, 3 December 2012

bb. See Appendix A for other applicable references.

D-3. Policy. The information below supplements policy in Paragraph 6 of the main EC.

a. National Flood Insurance Program (NFIP). The FEMA criteria related to NFIP mapping purposes (44 CFR 65.10, Mapping of areas protected by levee systems) are not USACE design standards and should not be a consideration in the technical analysis or design review. However, the impacts associated with mapping levee, floodwall, or channel projects for the NFIP, such as influences on floodplain management, should be discussed as part of compliance

with EO 11988, reference Paragraph 7.c.(3)(e) in the main EC and considered when discussing potential impacts to associated risks.

b. Completeness. Reference to Paragraph 6.l. in the main EC. An example is one reach of a levee system may require a slurry wall to address seepage and a different reach may require a seepage berm. The slurry wall and seepage berm can be constructed and function independently of each other, and, therefore, could be considered as two complete alterations.

c. Design and Construction Standards. Paragraph 6.m. in the main EC specifies that a proposed alteration itself meet current USACE design and construction standards. However, a requester is not required to bring the remaining existing USACE project up to current USACE design standards. An example is a requester has submitted a proposed alteration for a landside seepage berm for a levee, but the levee has erosion issues on the waterside at the same location. The seepage berm would need to meet USACE design and construction standards, but the proposed alteration would not have to also address the waterside erosion if the district has determined that the seepage berm was a complete alteration that is not influenced by the erosion issue.

D-4. Procedures. The information below corresponds and supplements the steps in Paragraph 7 of the main EC.

a. Step 1: Pre-Coordination. Ensure involvement of the district Levee Safety Officer (LSO) and Levee Safety Program Manager (LSPM).

b. Step 2: Written Request. If a proposed alteration is being requested as part of an approved System Wide Improvement Framework (SWIF), the requester must supply that information within their written request.

c. Step 3: Required Documentation.

(1) Technical Analysis and Design. The list below is only a guide for information and/or analyses that may be needed to review alterations to levee, floodwall, or channel projects. It is not intended to list every analysis or design consideration that may be needed for all proposals.

(2) Civil. Each request should clearly identify the existing condition of the portion of the levee, floodwall, or channel project being altered and include plan, profile and design details of the proposed alteration in relation to the existing USACE project. Below are examples of information that may be necessary to understand the existing and proposed conditions:

(a) Alteration location (Vicinity map and specific alteration location in station or river mile and/or decimal degrees)

(b) Applicable datum

(c) Real estate interests, existing and to be acquired, needed for the proposed alteration

(d) Grading plans

(e) Layout plan, profiles, and cross-sections of proposed alteration

(f) Previous inspection reports to assist in identifying existing deficiencies and their proximity to the proposed alteration

(g) Temporary measures required during construction (bypasses, cofferdams, etc.)

(3) Geotechnical. The following is a list of analyses or information that may be necessary to consider for geotechnical considerations and assessing their impacts if proposed alterations alter the levee, floodwall or channel bank cross-section or penetrate the natural blanket or foundation.

(a) Erosion control (changes in erosive forces on a slope)

(b) Material usage/borrow/waste/transport/hauling

(c) Placement of stockpiles, heavy equipment, or other surcharges

(d) Results of subsurface investigation – boring logs, test pit logs, laboratory test results, etc.

(e) Seepage analysis

(f) Settlement analysis

(g) Stability analysis

(h) Vegetation

(4) Structural. The following is a list of analyses or information that may be necessary to evaluate the impacts of proposed alterations to concrete, sheetpiling, or drainage structures:

(a) Bridges and related abutments

(b) Design analysis for retaining walls and excavation support system

(c) Design of shallow or deep foundations, including bearing capacity and settlement analysis if the construction is located within the line of protection or right-of-way and creates potential seepage problems

(d) Design recommendations for foundations on expansive soils

(e) Diaphragm walls

(f) Gates or other operable features

(g) Other structural components integral to the project

(h) Pier penetrations of levee embankments

(i) Stability analysis including sliding, overturning, bearing, flotation, uplift and any seismic load effects for any alteration to the channel walls and/or flood walls

(j) Structural drainage control methods

(k) Water stops and contraction/expansion joints

(5) Hydrology and Hydraulics. Refer to Appendix F for details on when and how a hydrology and hydraulics system performance analysis should be conducted. Refer to the list below for examples of factors that should be considered when evaluating hydrology and hydraulics impacts.

(a) Changes in velocity

(b) Changes in water surface profiles and flow distribution

(c) Scour analysis

(d) Sediment transport analysis

(e) Upstream and downstream impacts of the proposed alterations

(6) Water Control Management Plan. Alterations may have impacts on how water control structures are operated. In these cases, the alterations should consider any impacts or changes to water control plans that may be necessary. If a change to a water control manual is required, the NEPA document developed for the Section 408 alteration should incorporate appropriate analysis for updating the water control manual. Alterations that will work in conjunction with an existing Federal Water Control Manual (WCM) should be documented and incorporated into that WCM. Items to be considered are:

(a) Effects on existing Biological Opinions, Water Quality Certifications, Coastal Zone Management Concurrences, etc. should evaluate project impacts on any legal document, agreement, or requirement that informs water control management by the USACE

(b) Impacts/revisions to the operation of USACE facilities or other projects within the basin

(7) Operations, Maintenance and Flood Fighting. Alterations may change how a levee, floodwall or channel project is to be operated, maintained or require special flood fighting procedures. Reviews should consider the factors below to determine potential effects.

(a) Effects on existing project access

(b) Special inspection requirements

(c) Effects on maintenance practices

(d) Flood fighting requirements and practices

(e) Flood contingency plan during construction, measures proposed to protect area under construction, monitoring of river level, river stage at which plan will be activated, materials and equipment to be used to activate plan, and personnel contact and telephone number to activate plan

(8) Requester Review Plan Requirement. If the district determines a Type II Independent External Peer Review (IEPR) is required for a proposed alteration to a levee or floodwall project, the Risk Management Center (RMC) will determine based on the information provided in the Requester Review Plan for the Type II IEPR if the Levee Senior Oversight Group (LSOG) will review the proposed alteration. If it is determined that the LSOG review is required, the RMC will inform the division who will include the LSOG review requirement within the final approval memorandum, as required in EC 1165-2-214, for the Requester Review Plan to the District. The district should contact the HQUSACE Levee Safety Program Manager to schedule a briefing with the LSOG as soon as possible. Information to be presented should include available risk assessment (screenings or higher level risk assessments) information and a description of the proposed alteration. The LSOG briefing can occur concurrently with other steps, but should occur well before the request is submitted for division review. The RMC will consider the following in determining whether LSOG review is required:

(a) whether the benefits of the alteration are generally commensurate with the risks

(b) whether the alteration potentially worsens or creates new failure modes or risk drivers for the USACE project; and

(c) whether the alteration is exceptionally complex or high risk.

d. Step 4: District-Led Agency Technical Review (ATR).

(1) Rehabilitation Program. Proposed alterations to federally authorized levees, floodwalls, and channels, must also be evaluated to determine whether the alteration will become an integral component of the project. If it is determined that the proposed alteration will become an integral component of the project that is necessary for proper functioning of the project for its authorized purpose, the completed alteration will be included as a project feature eligible for rehabilitation assistance pursuant to PL 84-99. The district is responsible for making a determination as to whether or not a proposed alteration will become an integral component of the project. Factors to consider will vary depending on the type of infrastructure and the proposed alteration. This determination must be made for all proposed alterations to flood risk management projects, regardless of their status in the Rehabilitation Program at the time of the Section 408 request, to ensure that the proposed alteration is appropriately considered in future decisions about project eligibility for rehabilitation assistance. Examples of such alterations include stability or seepage berms, and changes to the structure type or geometry. For more information on USACE emergency activities and the rehabilitation program, see ER 500-1-1, Emergency Employment of Army and Other Resources – Civil Emergency Management Program.

(2) Risk. For levee and floodwall projects with risk screening or higher level risk assessment information, districts should take this information into account to determine whether the proposed alteration may increase the risk associated with the project. If the project does not have a risk screening or a higher level risk assessment completed, a risk assessment is not required to be conducted prior to making a Section 408 determination.

(3) The district Levee Safety Program Manager and Levee Safety Officer are required to review and endorse approval or recommend denial of any Section 408 request that modifies a levee or floodwall project.

e. Step 6: Division Review. For levee or floodwall project alterations requiring HQUSACE approval as determined by answering the questions in Paragraph 6.t. of the main EC, the division LSPM and LSO, in addition to any additional division reviewers, are required to review and endorse approval or recommend denial.

f. Step 7: HQUSACE Review. For levee or floodwall alterations requiring HQUSACE approval as determined by answering the questions in Paragraph 6.t. of the main EC, the HQUSACE LSPM or designee in addition to the Office of Water Project Review are required to review and endorse approval or recommend denial.

g. Step 8: Notification. In addition to the other notification procedures in Paragraph 7.c.(8) of the main EC, for alterations related to mapping for the National Flood Insurance Program (NFIP), the written approval document will specify that approval does not constitute, nor should it be construed as, an evaluation to determine if NFIP criteria have been met.

h. Step 9: Post-Permission Oversight.

(1) Inspections. Inspections conducted by USACE should document whether approved alterations are being operated and maintained in accordance with the approved Section 408 and/or updated O&M manual.

(2) National Levee Database (NLD). Districts should ensure that the NLD is updated for levee and floodwall projects, as needed, to capture new or changed features constructed as part of a Section 408 permission. The district will provide the requester with the requirements for any needed surveys, including updated centerline information and cross sections, in order to update the project information in the NLD to capture the alterations.

Appendix E

Navigation Channels, Harbors, Locks, Jetties, Bridges, and Features

E-1. Purpose. The purpose of this appendix is to provide supplemental information to be used in conjunction with guidance in the main EC for alterations proposed by others to USACE navigation projects, including channels, harbors, locks, jetties, bridges, and other associated features. Refer to Appendix B for proposed alterations to navigation dams.

E-2. References. The following is a list of references that may be relevant to consider for alterations to navigation features.

a. Section 204 of Water Resources Development Act of 1986, Public Law (PL) 99-662

b. 33 USC 565, River and Harbor Improvement by Private or Municipal Enterprise

c. ER 1110-2-1403, Studies by Coastal, Hydraulic, and Hydrologic Facilities and Others

d. ER 1110-2-1404, Engineering and Design - Hydraulic Design of Deep Draft Navigation Projects

e. ER 1130-2-520, Project Operations - Navigation and Dredging Operations and Maintenance Policies

f. ER 1140-1-211, Non-Department of Defense Reimbursable Services

g. ER 1165-2-124, Construction of Harbor and Inland Harbor Projects by Non-Federal Interests

h. EM 1110-2-1611, Layout and Design of Shallow-Draft Waterways

i. EM 1110-2-1613, Engineering and Design - Hydraulic Design of Deep Draft Navigation Projects

j. EP 1130-2-520, Project Operations - Navigation and Dredging Operations and Maintenance Guidance and Procedures

k. See Appendix A for other applicable references.

E-3. Policy. The information below supplements policy in Paragraph 6 of the main EC.

a. Mission of the Navigation Program. The mission of the USACE navigation program is to provide safe, reliable, efficient, effective, and environmentally sustainable waterborne transportation systems for movement of commerce, national security needs, and recreation. This

mission is accomplished by ensuring adequate project dimensions to provide safe passage of commercial navigation through the federally-authorized navigation project, while minimizing environmental impacts. Accordingly, any proposed alterations to an authorized navigation project must be evaluated to determine that such alteration will not impair the usefulness of the project and will not be injurious to the public interest.

b. Categories of Navigation Alterations. Proposed navigation alterations fall into two categories:

(1) Category 1: Improvements Associated with Water Resources Development Act of 1986, Section 204 (Section 204), Construction of Projects by Non-Federal Interests.

(a) Section 204(a) authorizes a non-federal interest to undertake navigational improvements in harbors or inland harbors of the United States, subject to obtaining any permits pursuant to Federal and State laws in advance of construction. Except for projects or improvements implemented under Section 204(e) and Section 204(f), non-federal interests will be responsible for the operations and maintenance of such improvements. Section 408 applies to these improvements and procedures in this EC must be followed.

(b) When there is a request for USACE to assume operations and maintenance responsibilities of the non-federal improvements pursuant to Section 204(f), processes in ER 1165-2-124 for Section 204(f) approval should be followed. Section 408 permission will also be required; however, the Section 204(f) report prepared for the Secretary of the Army may also serve as the documentation to inform the Section 408 permission decision. In general, the Section 204(f) report will not be submitted to the Assistant Secretary of the Army for Civil Works (ASA(CW)) for approval until after the requests for the Section 408 permission and Section 10/404/103 permit have been approved. In addition, a written agreement addressing the assumption of maintenance is required. To remain eligible for assumption under Section 204(f), the ASA(CW) determinations must be made and the agreement executed prior to initiation of construction, which is defined as award of the first construction contract. Approval by the ASA(CW) is required to grant an exception to policy to allow for solicitation of the construction contract prior to the required approvals, permissions and permits, and agreement.

(c) Section 204(b) allows non-federal interests to contract with USACE to provide technical assistance in obtaining all necessary permits for a non-federal interest to construct navigation improvements pursuant to Section 204(a) if the non-federal interest pays all the costs for such assistance. Authority to provide this assistance has been delegated to the field in accordance with the Support For Others guidance (ER 1140-1-211). This provision may be used to provide assistance for the Section 408 process.

(d) Section 408 is not applicable to construction undertaken by non-federal interests pursuant to Section 204(e).

(2) Category 2: Alterations not included in Category 1, which will follow guidance in this EC.

(a) Project Specific Setbacks. In order to help streamline the coordination and evaluation process, districts are encouraged to develop project specific setback distance criteria that establish minimum distances (adjacent, over, and/or below a navigation feature). The purpose would be to use the pre-determined technical analysis accomplished to determine the setbacks as a way to facilitate an expedited district-led Agency Technical Review (reference Paragraph 7.c.(4)). These criteria would then be used in a manner to determine that if any future construction and maintenance activities occur beyond these distances, then the alteration will likely not impact the federal navigation project nor be injurious to the public interest under Section 408. At a minimum, the following should be considered when developing setbacks:

- Maximum dredging depth and width, to include advanced maintenance, allowable over-depth, and non-pay overdepth
- Top edge of the navigation channel, including appropriate side slopes and overdepth
- Sufficient clearances of equipment needed for dredging the navigation channel to its full depth and width, including side slopes
- Minimum air gap required for lines or structures crossing above the channel
- Weather, tides, flow rates, velocities, and other factors related to the region
- Dredged Material Disposal facility availability

E-4. Procedures. The information below corresponds to and supplements the steps in Paragraph 7 of the main EC.

a. Pre-Coordination (reference step 1 in Paragraph 7 of main EC). Depending on the extent of the proposed alteration, coordination with other agencies such as the U.S. Coast Guard, National Oceanic and Atmospheric Administration (NOAA), USFWS, US EPA, US Navy, etc. may be necessary.

b. The following should be considered when implementing steps 1-8 in Paragraph 7 of the main EC:

(1) Activities proposed in federal navigation channels may also require evaluation by Regulatory pursuant to Section 10/404/103. In accordance with regulations, Regulatory must consider general impacts to navigation in its review of a permit application. A regulatory permit will not be issued if it is not compatible or conflicts with the authorized purpose of a federally authorized project. Therefore, Regulatory and Navigation should coordinate throughout their respective reviews.

(2) The majority of proposed alterations to federal navigation projects that also require Section 10/404/103 authorization are proposals for utility line crossings, boat docks, bulkheads, revetments, dredging, and other similar activities. Generally, Navigation can quickly and easily determine whether these proposed alterations could be constructed to avoid impacts to operation and maintenance of the navigation project (e.g. compare the proposal to approved set-back policies and/or overdepths) and thereby recommend Section 408 approval of an alteration request rapidly.

(a) In these basic cases, Navigation will document the results of their Section 408 evaluation and decision in a brief written letter to be signed by the District Commander, see Appendix H for an example. This letter will serve as the documented Section 408 decision that will accompany the Section 10/404/103 decision in the district file. This letter also can be sent to the requester at the same time with the Section 10/404/103 permit, if granted, so long as the requester and Section 10/404/103 permittee are the same entity and the approval and permit decisions are distinct in the transmittal.

(b) If Navigation determines the proposed alteration must be revised (e.g. installed at deeper depth than that proposed), Navigation will coordinate directly with the requester and copy Regulatory on the correspondence since such an alteration would likely affect the Regulatory evaluation. Likewise, Regulatory should also copy Navigation on any changes to the proposed alteration it may require for Section 10/404/103 purposes.

(c) In instances where the proposed alteration cannot be quickly and easily reviewed as outlined above, such as if technical analyses are warranted, and/or Navigation has determined it cannot approve the proposal under Section 408, the Navigation business line must conduct its review in accordance with the main EC.

c. Step 9: Post-Permission Oversight. Any long-term monitoring and maintenance of the approved navigation alteration will be the responsibility of the Section 408 permittee throughout the life of the alteration and without cost to the government. Navigation will continue to conduct routine inspections, maintenance and monitoring of the USACE navigation project, except for any features added by the Section 408 permittee's alteration. If the Section 408 permittee identifies potential impacts to the USACE project as a result of the construction and/or maintenance of the alteration the Section 408 permittee will notify USACE immediately. If USACE identifies potential impacts from the Section 408 permittee's construction or maintenance/monitoring activities, USACE will notify the Section 408 permittee immediately. USACE will work collaboratively with the Section 408 permittee to identify the appropriate corrective action. The Section 408 permittee will be responsible for implementing the appropriate corrective action as determined by USACE. It should be noted that any proposed corrective action may require a change to the original approved alteration or a new Section 408 request depending on the proposed action. Navigation should engage Regulatory in these discussions in case the impacts and/or corrective actions also require authorization under Section 10/404/103.

Appendix F

Hydrologic and Hydraulics System Performance Analysis

F-1. Purpose.

a. This appendix is intended to outline the requirements for a hydrologic and hydraulics system performance analysis as referenced in paragraph 7.c.(3)(b) of the main EC. The purpose of a hydrologic and hydraulics system performance analysis is to determine the potential upstream and downstream hydrologic and hydraulic impacts of proposed alterations. Districts will determine whether a hydrologic and hydraulics system performance analysis is needed and if so, the appropriate scope of analysis based on the complexity of the proposed alteration. The requester will be responsible for the analysis. This appendix describes when an analysis is required, how to perform the analysis and how to display the data.

b. The hydrologic and hydraulics system performance analysis described in this appendix is not a risk assessment. A risk assessment considers explicitly the performance of the structural flood risk management measures and the consequence of exposure of people and property to the entire range of likely flood events. The hydrologic and hydraulics system performance analysis only considers the likely flood events and the hydraulic loading and assumes the structural measures (dams, levee and floodwall systems, and channels) perform as authorized. It does not consider consequences.

F-2. References.

a. ER 1105-2-101, Risk Analysis for Flood Damage Reduction Studies.

b. EM 1110-2-1619, Risk-Based Analysis for Flood Damage Reduction Studies.

c. U.S. Army Corps of Engineers (USACE) Hydrologic Engineering Center (HEC). 2008. *HEC-FDA Flood Damage Reduction Analysis, User's Manual, Version 1.2.4.*, CPD-72. Hydrologic Engineering Center, Davis, CA.

d. USACE HEC. 2009. Project Report-71 (PR-71). Documentation and Demonstration of a Process for Risk Analysis of Proposed Modifications to the Sacramento River Flood Control Project (SRFCP) Levees.

e. Davis, Darryl W., Beth A. Faber, and J. R. Stedinger. 2008. *USACE Experience in Implementing Risk Analysis for Flood Damage Reduction Projects*, Journal of Contemporary Water Research and Education 140(1):3-14.

F-3. Policy.

a. For the purposes of this appendix, the word “system” is an integrated combination of features, property, and environment that are hydraulically interconnected in which the extent downstream and upstream of the proposed alteration captures the areas expected to be influenced by changes in discharge, volume, or corresponding water surface elevation at the proposed alteration site.

b. System performance analyses will be applied to alterations that alter the hydrologic and/or hydraulic conditions (e.g., reservoir operations, bridge constrictions, etc.) of federally authorized USACE projects. Districts will determine the appropriate scope of analysis based on the complexity of the proposed alteration.

c. The hydraulic analysis will evaluate pre- and post-project water surface elevations, changes in velocity, flow regime, and scour potential.

d. The hydraulic analysis will consider the full range of loading conditions.

e. For loading conditions where flood waters exceed the project’s system capacity, the analysis will assume weir flow.

f. Under no circumstances will the analysis assume breach or malfunction of any existing or altered component of the project system for the flood up to the top of containment as a means of relieving system impacts. The project is to be considered stable and functional to top of containment. The assumption is that the project can be stabilized to the authorized condition. Based on this assumption, fragility curves are not required.

g. Impacts will be determined by comparing performance parameters (annual exceedance probability (AEP), assurance (conditional non-exceedance probability (CNP), etc.) for the existing and authorized conditions, if they are different, to the conditions resulting from the project alteration.

F-4. Strategy.

a. Hydrologic and hydraulics system performance analysis for proposed alterations must assess system performance at the proposed alteration site and at all locations reasonably considered to be affected by the proposed alteration. The procedures described in this appendix are, in general, appropriate, with some adaptation to reflect the effects of hydraulic connectivity.

b. Hydrologic and hydraulics system performance analysis includes the following steps:

(1) Step 1: Define the spatial extent of the system for which hydrologic and hydraulic impacts must be assessed, and select index locations within that extent for the performance analysis.

(a) The extent of the hydraulically interconnected system must be defined as the first step in performance analysis. This extent must be broad enough to include channel reaches and floodplains downstream and upstream of the proposed alteration site that a reasonable analyst would expect to be influenced by changes in discharge, volume or corresponding water surface elevation at the proposed alteration site. Within that extent, impact areas should be identified and index locations selected to allow fair assessment of likelihood of inundation transference. If initial findings show significant impacts at the outer extents represented by the selection of index locations, additional index points may be required out to the locations showing no impacts. Guidance for identifying impact areas and selecting index locations is included in the user's manual for the HEC-FDA (HEC, 2008) software and in EM 1110-2-1619.

(b) Review of hydraulic model results will aid in determining the appropriate extent. For example, examination of computed water surface profiles will identify locations upstream or downstream of a proposed alteration site at which changes in channel geometry at the site will have an impact on water surface elevations. Care must be exercised and results scrutinized to judge if changes in computed elevations are logically related to the changes in channel geometry or if changes seen in the model results are an artifact of computational imprecision. In some cases downstream flows at a confluence will increase for a proposed alteration, but the increase will be due to a change in timing between contributing hydrographs. Consideration should be given to whether the change in timing would be expected to be reflected in historical events, or whether the change in timing is an artifact of the synthetic hydrology developed.

(2) Step 2: Identify the authorized and existing condition (if different) for all features (e.g. levee, floodwall, channel, and/or dams) of that system to serve as the basis for assessing impacts of proposed alterations.

(3) Step 3: Collect or develop the necessary functions and transforms to compute authorized and existing performance at all index locations within the system.

(a) Performance computations are completed on an index location by index location basis following the procedure described in EM 1110-2-1619 and illustrated in Figure F-1. Each of the applicable functions described in Figure F-1 must be developed for each index location. The unregulated discharge-probability function (Figure F-1a) must include all flows that accumulate at the index location, including tributary inflows upstream. The unregulated-regulated flow transform (Figure F-1c) must represent, in the aggregate, the impact of all regulation upstream of the index location. This impact will include the impacts of intentional regulation by upstream reservoirs and diversions, and the incidental impact of regulation if any upstream design features, such as levee systems, overtop and flows onto an adjacent floodplain. The discharge-stage transform (Figure F-1g) is a localized function, representing conditions at each index location, unaffected by upstream conditions, but including perhaps the impact of downstream conditions if backwater influences stage. Finally, the stage-damage relationship (Figure F-1k) is typically used to assess the economic risk. However, for proposed alterations, it is only required to consider hydrologic and hydraulics performance of the system, therefore the stage-damage relationship need not be “real” unless the requester has the information and chooses to include

economic damages. Reference F-2.d. of this appendix contains an example of how to utilize a "dummy" stage-damage relationship.

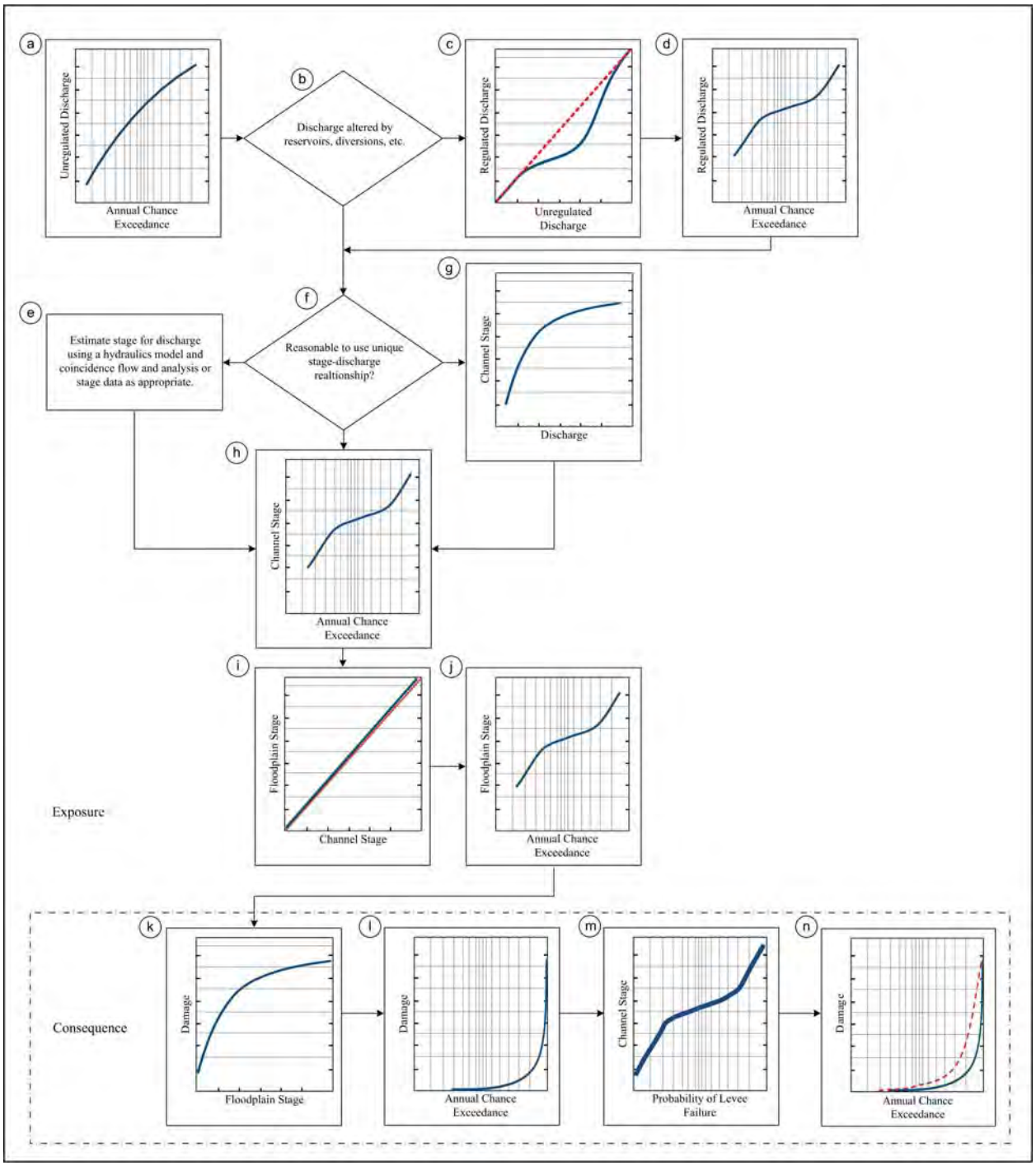

Figure F-1. Schematic of risk computation

(b) In addition to the various functions required for hydrologic and hydraulics system analysis, the uncertainty about each function must be described. This task is completed following the general guidance presented in this appendix and EM 1110-2-1619. However, current policy does not cover how to describe the uncertainty about functions that represent accumulated impacts. For example, the uncertainty about the unregulated to regulated discharge transform at a location downstream of multiple reservoirs must reflect the accumulated uncertainty about joint operation of those reservoirs. If the district needs assistance in determining accumulated impacts, districts should consult experts at Engineer and Research Development Center (ERDC), HEC, or engage the division and HQUSACE, reference paragraph 9 of the main EC, Vertical Teaming.

(4) Step 4: Assess hydrologic and hydraulics performance of the existing and authorized conditions, if they are different, at all index locations. Hydrologic and hydraulics performance is computed location by location within the extent of the system. The software HEC-FDA (HEC, 2008) may be used for this computation. Results may be reported as shown in paragraphs F-4 and F-5.

(5) Step 5: Simulate system behavior and performance with the features of the proposed alteration in place as necessary to revise and modify all functions and transforms throughout the system to reflect changes due to the proposed alteration.

(a) Analysis needed in this step will depend upon the proposed alteration. For example, if the alteration includes the addition of flood storage or changes to the manner in which available storage is operated, a reservoir system simulation model such as HEC-ResSim may be developed and ran with a period of record or selected hypothetical events. Through this model, a new unregulated to regulated discharge transform can be developed.

(b) Similarly, if the proposed alteration includes changes to the channel, for example through levee setbacks, these changes must be simulated to derive new transforms for downstream locations. Those transforms may change as a result of the channel changes.

(c) The system analysis must include a forecast of future hydrologic and hydraulics conditions with proposed alteration features in place. The analysis must consider the effects of reasonably foreseeable future alterations and/or projects throughout the system in conjunction with the proposed alteration.

(6) Step 6: Compute hydrologic and hydraulics conditions with the proposed alteration performance indices at index locations system-wide. Hydrologic and hydraulics performance are computed point by point within the extent of the system. The HEC-FDA software (HEC, 2008) may be used for this computation.

(7) Step 7: Determine if likelihood of inundation is transferred by comparing hydrologic and hydraulics performance indices system-wide. Once various indices of hydrologic and hydraulics performance is computed and reported, system-wide impact of a proposed alteration

can be assessed. For proposed alterations that reduce the likelihood of inundation, the AEP will be less and confidence in reduction in likelihood of inundation will be greater. However, these outcomes may not be true for all index locations within the system; therefore all locations must be assessed. Proposed alterations may have adverse changes, thus shown as increases in AEP and to decreases in assurance at one or more index points. If these adverse changes are determined to be significant, then the proposed alteration likely must be denied. If the district is unsure about determining if adverse impacts are significant, the district should engage the division and HQUSACE, reference paragraph 9 of the main EC, Vertical Teaming.

F-5. Display of Hydrologic and Hydraulics System Performance Reporting.

a. The performance is required to be described. Useful measures of this performance include the following:

(1) Annual exceedance probability for overtopping only. This measure is well represented by the annual exceedance probability computed for a location in the floodplain if that computation includes the entire range of exposure. For example, in the case of a floodplain containing a levee, the annual exceedance probability may be computed considering capacity exceedance due to overtopping only. Uncertainty about all functions must be included in the annual probability computations. Annual exceedance probability must also consider the entire range of discharge or elevation represented by the probability functions, from the $p = 0.50$ to $p = 0.002$ events, for example. Uncertainty about all functions must be included in the annual probability computations. Table F-1 provides a way to describe the performance at each index point in terms of AEP.

Table F-1 AEP

Index Point	Existing AEP	With Alteration AEP	Change in AEP
1			
2			
N			

(2) Assurance for overtopping only for selected flood loading. This performance measure represents the probability that an index point will perform as expected when the system is loaded with a single selected flood. For example, this index of performance may quantify the probability that the system will perform as expected if the flood discharge is 350,000 cfs (9,911 cu m/sec), or if the annual maximum event is a $p = 0.01$ event. The computation must consider uncertainty. Table F-2 provides a way to describe the performance at each index point for various flood events in terms of assurance (also referred to as “CNP”).

Table F-2 Assurance

Index Point	Probability of Annual Event					
	0.02		0.01		0.004	
	Existing	With Alteration	Existing	With Alteration	Existing	With Alteration
1						
2						
N						

In other words, this index of performance shows the probability that the target stage associated with each alteration plan will not be exceeded, given the occurrence of an event of specified annual chance exceedance probability.

b. To improve the understanding of the impacts of the proposed alteration, inundation maps showing flood depths for the two scenarios of 1) without the proposed alteration and 2) with the proposed alteration will be required. The inundation maps will include the location of the proposed alteration and areas within the system where hydrologic and hydraulics impacts may occur.

F-6. Display of System-Wide Hydrologic and Hydraulics Performance and Uncertainty Information. Displaying and reporting of system-wide hydrologic and hydraulics performance and uncertainty will require engineering judgment. Reference F-2.d. of this appendix may be used as an example. There may be challenges in developing consistent system-wide inflow flood-frequency curves with uncertainty; accurately representing reservoir operation rules with attendant uncertainty to develop regulated flow frequency curves; and adequately reflecting the integrity or lack thereof of the system with its associated uncertainty. The reference in paragraph F-2.e. contains further description of the challenges. Displaying and reporting of system-wide hydrologic and hydraulics performance and uncertainty information is an extension of displaying and reporting of hydrologic and hydraulics performance and uncertainty for a single site or impact area.

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Appendix G

Funding Agreements for the Purposes of Reviewing Requests Pursuant to 33 U.S.C. 408

G-1. Purpose. The purpose of this appendix is to provide guidance on the establishment, management, and oversight of funding agreements under two statutory authorities that allow the US Army Corps of Engineers (USACE) to accept and expend funds to expedite the review process for requests to alter USACE civil works projects pursuant to 33 U.S.C. 408, Section 14 of the Rivers and Harbors Appropriations Act of 1899, as amended (Section 408). The first statutory authority is 33 U.S.C. 2352, Section 214 of WRDA 2000, as amended (Section 214). This memorandum incorporates changes as a result of Section 1006 of the Water Resources Reform and Development Act of 2014 (WRRDA). The second statutory authority is 23 U.S.C. 139(j) (Section 139(j)), added to Title 23 of the United States Code by Section 6002 of the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU). Districts should select one or the other authority as applicable to the funding agreement. This appendix describes the specific requirements applicable to funding agreements under each authority, and in addition, common requirements that must be included in both types of funding agreement.

G-2. References.

a. 25 USC 479a. Publications of List of Recognized Tribes.

b. 20 USC 139(j). Efficient Environmental Reviews for Project Decision-Making.

c. Section 214 of the Water Resources Development Act of 2000 (Public Law 106-541), as amended (33 USC 2352).

d. Section 404 of the Clean Water Act. Permits for Dredged or Fill Material.

e. Section 10 of the Rivers and Harbors Act Section 10. Obstruction of Navigable Waters, Generally; Wharves, Piers, and Excavations and Filling In.

f. 10 USC 2695. Acceptance of Funds to Cover Administrative Expenses Relating to Certain Real Property Transactions.

g. US Army Corps of Engineers, Updated Implementation Guidance for Section 1006 of the Water Resources Reform and Development Act of 2014 and Guidance on the Use of Funding Agreements within the Regulatory Program, memorandum, 2 September 2015.

G-3. Authority.

a. Section 214 provides that the Secretary of the Army, after public notice, may accept and expend funds contributed by a non-federal public entity, natural gas company, or public-utility company to expedite the permit review process. The authority to accept and expend funds

from non-federal public entities does not expire, unless modified by law. The authority to accept and expend funds from public-utility companies and natural gas companies expires on June 10, 2021, unless otherwise extended or revoked by law.

b. Section 139(j) provides that the Secretary of Transportation may approve a request by a State to provide funds to affected Federal agencies participating in the environmental review process to support activities that directly and meaningfully contribute to expediting and improving transportation project planning and delivery for projects in that State.

G-4. Funding Agreements Pursuant Only to Section 214 of WRDA 2000, as amended.

a. By memorandum dated 29 June 2015, the Secretary of the Army delegated his authority to the Assistant Secretary of the Army for Civil Works. This authority has been re-delegated by memorandum dated 1 July 2015 to the Chief of Engineers and his authorized representatives to, after public notice, accept and expend funds contributed by non-federal public entities, public-utility companies, or natural gas companies to expedite the evaluation of permits under the jurisdiction of the Department of the Army. The Chief of Engineers re-delegated this authority to District and Division Commanders by memorandum dated 3 August 2015. The Administrative Assistant to the Secretary of the Army was provided copies of these delegations on 3 August 2015. These delegations of authority shall remain in effect until 10 June 2021.

b. Although not a limitation on the authority of any official that has been delegated the authority indicated in paragraph G-4.a., in those cases where a proposed action or decision regarding the acceptance of funds contributed by non-federal public entities, natural gas companies, or public-utility companies represents a change in precedent or policy is of significant White House, Congressional, Department of the Army or public interest; or has been or should be of interest or concern to the Assistant Secretary of the Army for Civil Works or the Secretary of the Army for any reason, the following procedure should be followed:

(1) Prior to making a decision on whether to accept and expends funds under Section 214 or rendering a Section 408 decision under a Section 214 agreement, the district shall notify the appropriate HQUSACE Regional Integration Team (RIT) through the division of the circumstances of the action or decision.

(2) The HQUSACE RIT in coordination with the HQUSACE Section 408 proponent for this policy will determine if briefing of Army is required in accordance with the delegation requirements, and arrange an informational briefing, as necessary. Should a briefing be required, the district will hold the decision of concern in abeyance until the briefing is completed.

c. Funding can only be accepted and expended through Section 214 funding agreements to expedite a Section 408 review if the proposed alteration serves a public purpose. Districts must evaluate proposed agreements from non-federal public entities to ensure that the proposed projects serve a public purpose, and districts have discretion in making that determination. It is recognized and allowable that funds provided under a Section 214 agreement with a non-federal public entity may potentially originate from a private entity or a combination of public and

private entities, so long as it is verified that the project serves a public purpose. In the WRRDA 2014 amendments to Section 214, Congress added public-utility companies and natural gas companies as potential parties to funding agreements under Section 214. Congress has determined which activities carried out by public-utility companies and natural gas companies serve a public purpose, as discussed in paragraphs G-4.c.(2) and G-4.c.(3) below.

d. Funding agreements pursuant to Section 214 may be executed with the following entities:

(1) Non-Federal Public Entities. The term "non-federal public entity" is limited to governmental agencies or governmental public authorities, including governments of Federally recognized Indian Tribes, e.g., any Indian or Alaska Native Tribe, band, nation, pueblo, village, or community that the Secretary of the Interior acknowledges to exist as an Indian Tribe pursuant to the Federally Recognized Indian Tribe List Act of 1994 [25 U.S.C. 479(a)]. Typical Section 408 requesting public entities may include: flood risk management districts, water conservation agencies, storm water management agencies, transportation departments, hydropower agencies, and port authorities. Private entities cannot be considered non-federal public entities. If the entity executing the Section 214 agreement is not the non-federal sponsor of the affected project, the executing party must have the endorsement of the non-federal sponsor as outlined in paragraph 6.d. of EC 1165-2-216.

(2) Public-Utility Companies. Public-utility companies include the following two subcategories: (i) electric utility companies, which are companies that own or operate facilities used for the generation, transmission, or distribution of electric energy for sale; and (ii) gas utility companies, which are companies that own or operate facilities used for distribution at retail of natural or manufactured gas for heat, light, or power (other than the distribution only in enclosed portable containers or distribution to tenants or employees of the company operating such facilities for their own use and not for resale). These companies are subject to Federal regulation outside of USACE authorities dating from the 1930's because Congress determined that such companies affected the public interest. Section 214 agreements with public-utility companies, as defined in this guidance, involving Section 408 requests will be limited to proposed alterations involving facilities for the generation, transmission, or distribution of electric energy for sale and facilities used for distribution at retail of natural or manufactured gas for heat, light, or power. Questions about possible exceptions to these limitations or appropriate courses of action should be coordinated through the division to HQUSACE.

(3) Natural Gas Companies. Section 214 also allows for funding agreements to be entered into with a natural gas company. A natural gas company is a company engaged in the transportation of natural gas in intrastate or interstate commerce or the sale of such gas in interstate commerce for resale. The transportation of natural gas in interstate commerce is subject to Federal regulation outside of USACE authorities dating from the 1930's because Congress determined that such activities affected the public interest. Section 408 requests reviewed under a Section 214 agreement with a natural gas company will be limited to alterations involving the transportation of natural gas (inclusive of gas gathering lines, feeder lines, transmission pipelines, and distribution pipelines) and any attendant storage facilities, as

these projects serve a public purpose. Questions about possible exceptions to these limitations or appropriate courses of action should be coordinated through the division to HQUSACE.

e. Funding agreements with municipal electric or gas authorities that meet the definition of non-federal public entity and the definition of public-utility company or natural gas company are not subject to the June 10, 2021, expiration date of the authority for public-utility and natural gas companies because they meet the definition of non-federal public entity.

f. Energy exploration and production activities, such as drilling, hydrofracturing, or mining, are not to be reviewed under Section 214 agreements with public-utility companies or natural gas companies, as these activities do not involve the generation, transmission, or distribution of electric energy or the transportation and/or distribution of natural gas.

g. No funds provided by a federal agency to a non-federal public entity may be accepted by USACE under Section 214 unless the non-federal public entity forwards to USACE a written confirmation from the federal agency that the use of the funds to expedite the evaluation of Section 408 permit applications is acceptable.

h. Activities conducted in accordance with a Section 214 agreement must expedite the Section 408 review process. Expediting the review process could include generally shorter review times as compared to prior to the agreement and the facilitation of a smoother review process through improved coordination and communication or through the development or use of programmatic agreements or standard operating procedures. The expedited review cannot result in an adverse effect on the timeframes for review of other Section 408 requests within the same district, when considered collectively.

G-5. Funding Agreements Pursuant Only to 23 U.S.C. Section 139(j).

a. Section 139(j) only allows for USACE to enter into funding agreements with state agencies. The U.S. Department of Transportation (USDOT) has additionally interpreted the statute as allowing tolling commissions and some Municipal Planning Organizations (MPOs) to be eligible to enter into a funding agreement. Section 139(j) agreements additionally require approval by the Secretary of Transportation, as state agencies are eligible to receive reimbursement with USDOT funds for these agreements. The USDOT has delegated approval of funding agreements down to the division level of either Federal Highways Administration (FHWA) or the Federal Transit Administration (FTA). The USDOT has not interpreted Section 139(j) as allowing other modal administrations (Federal Railroad Administration, Federal Aviation Administration, Maritime Administration) to support agreements with state agencies. Therefore, districts may only enter into a Section 139(j) agreement with highway and/or transit agencies.

b. Activities conducted in accordance with a Section 139(j) agreement must directly and meaningfully contribute to expediting and improving transportation project planning and delivery within the given State. In addition, Section 139(j) restricts the state transportation agency to only provide funds for activities beyond USACE's normal and ordinary capabilities

under its general appropriations. Because transportation project planning and delivery encompasses a variety of activities and reviews, participation in the transportation planning (pre-NEPA) process and streamlining initiatives such as NEPA/Section 408 synchronization efforts are encouraged under Section 139(j), along with activities described in paragraph G-6.a., so long as those activities result in review times that are less than the customary time necessary for such a review. FHWA has provided guidance that the development of programmatic agreements and initiatives satisfies the requirement to reduce time limits as long as the results of those efforts are designed to provide a reduction in review time. Section 139(j) puts the onus on FHWA and FTA to interpret allowable activities under the statute. Districts shall consider FHWA or FTA's approval of a funding agreement as certification that the agreement is compliant with Section 139(j). Section 139(j) agreements must meet FHWA/FTA's standards and requirements contained in this guidance.

c. FHWA or FTA may require documentation of the "customary time" necessary for a review and/or establishment of performance metrics for the agreement to demonstrate it is contributing to expediting and improving transportation project planning and delivery. Districts have discretion on the number and type of performance metrics within an agreement, including which milestones to use to determine time in review (receipt of request, date determined complete, etc.). When considering the quantity and content of any performance metrics for an agreement, the district must consider the potential effect of those metrics on performance management within the whole district. Districts must be cautious to not agree to any performance metrics that would be so onerous or stringent that achieving them comes at the cost of decreased performance for other Section 408 requests in the district.

d. Funding Agreements. A Section 139(j) funding agreement between the district(s) or division(s) and the funding transportation agency must include the projects and priorities to be addressed by the agreement. If the funding transportation agency does not know a list of projects and/or priorities at the time of the agreement, then the funding agreement should describe the process to identify or change projects and/or priorities for the agreement.

G-6. Guidance for Funding Agreements Pursuant to Both Section 214 or Section 139(j).

a. Acceptable Uses of Funds. Prior to expending funds on any activity, the district must determine that the activity contributes to meeting the specific purpose of the appropriate authority.

(1) Examples of acceptable activities that the funds may be expended on include, but are not limited to: district-led Agency Technical Review, real estate evaluation, technical writing, site visits, training, travel, field office set up costs, coordination activities, additional personnel (including support/clerical staff), technical contracting, programmatic tool development and improvement, and acquisition of geographic information system (GIS) data. Funds may also be used to hire contract staff. If contracts are used to develop decision documents or other NEPA documentation, such documents must be drafts only and be reviewed and adopted by the USACE decision maker pursuant paragraph 6.t. of EC 1165-2-216 before a Section 408 decision can be made.

(2) No funds received under Section 214 or Section 139(j) will be used by the Division or District Commanders for their review, recommendation, or decision concerning a Section 408 request.

(3) Section 214 and Section 139(j) will not be used to accept and expend funds to cover administrative expenses related to the issuance of real property instruments required if the Section 408 permission is granted. Those administrative costs for drafting, negotiating, or issuing any necessary real estate instruments will be accepted under the provisions of 10 USC 2695.

(4) Funds will not be used for enforcement activities. However, funds from these agreements may be used for compliance activities, including monitoring and compliance inspections. Enforcement activities must be charged to the applicable appropriations account based on the USACE civil works project.

b. Initial Public Notice for Intent to Accept Funds.

(1) Prior to accepting and expending funds, the division or district must issue a public notice, post the public notice in a clearly identified and easily accessible area (e.g., "Acceptance of Funds for Expediting Section 408 Requests") on its webpage, and distribute the notice to concerned agencies, organizations, and the interested public.

(2) The public notice will describe the entity providing such funds, the USACE authority to accept and expend such funds, the reason for such contributions, how acceptance of the funds is expected to expedite the Section 408 review process, what types of activities the funds will be expended on, what procedures will be in place to ensure that the funds will not impact the division or district's impartial decision making, and information on the impacts, if any, to the district's and division's Section 408 review and evaluation process that is not subsidized by funds contributed. Further, if funds are also intended to be accepted or have been accepted to expedite the evaluation of Section 10/404/103 permit applications for the same proposed alteration and/or by the same non-federal public entity, such intention should be clearly stated in the public notice. The public notice must also include information on the impacts of the proposed funding agreement on the division or district's ability to review other Section 408 requests.

c. Basis for Acceptance of Funds.

(1) Following the review of the comments received in response to the public notice, the Division or District Commander will determine if the acceptance and expenditure of funds is appropriate in consideration of the requirements under the applicable statutory authority, if the division or district will be able to preserve impartial decision making, and if the acceptance and expenditure of funds will not adversely affect review timeframes for other Section 408 requests. A final draft of a funding agreement, see paragraph G-6.d., must be completed to inform the decision.

(2) If the Division or District Commander determines, after considering public comments, that the acceptance and expenditure of the funds is appropriate, the funds may be accepted and expended. This decision will be documented in a Memorandum for the Record (MFR). An informational public notice will be issued regarding the Division or District Commander's decision. The division or district will post the informational public notice on its webpage in the same, easily identifiable and accessible area used for the initial public notice, and distribute the notice to concerned agencies, organizations, and the interested public. The districts must also provide a link on its webpage to the HQUSACE Section 408 webpage at http://www.usace.army.mil/Missions/CivilWorks/Section408 where active funding agreements will be posted.

d. Acceptance of Funds.

(1) Funds may only be accepted after the finalization of the decision MFR and issuance of the public notice of the execution of the funding agreement. Funding agreements will typically be executed in the format of a Memorandum of Agreement (MOA). At a minimum, the agreement must include a scope of work and an itemized budget estimate, address the provision of additional funds if needed, as well as the return of unused funds, and must identify the total annual cost for each federal fiscal year covered by the term of the MOA. The itemized budget estimate must include identification of personnel, hourly rates, indirect labor costs, estimated hours of work, and travel costs related to the MOA scope of work.

(2) Section 408 funding agreements may additionally cover the review of related Section 10/404/103 permits.

(3) Issuance of a new public notice is not required for renewal or modification of a funding agreement if the purpose of the agreement remains the same. For example, a new public notice would not be required if the MOA is amended to extend the term of the agreement, modify the proposed alteration identified in the MOA, adjust the terms of the advance payment contemplated under the MOA, or allow funding to be used for related Section 10/404/103 permit applications. The decision and basis for the renewal or modification should be documented in the MFR described in paragraph G-6.c.(2).

(4) Upon execution of any new, modified, or renewed funding agreement, the district or division shall forward a signed copy of the agreement to the HQUSACE Section 408 proponent for this policy for posting on the HQUSACE Section 408 website at http://www.usace.army.mil/Missions/CivilWorks/Section408.

e. Impartial Decision Making.

(1) Maintaining impartiality in decision making is of utmost importance under any funding agreement. Division and District Commanders must ensure that the acceptance and expenditure of funds from external entities will not impact impartial decision making with respect to application review and any final decision, either substantively or procedurally.

(2) Since Section 408 decisions may be at the Director of Civil Works level or the District Commander level, depending on the estimated magnitude of the impacts of the proposed alterations on the relevant USACE projects, impartial decision making at all review levels must be ensured. In cases where the approval authority is at the level of the Director of Civil Works, and the district has accepted funds, the district, through the division, must provide sufficient information to assure the decision maker that the acceptance and expenditure of funds by the district have not affected the district's or the division's evaluation of the Section 408 request, either substantially or procedurally. This information must be included as part of the Summary of Findings for the Section 408 request.

(3) When a final Section 408 decision has been made either by the Director of Civil Works or District Commander, that decision will be made publicly available on the originating district's webpage in an area clearly identifiable as being for Section 408 reviews funded through Section 214 or Section 139(j).

f. Tracking of Funds. The funds must be accounted for to ensure that they are expended for their intended purpose. Each district will establish a separate account to track receipt and expenditure of the funds in the Corps of Engineers Financial Management System. USACE personnel accomplishing the technical and administrative tasks required to expedite the evaluation of the Section 408 request covered by the MOA will charge their time against a specific account when working on those requests.

g. Annual Reporting. Within 30 calendar days of the conclusion of each fiscal year, district and division Section 408 coordinators will provide to the HQUSACE Section 408 proponent for this policy an annual letter report using the template provided below in G-7, documenting the following:

(1) A list of all active funding agreements during the subject fiscal year, including the date in which the agreement was initiated and whether Section 214 or Section 139(j) was used;

(2) An accounting of the total funds accepted and total funds expended per funding agreement;

(3) A list of all Section 408 decisions issued for the subject fiscal year under each funding agreement;

(4) A quantitative or qualitative assessment of how the use of funds expedited the Section 408 review process for each funding agreement;

(5) A brief description of the process used to ensure impartial decision making for each of the Section 408 decisions issued in the subject fiscal year;

(6) A statement certifying that all funded personnel are aware of and are appropriately trained on the requirements contained in this guidance memorandum; and,

(7) The MFR documenting the District or Division Commander's decision to accept funds for each active funding agreement.

HQUSACE will compile the reports received and provide a combined annual report to the Assistant Secretary of the Army for Civil Works (ASA(CW)). The ASA(CW) will submit the combined annual report to the specified Congressional committees within 90 days of the conclusion of each fiscal year.

G-7. Annual Reporting Template.

SUBJECT: *XXX* District FY 20*XX* Reporting for Funding Agreements to Expedite the Section 408 Review Process

1. Active Funding Agreements: (*In a table format such as below, list all funding agreements by name of the entity the agreement is with that were active during the subject fiscal year. Include initiation date of the agreement in MM/DD/YY format; mark an X in the cell indicating whether Section 214 or Section 139(j) was used; total funds accepted for the entire length of the agreement; total funds accepted for the subject fiscal year per agreement; total funds expended for the subject fiscal year per agreement; and the final Section 408 decision made associated with the agreement if a final decision has been made (mark this "review still pending" if no decision has been made yet).*)

Active Funding Agreement Name of Entity, (select one: non-federal, natural gas company, or public utility company)	Initiation Date	Section 214	Section 139(j)	Total Funds Accepted for the Agreement	Total Funds Accepted this FY	Total Funds Expended this FY	Section 408 Decision

2. Assessment: The goal of these funding agreements is to expedite the Section 408 review process. The following describes how funds from these agreements have been used to expedite the Section 408 review process.

(*Qualitatively or quantitatively describe how the use of the funds expedited the Section 408 review process. Include a separate description for each agreement if different means were used. For example, qualitative examples may include describing the dedication of staff for review, improved communication, and/or faster responses. Quantitative examples may include number of days of review time reduced or percentage of milestones met.*)

3. Impartial Decision Making: While funds may be accepted to expedite the Section 408 review process, the funds must not impact impartial decision making. The following outlines what measures have been taken to maintain impartial decision making for the Section 408 requests under these funding agreements.
(*List and describe all measures in place to monitor impartial decision making. If there were any issues or lapses, indicate so, and what steps were taken to resolve the situation.*)

4. Training: (*Include a statement certifying that all funded personnel are aware of and appropriately trained on the requirements contained within EC 1165-2-216 and this guidance memorandum. A description of training methods should be included*).

Encls (Attach decision MFRs) *XXX* District (or Division) Section 408 Coordinator

Appendix H

Example Section 408 Decision Letter

District Letterhead
(*Date here*)

(*Name and address of requester of determination here*)
[Mr./Ms.] (Full Name of Requester)
(Title of Requester**)**
(Requester Address**)**
(City, State Abbreviation**, and Zip Code)**

Dear [Mr./Ms.] (Last Name of Requester),

The (*district name here*) District of the U.S. Army Corps of Engineers (USACE) has performed an evaluation of your request to (*brief description of proposed alteration*) to (*name of federal project to be altered*) operated and maintained by (*name (s) of non-federal sponsor (s) and/or USACE*) pursuant to Section 14 of the Rivers and Harbors Act of 1899, 33 USC 408 (Section 408). This evaluation was performed in accordance with Engineer Circular (EC) 1165-2-216.

Based on this evaluation, the (*district name here*) District ("grants" or "denies") the request to alter (*name of federal project to be altered*) for the following reasons: (*summarize rationale*). (*Add optional language related to any special conditions*). (*If permission is granted, include the following statement – "As the requestor, you are solely responsible for any remedial action needed to correct any deficiency in the design or construction of the requested alteration.")*

For any questions regarding this evaluation, please contact (*name and title of district Section 408 point of contact here*) at (*contact information here*).

Sincerely,
(Name of District Commander)

(*district name here*)
U.S. Army Corps of Engineers

Enclosures (*Attach supplemental documentation as needed).*

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Appendix I

Acronyms

CFR	Code of Federal Regulation
CEQ	Council on Environmental Quality
EC	Engineer Circular
EP	Engineer Pamphlet
ER	Engineer Regulation
EA	Environmental Assessment
EIS	Environmental Impact Statement
FONSI	Finding of No Significant Impact
IEPR	Independent External Peer Review
M&I	Municipal and Industrial
MOU	Memorandum of Understanding
NEPA	National Environmental Policy Act
O&M	Operations and Maintenance
PPA	Project Partnership Agreement
ROD	Record of Decision
USACE	United States Army Corps of Engineers
USC	United States Code

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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

ER 1100-2-8162

CECW-CE
CECW-P

Regulation
No. 1100-2-8162

31 December 2013

INCORPORATING SEA LEVEL CHANGE IN CIVIL WORKS PROGRAMS

1. Purpose. This Regulation provides United States Army Corps of Engineers (USACE) guidance for incorporating the direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and systems of projects.

2. Applicability. This Regulation applies to all USACE elements having Civil Works responsibilities and is applicable to all USACE Civil Works activities. This guidance is effective immediately and supersedes all previous guidance on this subject.

3. Distribution Statement. This publication is approved for public release; distribution is unlimited.

4. References. Required and related references are at Appendix A. A glossary is included at the end of this document.

5. Geographic Extent of Applicability.

a. USACE water resources management projects are planned, designed, constructed, and operated locally or regionally. For this reason, it is important to distinguish between global mean sea level (GMSL) and local (or "relative") mean sea level (MSL). At any location, changes in local MSL reflect the integrated effects of GMSL change plus changes of regional geologic, oceanographic, or atmospheric origin as described in Appendix B and the Glossary.

b. Potential relative sea level change must be considered in every USACE coastal activity as far inland as the extent of estimated tidal influence. Fluvial studies that include backwater profiling should also include potential relative sea level change in the starting water surface elevation for such profiles, where appropriate. The project vertical datum must be the latest vertical reference frame of the National Spatial Reference System, currently NAVD88, to be held as constant for tide station comparisons, and a project datum diagram must be prepared per EM 1110-2-6056.

This regulation supersedes EC 1165-2-212, dated 1 October 2012

6. Incorporating Future Sea Level Change (SLC) Projections into Management, Planning, Engineering Design, Construction, and Operation and Maintenance of Projects.

a. Research by climate science experts predict continued or accelerated climate change for the 21st century and possibly beyond, which would cause a continued or accelerated rise in global mean sea level. (See Appendix B)

b. The resulting local relative sea level change (SLC) will likely impact USACE coastal project and system performance. As a result, managing, planning, engineering, designing, operating, and maintaining for SLC must consider how sensitive and adaptable 1) natural and managed ecosystems and 2) human and engineered systems are to climate change and other related global changes.

c. Planning studies and engineering designs over the project life cycle, for both existing and proposed projects, will consider alternatives that are formulated and evaluated for the entire range of possible future rates of SLC, represented here by three scenarios of "low," "intermediate," and "high" SLC. These alternatives will include structural, nonstructural, nature-based, or natural solutions, or combinations of these solutions. Alternatives should be evaluated using "low," "intermediate," and "high" rates of future SLC for both "with" and "without" project conditions. The historic rate of SLC (as described in Appendix B) represents the "low" rate. The "intermediate" and "high" rates are based on the following:

(1) The "intermediate" rate of local mean sea level change is estimated using the modified National Research Council (NRC) Curve I and equations 2 and 3 presented in Appendix B (see Figure B-10) and is corrected for the local rate of vertical land movement as discussed in Appendix B.

(2) The "high" rate of local mean SLC is estimated using the modified NRC Curve III and equations 2 and 3 in Appendix B (see Figure B-10) and is corrected for the local rate of vertical land movement as discussed in Appendix B. This "high" rate exceeds the upper bounds of IPCC estimates from both 2001 and 2007 to accommodate the potential rapid loss of ice from Antarctica and Greenland, but it is within the range of values published in peer-reviewed articles since that time (see Figure B-1).

(3) The low, intermediate, and high scenarios at NOAA tide gauges can be obtained through the USACE on-line sea level calculator at http://www.corpsclimate.us/ccaceslcurves.cfm.

d. Once the three rates have been estimated, the next step is to determine how sensitive alternative plans and designs are to these rates of future local mean SLC, how this sensitivity affects calculated risk, and what design or operations and maintenance measures should be implemented to adapt to SLC to minimize adverse consequences while maximizing beneficial effects. Alternative plans and designs are formulated and evaluated for three SLC possible futures. Alternatives are then compared to each other, and an alternative is selected for

recommendation. The approach to formulation, comparison, and selection should be tailored to each situation. The performance should be evaluated in terms of human health and safety, economic costs and benefits, environmental impacts, and other social effects. There are multiple ways to proceed at the comparison and selection steps. Possible approaches include:

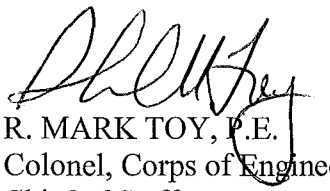
(1) Working within a single scenario and identifying the preferred alternative under that scenario. That alternative's performance would then be evaluated under the other scenarios to determine its overall potential performance. This approach may be most appropriate when local conditions and plan performance are not highly sensitive to the rate of SLC.

(2) Comparing all alternatives against all scenarios rather than determining a "best" alternative under any specific future scenario. This approach avoids focusing on an alternative that is only best under a specific SLC scenario and prevents rejecting alternatives that are more robust in the sense of performing satisfactorily under all scenarios. This comprehensive approach may be more appropriate when local conditions and plan performance are very sensitive to the rate of SLC.

(3) Reformulating after employing approaches (1) or (2) to incorporate robust features of evaluated alternatives to improve the overall life-cycle performance.

e. Plan selection should explicitly provide a method to address uncertainty, describing a sequence of decisions allowing for adaption based on evidence as the future unfolds. Since Civil Works projects typically have an actual physical life far beyond the period of economic analysis, careful consideration of adaptability is an important consideration in project formulation and development. Decision makers should not presume that the future will follow any one of the SLC scenarios exactly. Instead, analyses should determine how the SLC scenarios affect risk levels and plan performance, and identify the design or operations and maintenance measures that could be implemented to minimize adverse consequences while maximizing beneficial effects.

FOR THE COMMANDER:



R. MARK TOY, P.E.
Colonel, Corps of Engineers
Chief of Staff

2 Appendices:
APPENDIX A: References
APPENDIX B: Technical Supporting Material
Glossary

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APPENDIX A

References

A-1. Required References.

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APPENDIX B

Technical Supporting Material

B-1. Background on Sea Level Change.

a. In the preparation of this document USACE has relied on climate change science performed and published by agencies and entities external to USACE. The conduct of science as to the causes, predicted scenarios, and consequences of climate change is not within the USACE mission as a water resources management agency. USACE has been proactive, however, in working closely with science agencies to develop actionable science that can inform planning and engineering decisions. USACE climate change adaptation guidance will be periodically reviewed and revised as new information becomes available.

b. USACE water resources management projects are planned, designed, constructed, operated, and maintained locally or regionally. SLC can cause a number of impacts in coastal and estuarine zones, including changes in shoreline erosion, inundation or exposure of low-lying coastal areas, changes in storm and flood damages, shifts in the extent and distribution of wetlands and other coastal habitats, changes to groundwater levels, and alterations to salinity intrusion into estuaries and groundwater systems (e.g., CCSP 2009). At any location, changes in local relative sea level (LRSL) reflect the integrated effects of global mean sea level (GMSL) change plus local or regional changes of geologic, oceanographic, or atmospheric origin. Atmospheric origin refers to the effects of the climate oscillations such as the El Niño-Southern Oscillation (ENSO) and the North Atlantic Oscillation (NAO), which in turn impact coastal SLC at decadal time scales. It is important to understand the processes resulting in changes to GMSL.

(1) Global Sea Level Change. Global (eustatic) SLC is often caused by the global change in the volume of water in the world's oceans in response to three climatological processes: 1) ocean mass change associated with long-term forcing of the ice ages ultimately caused by small variations in the orbit of the earth around the sun; 2) density changes from total salinity; and most recently, 3) changes in the heat content of the world's ocean, which recent literature suggests may be accelerating due to global warming. Global SLC can also be caused by basin changes through such processes as seafloor spreading. Thus, global sea level, also sometimes referred to as global mean sea level, is the average height of all the world's oceans. Global sea level rise is a specific type of global SLC that climate models are forecasting to occur at an accelerated rate and is the topic of much of the discussion in this document. NOAA (2010) contains detailed information on GMSL; other publications provide a similar discussion (Church et al. 2007, NRC 2012).

(2) Relative Sea Level Change. Relative (local) SLC is the local change in sea level relative to the elevation of the land at a specific point on the coast. Relative SLC is a

combination of both global and local SLC caused by changes in estuarine and shelf hydrodynamics, regional oceanographic circulation patterns (often caused by changes in regional atmospheric patterns), hydrologic cycles (river flow), and local and/or regional vertical land motion (subsidence or uplift). Thus, relative SLC is variable along the coast. Relative SLC affects many applications, since the contribution to the local relative rate of rise from global sea level rise is expected to increase. Some areas, as discussed later in this chapter, are experiencing relative sea level fall, which can also have ecological and societal impacts. Some localized areas exhibit a more dramatic relative SLC trend than is generally observed globally unless data are filtered to account for local geophysical anomalies.

B-2. Determination of Historic Trends in Local MSL.

a. The planning, design, construction, operation, and maintenance of USACE water resource projects in and adjacent to the coastal zone must consider the potential for future accelerated rise in GMSL to affect the local MSL trend. At the same time, USACE project planners and engineers must be aware of the *historic* trend in local MSL, because it provides a useful minimum baseline for projecting future change in local MSL. Awareness of the historic trend of local MSL also enables an assessment of the impacts that SLC may have had on regional coastal resources and problems in the past.

b. Historic trends in local MSL are best determined from tide gauge records. The NOAA Center for Operational Oceanographic Products and Services (CO-OPS) provides historic information and local MSL trends for tidal stations operated by NOAA/NOS in the U.S. (see http://www.co-ops.nos.noaa.gov/index.shtml). NOAA CO-OPS has been measuring sea level for over 150 years, with tide stations operating on all U.S. coasts through the National Water Level Observation Network. The Permanent Service for Mean Sea Level (PSMSL), which is a component of the U.K. Natural Environment Research Council's National Oceanographic Centre, has been collecting, publishing, analyzing, and interpreting sea level data from the global network of tide stations since 1933. Global sea level data can be obtained from PSMSL via their website (http://www.psms.org). PSMSL should be considered as a source of information for non-U.S. stations that are not represented by NOAA-NOS. Using PSMSL data, NOAA-NOS also provides sea level trend estimates for stations identified by the Global Sea Level Observing System (GLOSS) community using the same methodology used for all U.S. stations (http://tidesandcurrents.noaa.gov/sltrends_global.shtml). Note that the periods of record for PSMSL gauges vary; some gauges have shorter periods of record than are recommended for relative SLC trend analysis. Figure B-1 illustrates the following conclusions:

(1) Most of the Atlantic and Pacific coasts of the lower contiguous 48 states have had sea level rise trends between 0 and 3 mm/yr (or 0 and +0.3 meters per century) (green symbols).

(2) The highest rates of local MSL rise in the U.S. have occurred along the Gulf Coast in the Mississippi River delta region at 9–12 mm/yr (or 0.9–1.2 meters per century) (red symbols), with significant rises in Texas and the mid-Atlantic (3–6 mm/yr or 0.3–0.6 meters per century).

(3) On the other hand, most stations in Alaska exhibit a falling trend of local MSL. Local mean sea level is falling relative to the land in many glacial fjords in Alaska because of local land vertical rebound after loss of the weight of the glaciers.

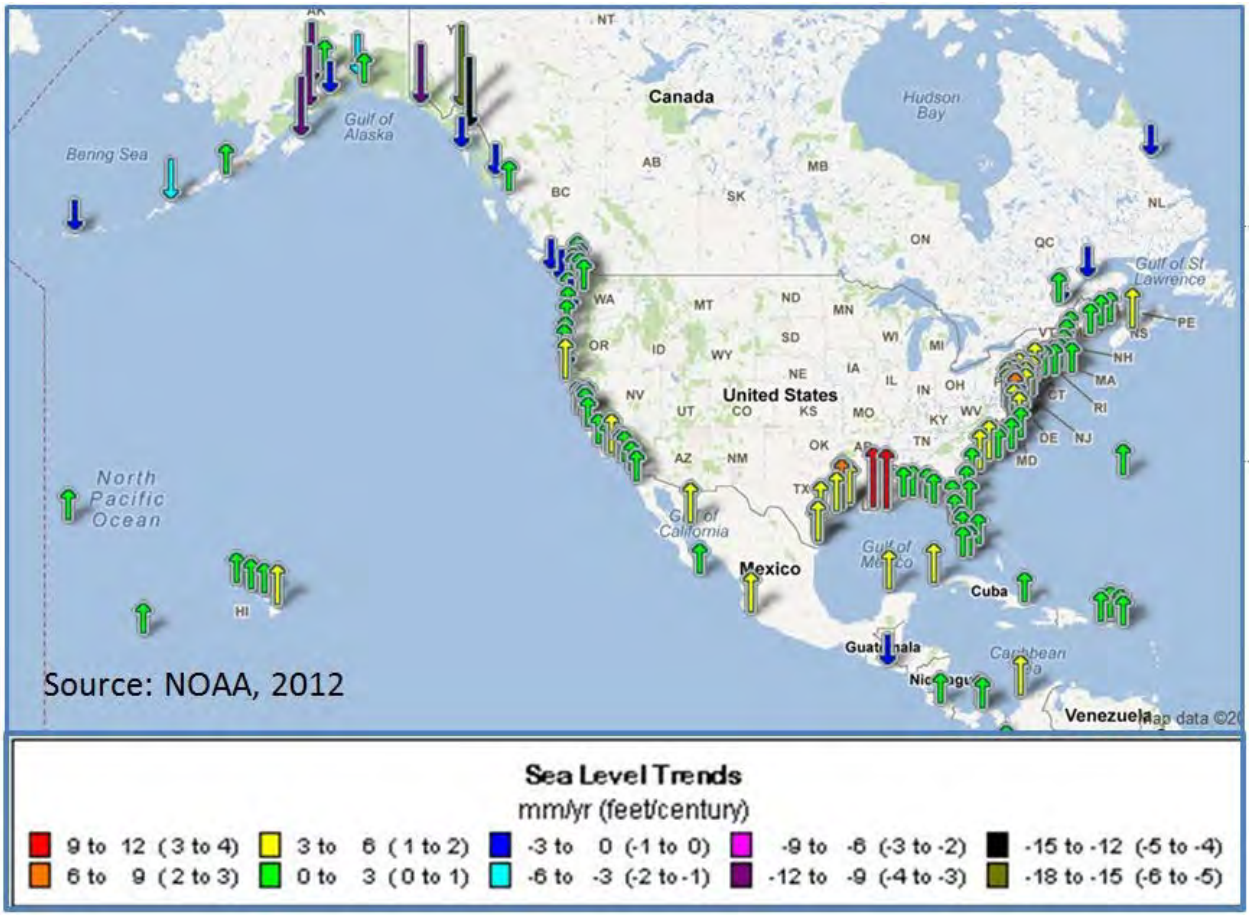


Figure B-1. Mean sea level trends for U.S. tide stations computed by NOAA for 128 long-term water level stations using a minimum span of 30 years of observations at each location. See http://tidesandcurrents.noaa.gov/sltrends/sltrends.shtml for updated information.

c. It is important to consider the length of tide station record required to obtain a robust estimate of the historic relative mean SLC. The length of the record is important because inter-annual, decadal, and multi-decadal variations in sea level are sufficiently large that misleading or

erroneous sea level trends can be derived from periods of record that are too short. (Douglas 2001, Zervas 2009). For example, Breaker and Ruzmaikin (2013) observed that decadal-scale variability can induce scatter into calculated acceleration rates for periods that are shorter than about 40 years.

d. The Manual on Sea Level Measurement and Interpretation (Intergovernmental Oceanographic Commission 1985, 2012) suggests that a tidal record should be of at least of two-tidal epoch duration (about 40 years) before being used to estimate a local MSL trend. Time series of 50–60 years are preferred in order to have reasonable confidence intervals for determining trends (Douglas 2001). Figure B-2 (from Zervas et al. 2009) shows the relationship between period of record and the standard error of the trend for selected U.S. tide stations. Note the significant decrease in standard error approximately at the 40- or 50-year period of record. Record lengths shorter than 40 years in duration could have significant uncertainty compared to their potential numerical trend values of a few millimeters per year. Using trends in relative mean sea level from records shorter than 40 years is not advisable. If estimates based on shorter terms are the only option, then the local trends must be viewed in a regional context, considering trends from simultaneous time periods from nearby stations to ensure regional correlation and minimize anomalous estimates. The nearby stations should have records that are long enough (greater than 40 years) to determine reasonable trends, which can then be compared to the shorter, local sea level records. Experts at NOAA-NOS should be able to assist when periods of record are short or records are otherwise ambiguous.

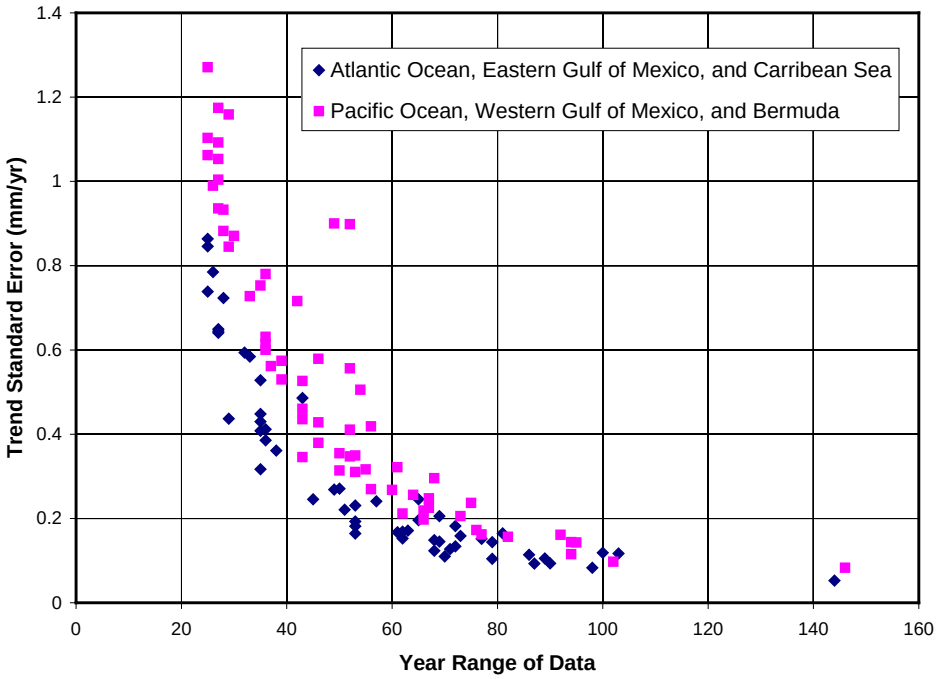


Figure B-2. Standard error of linear trend of sea level change vs. period of record for U.S. tide stations. (From Zervas et al. 2013.)

e. Standard Error of Estimate. For project planning and design supporting the entire project life cycle, the actual standard error of the estimate should be calculated for each tide gauge data trend analysis, and the estimates should not be used as the sole supporting data.

(1) For many locations along the U.S. Atlantic and Gulf of Mexico coastlines, tide station data are likely to have adequate spatial density and record duration to permit extrapolations between stations with an adequate degree of confidence.

(2) Recognized exceptions are the coastlines between Mobile, Alabama, and Grand Isle, Louisiana, and in Pamlico/Albemarle Sounds, North Carolina, which contain no acceptable long-term tide gauge records.

(3) Coastal Louisiana is subject to the highest rates of subsidence in the nation. Where a tide gauge is close to a project but has a short historical data duration, and another tide gauge is farther away but has a longer historical data duration, a tidal hydrodynamics expert (e.g., from NOAA-NOS) should be consulted as to the appropriate use of the closer tide gauge data.

f. Confidence Limits. Current information on the magnitude and confidence limits based on standard error of the estimate of trends for NOS tide stations is available online at http://tidesandcurrents.noaa.gov/sltrends/slrmap.html. Figure B-3 shows the Atlantic coast.

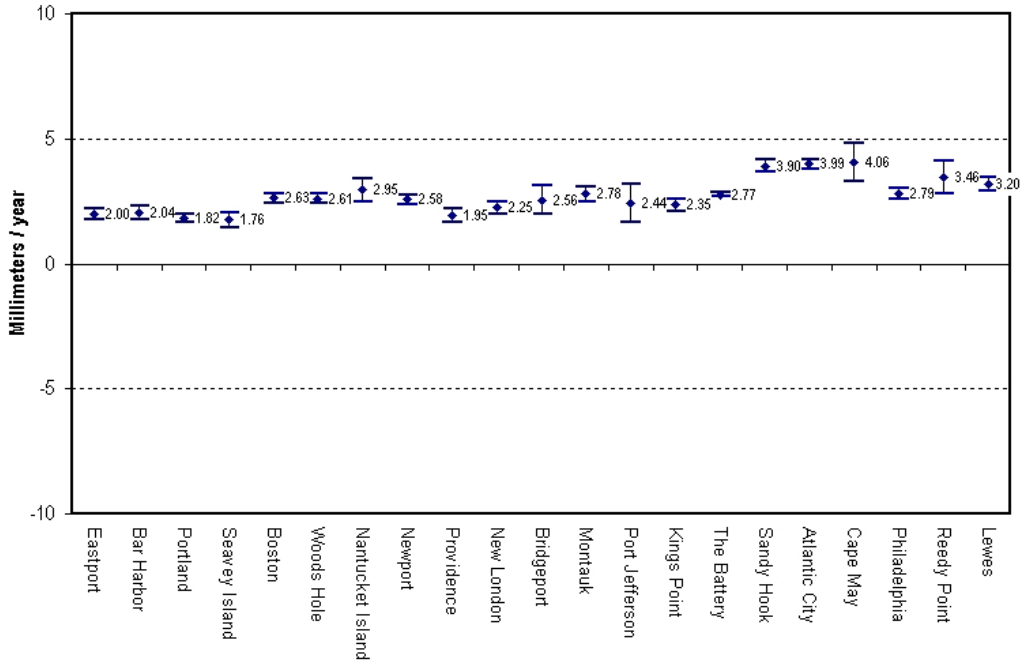


Figure B-3. Magnitude and confidence limits of trends for northern Atlantic coast NOS tide stations. [Zervas (2009), http://tidesandcurrents.noaa.gov/sltrends/index.shtml].

B-3. Regional Sea Level Change. Regional SLC rates should be evaluated as well as rates of local SLC and global SLC. The estimate of trends for NOS tide stations available online at http://tidesandcurrents.noaa.gov/sltrends/slrmap.html provides a sense of the regional variability of relative sea level trends around the coast. The graphical display of the data shows significant regional correlation of sea level trends, but in some instances the wide confidence limits also limit that interpretation. In many regions, a large component of the relative sea level trend can be due to vertical land motion, from either land subsidence or land isostatic rebound and deformation. The areas of maximum vertical land motion can generally be regionally described. For instance, in the coastal Louisiana and Texas region and the southeast Alaska region, the vertical land motion component dominates the trend. The graphical products from the satellite altimeter missions also demonstrate the regional variability of SLC. Although the average for the entire globe is approximate 3.0 mm/yr, there is significant regional variability, with some areas exhibiting neutral or even negative sea level trends. For the U.S., this is the case for much of the West Coast and Gulf of Alaska, for instance. Although the satellite altimeter average global rate is often used to suggest recent acceleration in rates of global sea level rise, the actual local or regional rate may be much different. Areas that could experience regional rates different than global rates include the northern Gulf of Mexico, the Gulf of Maine, and the Gulf of Alaska.

B-4. Estimating Future Change in Local MSL.

a. In USACE activities, analysts shall consider what effect changing relative sea level rates could have on design alternatives, economic and environmental evaluation, and risk. The analysis shall include, as a minimum, a low rate that shall be based on an extrapolation of the historical tide gauge rate, and intermediate and high rates that include future acceleration of GMSL. The analysis may also include additional intermediate rates, if the project team desires [e.g., the high rate from Parris et al. (2012)]. The sensitivity of each design alternative to the various rates of SLC shall be considered. Designs should be formulated using the wide body of currently accepted design criteria for each applicable mission area.

b. Uncertainty Over Time. The use of sea level rise scenarios as opposed to individual scenario probabilities underscores the uncertainty in how local relative sea levels will actually play out into the future. The use of “curves” is mathematically smooth, but it is unlikely that actual variations will have that attribute. The uncertainty is magnified when the responses of coastal systems and processes are considered or when the combined effects of sea level rise and altered storm frequency or intensity are evaluated.

c. The 1987 NRC report recommended that feasibility studies for coastal projects consider the high probability of accelerating GMSL rise and provided three different scenarios. NRC (1987) described these three scenarios using the following equation:

$$E(t) = 0.0012t + bt^2 \quad (1)$$

in which *t* represents years, starting in 1986, *b* is a constant, and *E(t)* is the eustatic sea level change, in meters, as a function of *t*. The NRC committee recommended that "projections be updated approximately every decade to incorporate additional data." At the time the NRC report was prepared, the estimate of global mean sea level change was approximately 1.2 mm/year. Using the current estimate of 1.7 mm/year for GMSL change, as presented by the IPCC (2007a), results in this equation being modified to be:

$$E(t) = 0.0017t + bt^2 \quad (2)$$

(1) The three scenarios proposed by the NRC result in global eustatic sea level rise values, by the year 2100, of 0.5 meters, 1.0 meters, and 1.5 meters. Adjusting the equation to include the historic GMSL change rate of 1.7 mm/year and the start date of 1992 (which corresponds to the midpoint of the current National Tidal Datum Epoch of 1983–2001), instead of 1986 (the start date for equation 1), results in updated values for the variable b being equal to 2.71E-5 for modified NRC Curve I, 7.00E-5 for modified NRC Curve II (not used in the USACE analysis but provided here for completeness), and 1.13E-4 for modified NRC Curve III. The year 1992 is used to start these curves because 1992 is the center year of the NOAA National Tidal Datum Epoch (NTDE) of 1983–2001. The NTDE is the period used to define tidal datums (Mean High Water, for instance, and local MSL) (Flick et al. 2011).

(2) Manipulating equation (2) to account for the fact that it was developed for eustatic sea level rise starting in 1992, while projects will actually be constructed at some date after 1992, results in equation (3):

$$E(t_2) - E(t_1) = 0.0017(t_2 - t_1) + b(t_2^2 - t_1^2) \quad (3)$$

where t_1 is the time between the project's construction date and 1992 and t_2 is the time between a future date at which one wants an estimate for sea level change and 1992 (or $t_2 = t_1$ + number of years after construction) (Knuuti 2002). For example, if a designer wants to know the projected eustatic sea level rise at the end of a project's period of analysis, and the project is to have a fifty-year life and is to be constructed in 2013, $t_1 = 2013 - 1992 = 21$ and $t_2 = 2063 - 1992 = 71$.

(3) The low, intermediate, and high scenarios for NOAA tide gauges can be obtained through the USACE on-line sea level calculator at http://www.corpsclimate.us/ccaceslcurves.cfm.

(4) Figure B-4 illustrates an example of the three sea level rise curves for a location in Grand Isle, Louisiana.

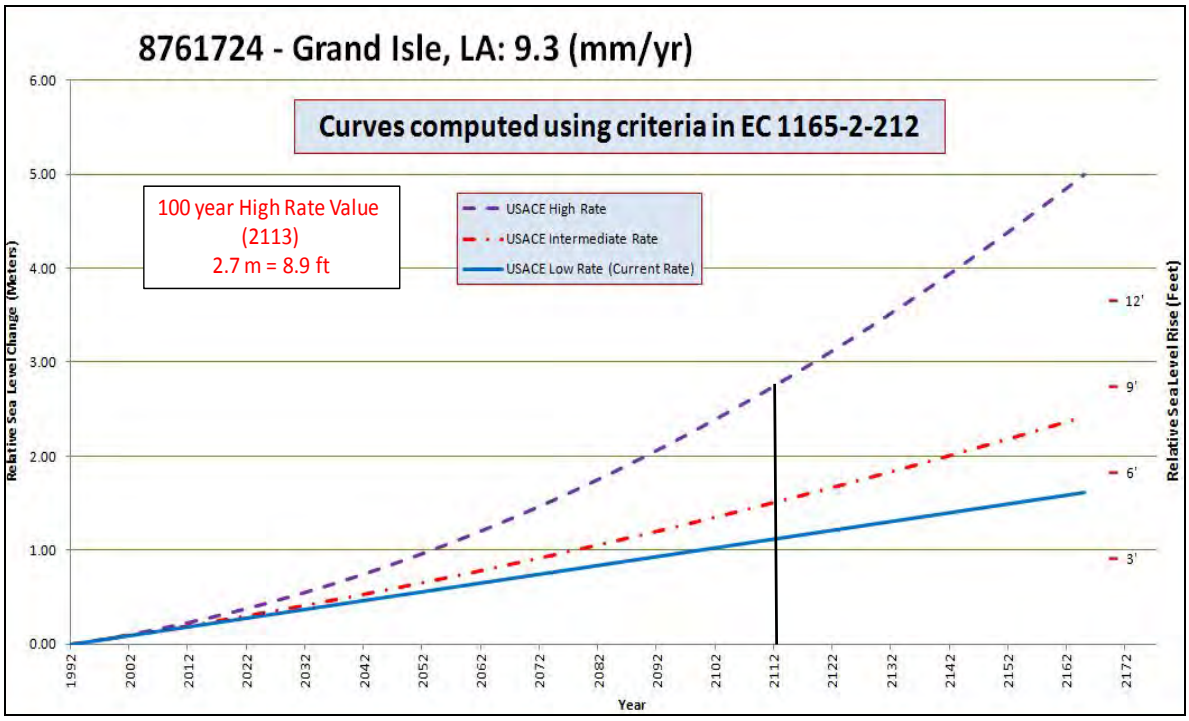


Figure B-10. Example USACE SLC curves for Grand Isle, Louisiana.

GLOSSARY

Terms and Abbreviations

Coastal
As used in this ER, locations with oceanic astronomical tidal influence, as well as connected waterways with base-level controlled by sea level. In the latter waterways, influence by wind-driven tides may exceed astronomical tidal influence. Coastal areas include marine, estuarine, and riverine waters and affected lands. (The Great Lakes are not considered "coastal" for the purposes of this ER.)

Datum
A horizontal or vertical reference system for making survey measurements and computations; a set of parameters and control points used to accurately define the three-dimensional shape of the Earth. The datum defines parts of a geographic coordinate system that is the basis for a planar coordinate system. Horizontal datums are typically referred to ellipsoids, the State Plane Coordinate System, or the Universal Transverse Mercator Grid System. Vertical datums are typically referred to the geoid, an Earth model ellipsoid, or a Local Mean Sea Level (LMSL). The current vertical datum used in the United States is the North American Vertical Datum of 1988 (NAVD 88), which replaced the National Geodetic Vertical Datum of 1929 (NGVD 29) (formerly referred to as the Sea Level Datum of 1929). For tidal datums, see below.

Eustatic sea level rise
A change in global average sea level brought about by an increase in the volume of the world ocean (IPCC 2007b).

Global mean sea level (GMSL)
The mean sea level for all the world's oceans. Sea level can change globally due to (1) changes in the shape of the ocean basins, (2) changes in the total mass of water, and (3) changes in water density. Sea level changes induced by changes in water density are called steric. Density changes induced by temperature changes only are called thermosteric, while density changes induced by salinity changes are called halosteric (IPCC 2007b).

Local (i.e., "relative") sea level
Sea level measured by a tide gauge with respect to the land on which it is situated. See mean sea level (MSL) and sea level change (SLC). Relative sea level change occurs where there is a local change in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence. In areas subject to rapid land-level uplift, relative sea level can fall (IPCC 2007b). Relative sea level change will also affect the impact of any regional SLC.

Mean sea level (MSL)
A tidal datum; the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch (approximately 19 years). Shorter series are specified in the name: e.g., monthly mean sea level and yearly mean sea level (NOAA 2000).

Post-glacial rebound
The vertical movement of the land and sea floor following the reduction of the load of an ice mass, for example, since the last glacial maximum (~21,000 years ago). The rebound is an isostatic land movement (IPCC 2007b).

Regional sea level change
An increase or decrease in the mean level of the ocean's surface over a specific region. Global sea level has regional variations, and regional sea level change may be equal to, greater than, or less than global sea level change due primarily to regional differences in ocean heating and cooling or to changes in bathymetry. Regional sea level change as used here does not include local geologic effects, such as subsidence or tectonic movement.

Risk
A measure of the probability and severity of undesirable consequences (including, but not limited to, loss of life, threat to public safety, environmental and economic damages).

Sea level change
A change in the mean level of the ocean.

Tide station
A device at a coastal location (and some deep-sea locations) that continuously measures the level of the sea with respect to the adjacent land. Time averaging of the sea level so recorded gives the observed secular changes of the relative sea level (IPCC 2007b).

Tidal datums
A standard elevation defined in terms of a certain phase of the tide. Tidal datums are local datums and should not be extended into areas which have differing hydrographic characteristics without substantiating measurements. In order that they may be recovered when needed, such datums are referenced to fixed points known as bench marks.

Uncertainty
The result of imperfect knowledge concerning the present or future state of a system, event, situation, or (sub) population under consideration. There are two types of uncertainty: aleatory and epistemic. Aleatory uncertainty is attributed to inherent variation that is understood as variability over time and/or space. Epistemic uncertainty is attributed to our lack of knowledge about the system (e.g., what value to use for an input to a model or what model to use). Uncertainty can lead to lack of confidence in predictions, inferences, or conclusions.

Outline of Unresolved Issues to Address

Navigation Issues

- If a navigable channel is anticipated, is the intent to allow commercial navigation to the full depths of the Wilmington Harbor Project (or deeper)? If so, what do you propose to be done with the current channel downstream of the inlet? If not, what efforts are anticipated to reduce project-induced shoaling?

- Is the State prepared to enter into a binding agreement with the Army to finance any additional costs (anticipated or unanticipated) associated with the project's effects on the navigation project?

- If a navigable channel is anticipated, what range of alternatives should be considered?
    - Channel depths, dimensions, or alternate locations?
    - Infrastructure changes necessary to accomplish the project?
    - What efforts are anticipated to achieve channel dimensions?
        - Maintenance dredging?
        - Hardened structures?
        - Sand bypassing efforts?
    - Is there an intent (now or in the future) to have the Federal Government assume maintenance responsibilities for this project? If so, please reference Engineer Regulation (ER) 1165-2-124 for processes implementing Section 204(f) of the Water Resources Development Act of 1986, attached.

- How does the State, as non-federal sponsor for the Wilmington Harbor Project, expect to take responsibility for the navigable capacity of the Project to the extent that this project might alter that? Please refer to our Section 408 Guidance at Appendix E for more discussion of this issue.

Environmental Issues

- We would need to know the anticipated effects of the project, including quantified predicted losses (and/or gains) of wetlands, coastal marsh, beach, dune, shallow-bottom habitat, etc. Losses would be from:
    - Construction (rock removal, dredging, shoreline stabilization, etc.)
    - Maintenance (dredging, beach placement, offshore disposal, etc.)
    - Necessary infrastructure changes (roads, ferries, utilities, etc.)
    - Reasonably forseeable secondary and cumulative impacts (inlet migration, increased wave action, change in tidal prism, change in salinity, change in marine traffic patterns, etc.)

  The effects outlined above would need to be then considered with respect to:
    - Endangered Species, both terrestrial and aquatic
    - Wetland quality and function

- Essential Fish Habitat
- Migratory Birds and other Fish and Wildlife Resources
- Water Quality
- Coastal and Fishery Resources

Coastal Engineering Issues

- What effects would the proposed project have on the existing sand-sharing system?
- What salinity effects might be anticipated?
- What shoaling effects are expected?
- What sediments would be excavated, and what would a disposal/placement plan need to entail?
- Are hardened structures necessary to keep an inlet in place?
- Would the inlet be allowed to migrate?

Cultural Resource Issues

- The Dam itself is a historic structure. What efforts would be taken to preserve its historic significance to the region?
- What known cultural resources are in the area of potential effect, and how would those be dealt with?
- What would be the plan for identifying other potentially affected cultural resources in the vicinity of the project?

Recreation and Coastal Resource Issues

- The project's compliance with existing DCM regulations should be detailed.
- The Project's effects on commercial fishing, recreational fishing, and shellfishing should be identified.
- The project's effects on recreation at the Coastal Reserve and in other affected areas should be identified.

Governmental Issues

- We understand that at this point, the NC Division of Coastal Management is following the direction of the NC General Assembly as described in the referenced State law. As

the State moves forward with this study, we would like to have a clear understanding of which entities are speaking for the State. We are particularly concerned that the State's Executive Branch will be participating in several capacities in this effort: 1) as the entity carrying out the General Assembly's mandate to study the NID/SDD removal and change Reserve boundaries; 2) as the Corps' cost-sharing partner in the Wilmington Harbor Project; 3) as the owner and operator of the State Port at Wilmington; 4) as the property owner of much of the land affected by the proposed action; and 5) as the regulatory agency assigned to protect the State's water, fisheries, wildlife, cultural, and coastal resources. As such, it will be very important for entities communicating on behalf of the State to clarify which roles they are filling, and which of these interests they represent (and which they do not).

- We trust that DCM understands that the State, even through legislative mandate, cannot constrict reasonable alternatives and approaches to meet the purpose and need under CWA and NEPA. A full range of reasonable alternatives and options will need to be studied, to include the "no action" alternative.

- Would this action potentially affect the boundary between New Hanover and Brunswick Counties, or any similar jurisdictional issues?

CECW-PA Regulation No. 1165-2-124	Department of the Army U.S. Army Corps of Engineers Washington, DC 20314-1000	ER 1165-2-124 1 Oct 90
	Water Resources Policies and Authorities CONSTRUCTION OF HARBOR AND INLAND HARBOR PROJECTS BY NON-FEDERAL INTERESTS	
	Distribution Restriction Statement Approved for public release; distribution is unlimited.	

DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
Washington, DC 20314-1000

CECW-PA

Regulation
No. 1165-2-124

1 October 1990

Water Resource Policies and Authorities
CONSTRUCTION OF HARBOR AND INLAND HARBOR PROJECTS
BY NON-FEDERAL INTERESTS

1. Purpose. This regulation provides instructions on the use of Sections 204(a), 204(b), 204(c), 204(d), 204(e) (Operations and Maintenance), and 204(f) of the Water Resources Development Act (WRDA) of 1986.

2. Applicability. This regulation applies to HQUSACE/OCE elements, major subordinate commands, districts, laboratories, and field operating activities (FOA) having Civil Works responsibilities.

3. References.

a. Water Resources Development Act of 1986, Public Law (PL) 99-662.

b. ER 1105-2-100. (Draft)

c. ER 1140-1-211.

d. ER 1165-2-120.

4. Definitions.

a. Harbor and Inland Harbor - Section 204 applies to the places identified by the terms "harbor", "inland harbor", "deep-draft harbor", and "general cargo harbor" which are defined in Section 214 of PL 99-662. Harbors and Inland Harbors include any project of improvement for commercial navigation purposes in the navigable waters of the U.S. excluding

(1) inland waterways subject to waterway user fuel taxes under PL 95-502, as amended, or as otherwise defined,

(2) the Saint Lawrence Seaway,

(3) navigation improvements constructed or maintained by non-public interests,

(4) interior access channels, berthing and mooring areas, and other improvements that are not included in "general navigation features" as that term applies in Authorized Federal Projects;

(5) navigation improvements for the benefit of only one owner/user; and

(6) any portion of the Columbia River other than the channels on the downstream side of Bonneville lock and dam.

b. Authorized Federal Project - Any navigation improvement project specifically authorized by Federal statute.

c. Non-Federal Interest - is defined as a State, political subdivisions thereof, or other responsible agency described as a legally constituted and financially capable public body with full legal authority and financial capability to obligate itself to execute and perform fully all the requirements and terms of its local cooperation agreement. Included is a public agency or port authority established under State laws or a compact entered into between two or more States with the consent of Congress under Section 10 of Article I of the constitution.

d. Separable Element - Section 103(f) of PL 99-662 defines Separable Element as a portion of a project (1) which is physically separable from other portions of the project; and (2) which (A) achieves hydrologic effects, or (B) produces physical or economic benefits, which are separably identifiable from those produced from other portions of the project.

e. Eligible Operation and Maintenance - Section 214 of PL 99-662 defines eligible operation and maintenance to mean all operations, maintenance, repair, and rehabilitation, including maintenance dredging reasonably necessary to maintain the width and nominal depth of any harbor or inland harbor. It does not include providing any lands, easements, rights-of-way, or dredged material disposal areas including retaining dikes necessary for use of the area, or performing relocations required for project operation and maintenance.

5. Background.

a. Section 204(a) authorizes a non-Federal interest to undertake navigational improvements in harbors or inland harbors. Projects constructed under this subsection are not considered to be Federal projects unless the Federal Government later assumes responsibility for operation and maintenance after project construction is completed pursuant to Section 204(e) (Operation and Maintenance). For any project constructed in

accordance with Section 204(a), the non-Federal interest is fully responsible for all construction costs incurred and for obtaining all necessary permits. See paragraph 6 for further discussion of Section 204(a).

b. Section 204(b) allows the non-Federal interest to contract with the Corps of Engineers to have the Corps undertake studies and engineering for projects which the non-Federal interest will construct under 204(a). The studies, conducted at the expense of the non-Federal interest, can be used (under Section 204(d)) in addressing the requirements for obtaining the appropriate permits required under the Secretary's authority as well as support for a request for Federal operation and maintenance under Section 204(e) (Operation and Maintenance). See paragraph 7 for further discussion.

c. Section 204(c) permits the Corps to turn over to non-Federal interests Corps studies initiated before 17 November 1986 (either finished or unfinished), so that the study information may be used in the permitting process. If the transferred Corps study is complete, it can be used (under Section 204(d)) in addressing the requirements for obtaining the appropriate permits required under the Secretary's authority as well as support for a request for Federal operation and maintenance under Section 204(e) (Operation and Maintenance). See paragraph 7 for further discussion.

d. Section 204(d) states that if the Corps of Engineers has completed a study and engineering for an improvement to a harbor, including filing of a Final Environmental Impact Statement, and the non-Federal interest has requested and received such study and engineering from the secretary pursuant to subsection (b) or (c) of Section 204, the non-Federal interest is authorized to carry out the improvement. Any improvement implemented in accordance with subsection (d) of Section 204 shall be deemed to satisfy the requirements for obtaining the appropriate permits required under the Secretary's authority, subject to a finding that(1) the applicable regulatory criteria and procedures have been satisfied and that(2) regulatory requirements and environmental conditions have not changed since the studies were completed. Note this provision only applies to satisfying the permits required under the Secretary's authority.

e. Section 204(e). The 1986 Water Resources Development Act contains two sections labeled 204(e). Regulations implementing the first Section 204(e) (Reimbursement) are available in ER 1165-2-120. The second Section 204(e) (Operation and Maintenance) gives the Secretary of the Army responsibility for operation and maintenance of any project constructed by non-Federal interests under Section 204, provided

that before construction, the Secretary determines that the proposed work is economically justified and environmentally acceptable. The Secretary must also certify that the work has been completed in accordance with applicable permits and acceptable design standards. To avoid confusion, all references to the section authorizing Federal assumption of operation and maintenance will be referred to herein as Section 204(e') (Operation and Maintenance). Further guidance regarding Section 204(e') (Operation and Maintenance) is provided in paragraph 8.

f. Section 204f allows the Secretary to approve as many as two proposals whereby a non-Federal interest would undertake all or part of an authorized Federal project as the agent of the Secretary by utilizing its own personnel or by procuring outside services, so long as the cost of doing so will not exceed the cost of the Secretary undertaking the project. See paragraph 9.

6. Non-Federal Construction of a Project. Section 204(a) applies to construction of a navigation improvement by non-Federal interests without Federal participation in the initial costs of project construction. Although Section 204(a) authorized non-Federal interests to undertake navigational improvements in harbor or inland harbors, it does not change requirements to obtain regulatory permits for the proposed improvement. All permits required pursuant to Federal and State laws must be obtained in advance of the actual construction. Furthermore, in the event that fish and wildlife mitigation measures are determined appropriate, such mitigation shall be conducted before or concurrent with construction. See paragraph 8 regarding how a non-Federal project may qualify for Federal assumption of O&M.

7. Studies undertaken by the Corps of Engineers. Reference is made to three categories of Corps of Engineers studies in Subsections 204(b) and 204(c): new studies requested by the non-Federal interest; studies initiated prior to 17 November 1986; that are still unfinished; and completed studies initiated prior to 17 November 1986. All can be used to help expedite the Federal permitting process.

a. Subject to policies established in ER 1140-1-211, a district commander may provide study services to a non-Federal interest to meet the objectives of Section 204(b) with funds advanced by the non-Federal interest, if Corps personnel are available to do the work.

b. Whenever a non-Federal interest requests studies and engineering from the Corps, the District Commander should also be prepared to provide guidance to the requesting party concerning the need for any additional work that must be completed prior to obtaining any permits required pursuant to Federal and State laws.

8. When the conditions of Section 204(d) are met, the appropriate permits required under the Secretary's authority shall be granted subject to the non-Federal interest's acceptance of the terms and conditions of such permits. The Corps will monitor projects that have been constructed using Federal permits obtained through Section 204(d) in the same way that all other non-Federal projects are monitored to ensure that such projects have been constructed in accordance with the terms and conditions of such permits.

9. Operation and Maintenance (O&M). Subject to certain conditions, the Federal Government will become responsible for the future operation and maintenance of a harbor or inland harbor improvement constructed by a non-Federal interest under Section 204(a), Section 204(d), or Section 204(e) (Reimbursement). Federal O∧M responsibilities for authorized Federal projects subject to reimbursement, Section 204(e), are addressed in ER 1165-2-120. The procedures described herein apply only to improvements undertaken by the non-Federal interest under the authority of Section 204(a) or Section 204(d).

a. Secretary Approval. No construction shall commence for any project which proposes to have the Secretary maintain the general navigation features under the authority of Section 204(e') (Operation and Maintenance) until the Secretary of the Army determines that the proposed improvements are economically justified, environmentally acceptable and consistent with the purposes of Title II of P.L. 99-662. The Secretary must, before construction, review and approve the economic justification, details of the project plans and design, arrangements for the prosecution of the work, and the environmental aspects. All information necessary for this determination must be provided at non-Federal expense.

b. Environmental Acceptability. Since the non-Federal interest will be required to obtain all necessary Federal, State, and local permits, normally environmental concerns will be addressed adequately through the permitting process. However, consideration will be given to any need for further documentation to meet NEPA requirements.

c. Economic Justification. In order to find the proposed work economically justified, it must be demonstrated that:

(1) Project benefits as defined by the Water Resources Council's Principles and Guidelines exceed project costs, including construction and O&M costs.

(2) Project O&M costs are no greater than the O∧M costs of the project which maximizes net benefits (the so-called "NED plan"). Note that the proposed work does not have to be the NED plan, but only that project benefits exceed project costs.

d. Consistent with Federal Policy. Maintenance of the project must be consistent with other Federal policies, including the policy that the benefits from the project do not accrue to a single privately owned facility (benefit of only one owner/user).

e. Submittal of Data. The study which determines the relationship between project benefits and project costs will be the responsibility of the non-Federal interest. A report of study results will be provided to the District Commander for review and comment. Once the District Commander is satisfied that the study adequately addresses the economic issues and environmental concerns, the study will be forwarded to the Secretary of the Army along with details of proposed design, plans and specifications, and arrangements for prosecution of the work.

f. Construction and Certification. The project must be constructed in accordance with applicable permits, appropriate engineering and design standards, and plans approved by the Secretary of the Army. This means that:

(1) The Corps of Engineers will have the right to inspect the work and to enter, at reasonable times and in a reasonable manner, upon land which the non-Federal interest owns or controls for access to the project for purposes of inspection.

(2) The District Commander must certify that the project was completed in accordance with applicable permits and approved plans. The District Commander will then forward such certification through the Division Commander and Chief of Engineers to the Secretary of the Army.

g. Funding of Document Review and Construction Inspection. Funding for the Corps activities involved in document review as well as inspection and certification of construction should be requested through the normal budgetary process in response to the annual program and budget EC.

h. Cost Sharing for O&M.

(1) Commercial Navigation. Cost sharing will be in accordance with the terms of Section 101b of WRDA of 1986, PL 99-662:

(a) For projects whose depths do not exceed 45 feet, the Federal Government will assume 100 percent of eligible O&M costs (see paragraph 4f). All other costs including lands, easements, rights-of-way and dredged material disposal sites are the responsibility of the non-Federal interest.

(b) When the project depth exceeds 45 feet, the non-Federal interest will be responsible for 50 percent of the incremental eligible O&M costs beyond that necessary to maintain a 45 foot project.

(2) Recreation Navigation. O∧M costs for recreational features of a project shall be assigned 100 percent to non-Federal interests (Reference Section 103(c) (4) and Section 103(j) of WRDA of 1986, PL 99-662.)

i. Discontinuance of Maintenance. If, at any time subsequent to construction, the Secretary of the Army determines that the O&M of the project is no longer economically justified or environmentally acceptable, the Federal Government will no longer be responsible for O&M. The Federal Government may choose to maintain a lesser depth or completely discontinue maintenance activities.

j. Model Agreement. A sample model agreement is attached as Appendix A.

10. Section 204(f). A proposal by a non-Federal interest to act as an agent of the Secretary for a Corps project under the terms of Section 204(f) must be approved in advance by the Assistant Secretary of the Army (Civil Works). The proposal would be submitted to the district commander who would forward it, with recommendations to the division and subsequently to HQUSACE (ATTN: CECW-P). Implementation policy is as follows:

a. The proposal must show that the proposed plan can be undertaken at a cost which does not exceed that which could be expected to accrue under normal Corps of Engineers procedures, and offer convincing evidence that the final project will be completed at no additional cost to the Government and within a reasonable schedule.

b. The non-Federal interest must obtain all necessary permits including those Federal permits ordinarily not required when the Corps does the work.

c. Submission proposal by non-Federal interest shall describe procurement methods to be used for procuring outside services, work to be done by its own personnel, and the desired basis for computation of the requested reimbursement amount.

d. Non-Federal interest may start work under Section 204(f) at the Planning, Engineering and Design stage or construction stage as agreed upon with the Secretary.

e. Payment for the Federal share will be after completion of the work that would have been otherwise a Federal

responsibility. The District Commander shall certify accomplishment of such work and forward request for reimbursement.

FOR THE COMMANDER:

Albert J. Genetti, Jr.
Colonel, Corps of Engineers
Chief of Staff

APP A - Model Agreement

APPENDIX A

MODEL AGREEMENT
UNDER SECTION 204(e) (Operation and Maintenance)
OF PUBLIC LAW 99-662
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
[THE NON-FEDERAL INTEREST]
FOR FEDERAL ASSUMPTION OF THE
OPERATION AND MAINTENANCE OF
[NAME OF PROJECT]

THIS AGREEMENT entered into this _____ day of 19__, by and between the United States of America (hereinafter referred to as the "GOVERNMENT") represented by the Assistant Secretary of the Army (Civil Works), and name of non-Federal Interest (hereinafter referred to as the "[local sponsor]"); (Throughout this document the term "local sponsor" is included in square brackets. This is to indicate that this phrase can be replaced by either an abbreviated name for the non-Federal interest such as the "City" or the "Port" or by the term "local sponsor.")

WHEREAS, Section 204(e) of the Water Resources Development Act of 1986 (WRDA 1986) (33 U.S.C. Section 2232(e)) authorizes the Secretary of the Army, subject to certain limitations contained therein, to assume responsibility for the operation and maintenance of a navigation project that is constructed by non-Federal interests pursuant to Section 204 of WRDA 1986; and

WHEREAS, the [local sponsor] has proposed to construct [name and location of project]; and

WHEREAS, the Assistant Secretary of the Army (Civil Works) has determined that the improvements are economically justified, environmentally acceptable, and consistent with the purposes of Title II of WRDA 1986.

NOW THEREFORE, it is agreed between the Government and the [local sponsor] that:

Article 1 - Definitions.

For purposes of this Agreement:

[1]- Throughout this document the term “local sponsor” is included in square brackets. This is to indicate that this phrase can be replaced by either an abbreviated name for the non-Federal interest such as the “City” or the “Port” or by the term “local sponsor.”

The term "general navigation features of the project" shall mean the following project features assigned to commercial navigation: [here describe the work to be performed which will be subject to Operation and Maintenance by the government, e.g., "dredging to a depth of 40 feet below the mean low water a channel from x to x ..."]

Article 2 - Project--Construction.

(Describe the construction (all features) to be performed by the local sponsor).

Article 3 - Review of Designs, Detailed Plans and Specifications, and Arrangements for Prosecution of the Work.

No construction shall commence under this Agreement until the designs, detailed plans and specifications, and arrangements for the prosecution of the work have been approved by the Secretary of the Army. The Commander, U.S. Army District _____ shall ensure that all required Federal, State, regional, and local permits have been obtained. Proposed changes in approved designs, plans and specifications also must be reviewed and approved by the District Commander in advance of construction.

Article 4 - Inspection of Work.

The Government may inspect any work that is performed under this Agreement and the [local sponsor] hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the [local sponsor] owns or controls for access to the project for purposes of inspection.

Article 5 - Obligations of the [local sponsor].

The [local sponsor] agrees to:

a. Construct the Project, including the general navigation features of the Project, at no cost to the Federal government.

b. Provide and maintain at its own expense, all facilities other than the general navigation features of the project.

c. Ensure that the project and ancillary facilities shall be open to all on an equal basis.

d. [Add any additional language to describe fully portions of the project for which the local sponsor will be responsible including 100 percent of all costs associated with project purposes other than commercial navigation, responsibility for securing necessary aids to navigation, etc.]

e. [Add additional paragraphs as needed to reflect special requirements.]

Article 6 - Operation and Maintenance.

After completion of the project, the Government shall operate and maintain the general navigation features of the project. This responsibility shall not begin unless and until the Secretary of the Army has certified that the work described in Article 2 has been completed in accordance with applicable permits and approved plans. The [local sponsor] shall provide to the Government all lands, easements, rights-of-way, and dredged material disposal areas, and perform all relocations required for operation and maintenance of the general navigation features of the project. Operation and maintenance of such features will remain a Federal responsibility consistent with the availability of funds, unless the Secretary finds that the project is no longer economically justified or environmentally acceptable.

[In the case of a deep draft project exceeding 45 feet, add the following as paragraph b, Article 6 and label the above paragraph as paragraph a]: The [local sponsor] shall pay to the Government one half of the excess of the cost of operation and maintenance of the general navigation features of the project over the cost which the Secretary determines would be incurred for operation and maintenance of such features if the project had a depth of 45 feet. No Federal funds may be used to meet the local sponsor's share of operation and maintenance expenses of the general navigation features of the project unless the expenditure of such funds is expressly authorized by statute as verified in writing by the granting agency.

Article 7 - Disputes.

Before any party to this Agreement may bring suit in any court concerning an issue relating to this Agreement, such party must first seek in good faith to resolve the issue through negotiation or other forms of nonbinding alternative dispute resolution mutually acceptable to the parties.

Article 8 - Release of Claims.

The [local sponsor] shall hold and save the Government free from all damages arising from the construction, operation, and maintenance of the project, except for damages due to the fault or negligence of the Government or its contractors in connection with Federal responsibilities for operation and maintenance of the general navigation features of the project.

Article 9 - Officials Not to Benefit.

No member of or any delegate to the Congress, or Resident Commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

Article 10 - Covenant Against Contingent Fees.

The [local sponsor] warrants that no person or selling agent has been employed or retained to solicit or secure this Agreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the [local sponsor] for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this Agreement without liability, or in its discretion to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

Article 11 - Relationship of Parties.

The parties to this Agreement act in an independent capacity in the performance of their respective functions under this agreement, and neither party is to be considered the officer, agent, or employee of the other.

Article 12 - Notices.

a. All notices, requests, demands, and other communications required or permitted to be given under this Agreement shall be deemed to have been duly given if in writing and delivered personally, given by prepaid telegram, or mailed by first-class (postage-prepaid), registered, or certified mail, as follows:

If to the [local sponsor]:

(ADDRESS)

If to the Government:

(ADDRESS) (Normally this will be the District Commander)

b. A party may change the address to which such communications are to be directed by giving written notice to the other in the manner provided in this section.

c. Any notice, request, demand, or other communication made pursuant to this article shall be deemed to have been received by the addressee at such time as it is personally delivered or on the third business day after it is mailed, as the case may be.

Article 13 - Expiration of Agreement.

This Agreement shall expire and become null and void if the project to be constructed by the [local sponsor] is not undertaken within _____ (years, months) of the effective date of this Agreement and completed within _____ (years, months) thereafter.

ARTICLE 14 - TERMINATION OR SUSPENSION

If the Government fails to receive annual appropriations in amounts sufficient to meet project operation and maintenance expenditures for the then-current or upcoming fiscal year, the Government shall so notify the Local Sponsor. After 60 calendar days either party may elect without penalty to terminate this Agreement pursuant to the Artical or to defer future perfermance hereunder; howerer, deferral of future performance under this Agreement shall not affect existing obligation previously incurred. In the event that either party elects to defer future performance under this Agreement pursuant to this Article, such deferral shall remain in effect until such time as the Government receives sufficient appropriations or until either party elects to terminate this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THE DEPARTMENT OF THE ARMY	THE LOCAL SPONSOR
BY: _____ Assistant Secretary of the Army (Civil Works)	BY: _____
DATE: _____	DATE: _____

Attachments
Certification Regarding Lobbying
Certification of Authority

Certification Regarding Lobbying.

The undersigned certifies, to the best of its knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the entering into of this cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this cooperative agreement, the undersigned shall complete and submit Standard Form LLL "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all contracts and awards for work described in Article 2 and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance is placed when this transaction is made or entered into. This certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. The prohibition does not apply to the following activities:

(1) providing information specifically requested by the Secretary of the Army and U.S. Army Corps of Engineers or information not specifically requested but necessary for the Secretary to make an informed decision, or

(2) professional or technical services applying a professional or technical discipline rendered directly in the preparation and submission of the application, or

(3) technical discussion regarding the application features and adaption of the proposal to meet eligibility requirements.

_____
Sponsor

CERTIFICATE OF AUTHORITY

I, _____, do hereby certify that I am the principal legal officer of the [local sponsor], that the [local sponsor] is a legally constitued public body with full authority and legal capability to perform the terms of the Agreement between the Department of the Army and the [local sponsor] in connection with the Operation and Maintenance of the Project and that the persons who have executed this Agreement on behalf of the [local sponsor] have acted within their statutory authority.

IN WITNESS WHEREOF, I have made and executed this certification this _____ day of _____ 19__.

_____
[Signed]
Title

REQUEST FOR INFORMATION

STATE OF NORTH CAROLINA **Department of Environmental Quality, Division of Coastal Management**	**REQUEST FOR INFORMATION NO**. 16-32314-WA Due Date: February 4, 2016 at 2:00 PM
Refer <u>ALL</u> Inquiries to: Wanda Andrews Telephone No. 919-707-8538	Issue Date: January 7, 2016 Solicitation: Analysis of Removal of the Southern Component of the New Inlet Dam
Email: wanda.andrews@ncdenr.gov	Using Agency Name: NC DEQ Coastal Management

VENDOR INFORMATION

VENDOR NAME: Vendor Name	EMAIL: Email address	
STREET ADDRESS: Street Address	P.O. BOX IF APPLICABLE: P.O. Box	ZIP: 00000
CITY & STATE & ZIP: City State Zip Code	TELEPHONE NUMBER: xxx-xxx-xxxx	
NAME & TITLE OF CONTACT PERSON: Name Title		

1.0 SUBMISSION INSTRUCTIONS:

A. Email (Preferred):

Submit one emailed electronic copy of this completed Word file to Wanda Andrews at wanda.andrews@ncdenr.gov. It is the responsibility of the Vendor to submit the Request for Information (RFI) by the specified time and date of opening.

B. Mail:

Mail only one Request for Information (RFI) response per envelope. Address envelope and clearly note RFI number as shown below. It is the responsibility of the Vendor to have the RFI in this office by the specified time and date of opening.

MAILING ADDRESS, IF DELIVERED BY US POSTAL SERVICE	**OFFICE ADDRESS, IF DELIVERED BY ANY OTHER MEANS**
RFI NO. 16-32314-WA **Department of Environmental Quality, Coastal Management Division** **Attn: Wanda Andrews** **Box: 1606 MAIL SERVICE CENTER** **Raleigh, NC 27699**	**RFI NO. 16-32314-WA** **Department of Environmental Quality, Coastal Management Division** **Attn: Wanda Andrews** **217 West Jones Street, Suite 5422M, Raleigh, NC 27603-1606**

IMPORTANT NOTE ABOUT MAIL SUBMISSIONS: All Vendors are urged to take the possibility of delay due to submitting via U.S. Mail into account when submitting their response to this RFI.

QUESTIONS

Submit written questions to Wanda Andrews until January 19, 2016 at 11:00 AM. Questions may be submitted by email to wanda.andrews@ncdenr.gov.

2.0 OVERVIEW

The purpose of this Request for Information (RFI) is to acquire information from Vendors regarding their capability to conduct a cost benefit analysis of removal of the Southern Component of the New Inlet Dam and an inventory of the necessary permits and approvals needed to develop and implement a removal plan. The State of North Carolina will use the information received from this RFI as input for potential future contracting strategies. Vendors interested in participating in possible future opportunities are encouraged to respond to this RFI.

It is the objective of this RFI to:

> Develop an understanding of which firms are capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam along the Cape Fear River as proposed in the 2015 Appropriations Act Section 14.6.(h) and an inventory of the necessary permits and approvals needed to develop and implement a removal plan.

The following are attached to the RFI as one attachment: 1. 2015 Appropriations Act Section 14.6. (h), 2. Map of the New Inlet Dam, and 3. Pictures of the Southern Component of the New Inlet Dam.

The State is seeking detailed responses to the RFI demonstrating your firm's experience in these areas.

3.0 INSTRUCTIONS

3.1. Schedule

Respondents will have four (4) weeks to prepare and return their submissions to this RFI. Responses must be received by the date, time and the location specified on the first page of this RFI.

3.2. Clarification Questions

Clarification questions will be accepted until January 19, 2016 at 11:00 AM as specified on the first page of this RFI. Clarification questions can be submitted by email (preferred method) to wanda.andrews@ncdenr.gov. An addendum containing any general clarification questions and their answers may be issued as an addendum to this RFI.

3.3. Response

Please note this is a request for information only and not a request for goods or services. The Vendor must bear all costs for preparing this RFI.

4.0 RESPONSE

4.1 Instructions:
Vendors are requested to respond to the requested information below. A response does not bind or obligate the responder to the State of North Carolina to any agreement of provision or procurement of products referenced. No contract can or will be awarded based on submissions.

In order to facilitate the review of the questions, please provide the information in the exact order as below and do not alter the format of this document. You may put responses within this document directly below each question. Please rename this document NC Analysis of Removal of the Southern Component of the New Inlet Dam RFI_VENDOR NAME.doc (.docx also acceptable). In the renamed document title VENDOR NAME should be substituted with your company's name.

4.2 Requested Information:

1. **Topic 1: State and Federal Permits, Approvals, and Studies**

   Question 1: What types of permits, approvals, and environmental studies will likely be needed to develop and implement a removal plan for the Southern Component of the New Inlet Dam? Describe the approach the firm will take to inventory these.

   RESPONSE:

   Question 2: Describe the firm's experience working with the types of permits, approvals, and environmental studies identified in Question 1 above. List all certifications and licenses the firm holds that are relevant to this work.

   RESPONSE:

2. **Topic 2: Costs and Benefits Analysis**

   Question 1: Describe the firm's experience in conducting costs and benefits analyses. List all certifications and licenses the firm holds that are relevant to this work.

   RESPONSE:

   Question 2: Describe the firm's ability and approach to conduct a costs and benefits analysis on the following topics as they relate to the proposal to remove the Southern Component of the New Inlet Dam:

   a. Environmental impacts including hydrology (e.g., salinity regime, tidal prism, and currents), sediment dynamics, habitat distribution, species distribution and utilization, and water quality to the Zeke's Island Reserve, lower Cape Fear River, and other special economic and natural resource assets in the immediate vicinity of the New Inlet Dam;
   b. Navigational access impacts to the Port of Wilmington and for other commercial and recreational vessels;
   c. Economic factors including cost and maintenance of removal, cost and maintenance of restored condition, and changes to commercial and recreational use of the area;
   d. Beach erosion and sand management for adjacent and surrounding beach communities; and
   e. Storm vulnerability to the Zeke's Island Reserve, lower Cape Fear River, adjacent and surrounding communities, and other special economic and natural resource assets in the immediate vicinity of the New Inlet Dam.

RESPONSE:

(22) The Secretary of Environment and Natural Resources for the waiver or modification of non-State cost-share requirements under G.S. 143-215.73G."

CAPE FEAR ESTUARINE RESOURCE RESTORATION

SECTION 14.6.(h) The General Assembly finds that the New Inlet Dam or "The Rocks" was constructed by the United States Army Corps of Engineers in the late 19th century. The New Inlet Dam is composed of two components, a Northern Component that extends from Federal Point to Zeke's Island and a Southern Component that extends southwestward from Zeke's Island and separates the New Inlet from the main channel of the Cape Fear River. The General Assembly further finds that the Southern Component of the New Inlet Dam impedes the natural flow of water between the Cape Fear River and the Atlantic Ocean that occurred prior to emplacement of the dam. The General Assembly further finds that it is necessary to consider removal of the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean. To this end, the Department of Environment and Natural Resources shall do all of the following:

(1) Notify the United States Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam.

(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam, including an inventory of all necessary State and federal permits and approvals needed to develop and implement a removal plan. Identification of a capable firm pursuant to this section shall be done in accordance with Article 8 of Chapter 143 of the General Statutes.

(3) Request approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island for both of the following changes:

a. Moving the current western boundary 200 feet seaward and removing the area that lies between the current boundary and the new boundary from the North Carolina National Estuarine Research Reserve.

b. Compensating for any loss of acreage pursuant to sub-subdivision a. of this subdivision by adding a corresponding amount of acreage to the northern boundary of Zeke's Island from adjacent acreage at Fort Fisher State Recreation Area.

(4) If the Department obtains approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island as described in subdivision (3) of this subsection, the Coastal Resources Commission shall amend 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) as follows:

a. Definitions. – "Reserve Components Rule" means 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) for purposes of this section and its implementation.

b. Reserve Components Rule. – Until the effective date of the revised permanent rule that the Coastal Resources Commission is required to adopt pursuant to sub-subdivision d. of this subdivision, the Commission and the Department of Environment and Natural Resources shall implement the Reserve Components Rule, as provided in sub-subdivision c. of this subdivision.

c. Implementation. – Notwithstanding the Reserve Components Rule, the Commission shall adjust the boundary established for Zeke's Island in conformance with any boundary change that is approved by the National Oceanic and Atmospheric Administration pursuant to subdivision (3) of this subsection.

d. Additional rule-making authority. – The Commission shall adopt a rule to replace the Reserve Components Rule. Notwithstanding G.S. 150B-19(4), the rule adopted by the Commission pursuant to this subdivision shall be substantively identical to the provisions of sub-subdivision c. of this subdivision. Rules adopted pursuant to this subdivision are not subject to Part 3 of Article 2A of Chapter 150B

of the General Statutes. Rules adopted pursuant to this subdivision shall become effective as provided in G.S. 150B-21.3(b1) as though 10 or more written objections had been received as provided by G.S. 150B-21.3(b2).

e. Effective date. – Sub-subdivision c. of this subdivision expires when permanent rules to replace sub-subdivision c. of this subdivision have become effective, as provided by sub-subdivision d. of this subdivision.

Notwithstanding any other provision of law, the Department of Environment and Natural Resources may use funds from the Deep Draft Navigation Channel Dredging and Maintenance Fund, established pursuant to G.S. 143-215.73G, as enacted by subsection (c) of this section, to implement this subsection. No later than April 1, 2016, the Department shall report to the Environmental Review Commission, the chairs of the Senate Appropriations Committee on Natural and Economic Resources and the House Appropriations Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division regarding its implementation of this subsection, including a copy of the Request for Information required by subdivision (2) of this subsection and any responses received to the Request. Neither the Department nor any State agency may proceed with the removal of the New Inlet Dam until (i) the Environmental Review Commission has reviewed the report required by this section and (ii) a bill expressly providing authorization for the removal becomes law.

CLARIFY COASTAL COUNTY AUTHORITY OVER ABANDONED VESSELS

SECTION 14.6.(n) Section 1 of S.L. 2013-182 is repealed.

SECTION 14.6.(o) G.S. 153A-132(i), as rewritten by S.L. 2013-182, reads as rewritten:

"(i) A county may by ordinance prohibit the abandonment of vessels in navigable waters within the county's ordinance-making jurisdiction, subject to the provisions of this subsection. The provisions of this section shall apply to abandoned vessels in the same manner that they apply to abandoned or junked motor vehicles to the extent that the provisions may apply to abandoned vessels. For purposes of this subsection, an "abandoned vessel" is one that meets any of the following:

(1) A vessel that is moored, anchored, or otherwise located for more than 30 consecutive days in any 180 consecutive-day period without permission of the dock owner.

(2) A vessel that is in danger of sinking, has sunk, is resting on the bottom, or is located such that it is a hazard to navigation or is an immediate danger to other vessels.

Shipwrecks, vessels, cargoes, tackle, and other underwater archeological remains that have been in place for more than 10 years shall not be considered abandoned vessels and shall not be removed under the provisions of this section without the approval of the Department of Cultural Resources, which is the legal custodian of these properties pursuant to G.S. 121-22 and G.S. 121-23. This subsection applies only to the counties set out in G.S. 113A-103(2)."

EROSION CONTROL STRUCTURES

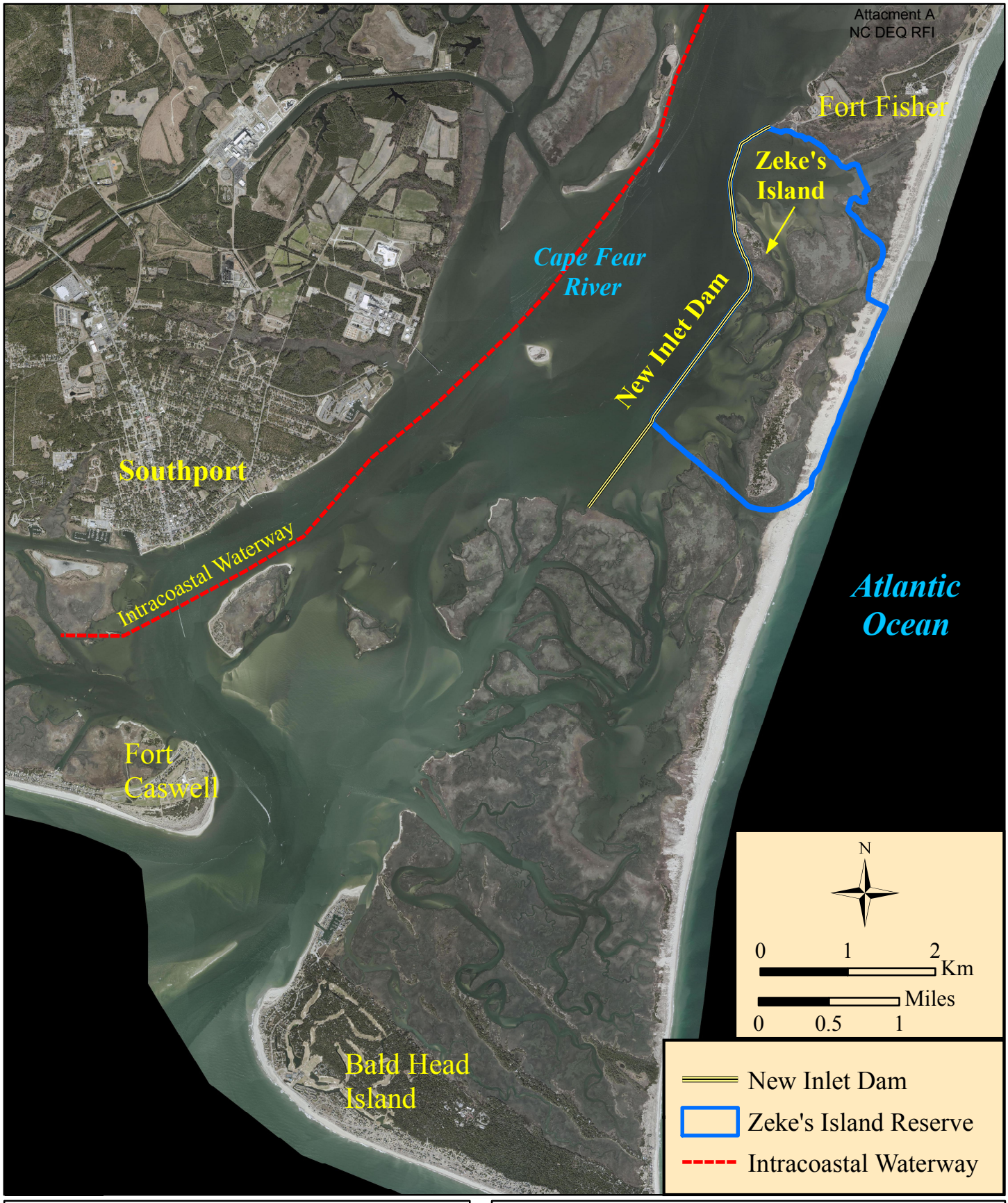
SECTION 14.6.(p) The Coastal Resources Commission shall amend its rules for the use of temporary erosion control structures to provide for all of the following:

(1) Allow the placement of temporary erosion control structures on a property that is experiencing coastal erosion even if there are no imminently threatened structures on the property if the property is adjacent to a property where temporary erosion control structures have been placed.

(2) Allow the placement of contiguous temporary erosion control structures from one shoreline boundary of a property to the other shoreline boundary, regardless of proximity to an imminently threatened structure.

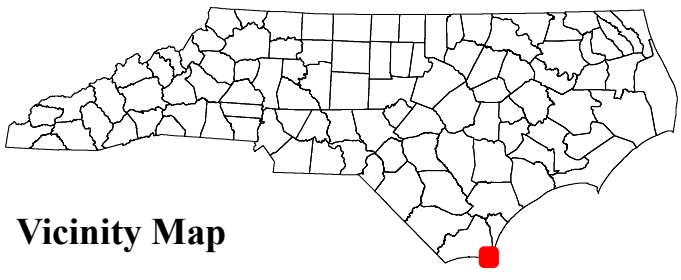
(3) The termination date of all permits for contiguous temporary erosion control structures on the same property shall be the same and shall be the latest termination date for any of the permits.

(4) The replacement, repair, or modification of damaged temporary erosion control structures that are either legally placed with a current permit or



New Inlet Dam

Map produced to support Request for Information per 2015 Appropriations Act Section 14.6.(h).



Vicinity Map

Figure 1. Photograph taken 12.11.2015 on the New Inlet Dam approximately 0.25 miles south of Zeke's Island looking south along the dam at low tide. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Attacment A
NC DEQ RFI

Figure 2. Photograph taken 12.11.2015 on the New Inlet Dam approximately 0.25 miles south of Zeke's Island looking north along the dam at low tide. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Figure 3. Photograph taken 12.11.2015 on the New Inlet Dam at low tide depicting a more intact portion of the dam surface. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Figure 4. Photograph taken 12.11.2015 on the New Inlet Dam at low tide depicting a less intact portion of the dam surface. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Figure 5. Photograph taken 12.11.2015 on the New Inlet Dam at low tide depicting a concrete cap on a portion of the dam surface. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Environmental Quality

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

BID ADDENDUM

FAILURE TO RETURN THIS BID ADDENDUM IN ACCORDANCE WITH INSTRUCTIONS MAY SUBJECT YOUR BID TO REJECTION.

Bid Number: 16-32314-WA Bid opening Date/Time remains: February 04, 2016

DISCRIPTION: **Analysis of removal of the Southern Component of the New Inlet Dam**

Addendum Number: 2

Addendum Date: January 11, 2016

INSTRUCTIONS:

On addendum number 1, the captions of the pictures are not clear and some of the letters have been cut off. The pictures are in the correct order. I have copied the captions on to a separate document as addendum number 2. It is not necessary for this addendum to be signed and returned along with your completed RFI but it is acceptable should you chose to do so.

1. Check ONE of the following options:

☐ Bid has not been sent. Any changes resulting from this addendum are included in our bid.

☐ Bid has already been sent. No changes resulted from this addendum.

☐ Bid has already been sent. Changed resulting from this addendum is as follows:

_____

_____

_____

Execute Addendum:

Bidder:
_____

Authorized Signature:
_____

Name and Title (Typed):
_____

Date: _____

Figure 1. Photograph taken 12.11.2015 on the New Inlet Dam approximately 0.25 miles south of Zeke's Island looking south along the dam at low tide. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6. (h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

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REQUEST FOR INFORMATION

STATE OF NORTH CAROLINA **Department of Environmental Quality, Division of Coastal Management**	**REQUEST FOR INFORMATION NO**. 16-32314-WA Due Date: February 4, 2016 at 2:00 PM
Refer ALL Inquiries to: Wanda Andrews Telephone No. 919-707-8538	Issue Date: January 8, 2016 Solicitation: Analysis of Removal of the Southern Component of the New Inlet Dam
Email: wanda.andrews@ncdenr.gov	Using Agency Name: NC DEQ Coastal Management

VENDOR INFORMATION

VENDOR NAME: Cardno, Inc.	EMAIL: Sharon.Niemczyk@cardno.com	
STREET ADDRESS: 5400 Glenwood Avenue, Suite G-03	P.O. BOX IF APPLICABLE:	ZIP:
CITY & STATE & ZIP: Raleigh, North Carolina 27612	TELEPHONE NUMBER: 561-629-3594	
NAME & TITLE OF CONTACT PERSON: Sharon Niemczyk Senior Consultant		

1.0 SUBMISSION INSTRUCTIONS:

A. Email (Preferred):
Submit one emailed electronic copy of this completed Word file to Wanda Andrews at wanda.andrews@ncdenr.gov. It is the responsibility of the Vendor to submit the Request for Information (RFI) by the specified time and date of opening.

Information that assists or otherwise relates to developing specifications for a solicitation by the State is deemed confidential until award of a contract in connection with such solicitation.

B. Mail:

Mail only one Request for Information (RFI) response per envelope. Address envelope and clearly note RFI number as shown below. It is the responsibility of the Vendor to have the RFI in this office by the specified time and date of opening.

MAILING ADDRESS, IF DELIVERED BY US POSTAL SERVICE	**OFFICE ADDRESS, IF DELIVERED BY ANY OTHER MEANS**
RFI NO. 16-32314-WA **Department of Environmental Quality, Coastal Management Division** **Attn: Wanda Andrews** **Box: 1606 MAIL SERVICE CENTER** **Raleigh, NC 27699**	**RFI NO. 16-32314-WA** **Department of Environmental Quality, Coastal Management Division** **Attn: Wanda Andrews** **217 West Jones Street, Suite 5422M, Raleigh, NC 27603-1606**

IMPORTANT NOTE ABOUT MAIL SUBMISSIONS: All Vendors are urged to take the possibility of delay due to submitting via U.S. Mail into account when submitting their response to this RFI.

QUESTIONS

Submit written questions to Wanda Andrews until January 19, 2016 at 11:00 AM. Questions may be submitted by email to wanda.andrews@ncdenr.gov.

2.0 OVERVIEW

The purpose of this Request for Information (RFI) is to acquire information from Vendors regarding their capability to conduct a cost benefit analysis of removal of the Southern Component of the New Inlet Dam and an inventory of the necessary permits and approvals needed to develop and implement a removal plan. The State of North Carolina will use the information received from this RFI as input for potential future contracting strategies. Vendors interested in participating in possible future opportunities are encouraged to respond to this RFI.

It is the objective of this RFI to:

> Develop an understanding of which firms are capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam along the Cape Fear River as proposed in the 2015 Appropriations Act Section 14.6.(h) and an inventory of the necessary permits and approvals needed to develop and implement a removal plan.

The following are attached to the RFI as one attachment: 1. 2015 Appropriations Act Section 14.6. (h), 2. Map of the New Inlet Dam, and 3. Pictures of the Southern Component of the New Inlet Dam.

The State is seeking detailed responses to the RFI demonstrating your firm's experience in these areas.

3.0 INSTRUCTIONS

3.1. Schedule

Respondents will have four (4) weeks to prepare and return their submissions to this RFI. Responses must be received by the date, time and the location specified on the first page of this RFI.

3.2. Clarification Questions

Clarification questions will be accepted until January 19, 2016 at 11:00 AM as specified on the first page of this RFI. Clarification questions can be submitted by email (preferred method) to wanda.andrews@ncdenr.gov. An addendum containing any general clarification questions and their answers may be issued as an addendum to this RFI.

3.3. Response

Please note this is a request for information only and not a request for goods or services. The Vendor must bear all costs for preparing this RFI.

4.0 RESPONSE

4.1 Instructions:

Vendors are requested to respond to the requested information below. A response does not bind or obligate the responder to the State of North Carolina to any agreement of provision or procurement of products referenced. No contract can or will be awarded based on submissions.

In order to facilitate the review of the questions, please provide the information in the exact order as below and do not alter the format of this document. You may put responses within this document directly below each question. Please rename this document NC Analysis of Removal of the Southern Component of the New Inlet Dam RFI_VENDOR NAME.doc (.docx also acceptable). In the renamed document title VENDOR NAME should be substituted with your company's name.

4.2 Requested Information:

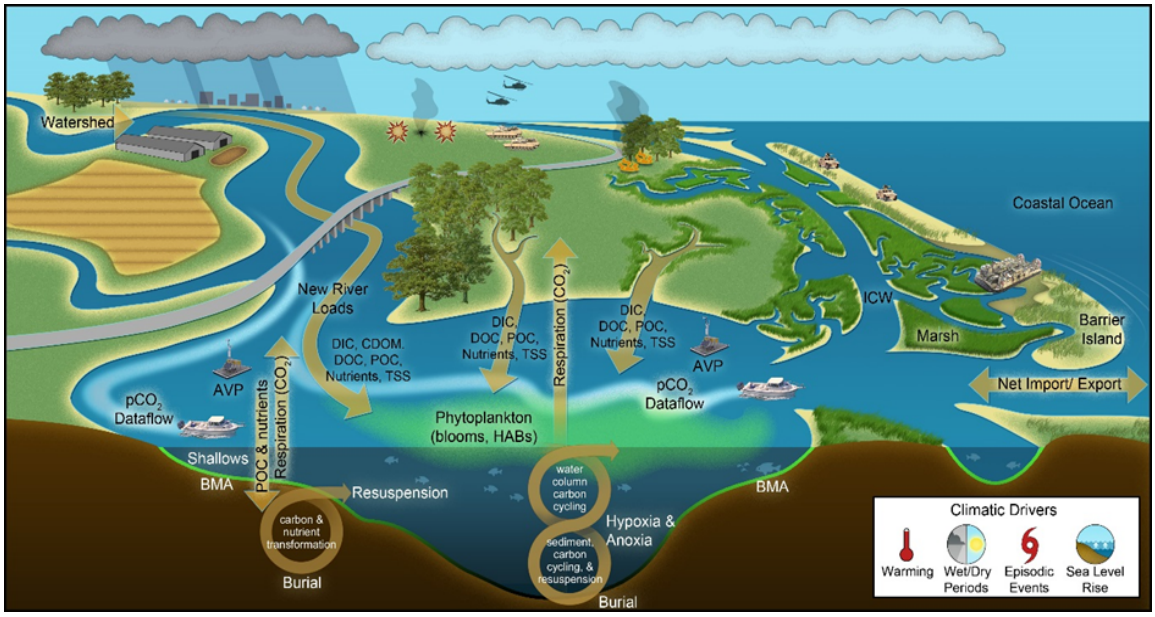
1. **Topic 1: State and Federal Permits, Approvals, and Studies**

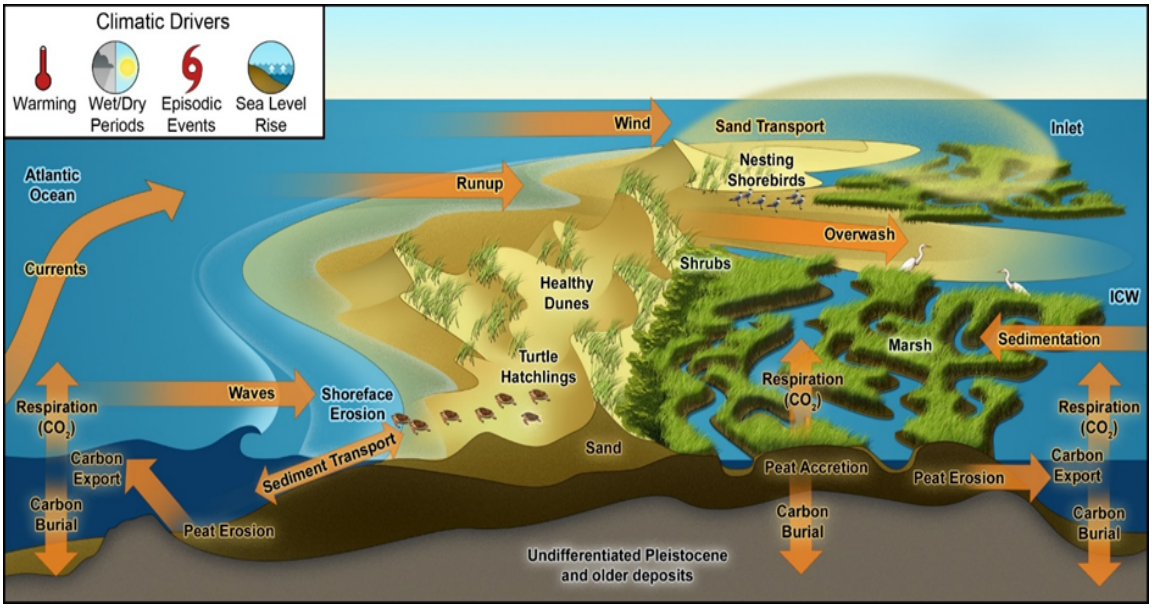
Question 1: What types of permits, approvals, and environmental studies will likely be needed to develop and implement a removal plan for the Southern Component of the New Inlet Dam? Describe the approach the firm will take to inventory these.

RESPONSE:

Cardno will work closely with the State of North Carolina (NC), Department of Environmental Quality (DEQ) - Division of Coastal Management (CAMA) to develop a clear understanding of the goals and objectives of the project for the removal of the southern component of the New Inlet Dam. We will coordinate with the NCDEQ to develop a clear and concise project description along with initial maps of the proposed project which will develop the foundation for identification of environmental and economic considerations for the removal plan. A clear project understanding will assist us in developing a project framework and an organized approach to scheduling and conducting necessary studies, surveys and regulatory requirements to obtain local, state and federal authorizations for the project.

Cardno's technical experts are well versed in complex environmental assessments and predicting the effects of developments in and infrastructure removal from coastal/estuarine systems. Our team of engineers, coastal and aquatic ecologists, modelling experts and economists have previously addressed similar issues associated with complex projects involving environmental, social and economic impacts. The range of issues within the coastal barrier and estuarine ecosystems that may be potentially affected by the removal (i.e., interactions among hydrodynamics, water quality, habitat, and ecological health) is illustrated in the following





conceptual diagrams (US DOD Defense Coastal/Estuarine Research Program based in the Marine Corp Base Camp Lejeune North Carolina, Onslow Beach). In addition to the ecosystem and coastal processes, the potential impacts to socio-economic conditions, recreation, and tourism as well as the navigation channels and the Port of Wilmington infrastructure would also need to be considered. Cardno will initially conduct an environmental constraints analysis and gather high level information about the project site, surrounding waterbodies, lands and communities to further refine our analysis of environmental considerations, scientific and engineering analysis and regulatory concerns.

Numerous local, state, and federal agencies will be involved in various roles from issuing permits or regulatory authorizations to review, coordination or as a commenting agency for the project so it is vital to develop a clear and streamlined approach. Coordination and communication with several of these entities is recommended well in advance of beginning the permitting process in the case where the regulatory phase may be lengthy. A list of most, but not all agencies or interested parties that will likely have an active role in regulation of this project are presented in Table 1. A prescribed framework will be developed that identifies the necessary studies, data, permits, licenses or authorizations and will be incorporated into a project schedule to track progress.

Table 1 A List of Potential Regulatory and Commenting Agencies

Agency Name	Agency Role
U.S. Army Corps of Engineers (USACE)	Permit – Section 10 of the Rivers and Harbors Act of 1899; Section 404 of the Clean Water Act; Section 401 Water Quality Certification; Section 408 (Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408)
National Marine Fisheries Service (NMFS)	Environmental Analysis Review, Fisheries Issues, Essential Fish Habitat, Protected Species
U.S. Fish And Wildlife Service (USFWS)	Approval for adjusting the boundary of the Zeke's Island Research Preserve, Environmental Analysis Review, Fisheries issues, Rare, Threatened and Endangered Species

U.S. Coast Guard (USCG)	Environmental Review, Navigation
U.S. Environmental Protection Agency (USEPA)	Permit – Dredge Water Discharge (Environmental Analysis Review)
NC Department of Commerce – Visit North Carolina	A coordination department, business unit of Economic Development Partnership of North Carolina.
NC State Environmental Review Clearinghouse	Letter of Concurrence and Full Consistency of the Federal Activity in Accordance with the State's Approved Coastal Management Program
NC State Historic Preservation Commission	Historic and Cultural Resource Review
NC State Office of Archaeology	Permit or Coordination of historic and underwater archaeology, and survey of land and sea properties in NC.
NC State Division of Energy, Mineral and Land Resources	Coordination and commenting agency
NC State Division of Marine Fisheries	Coordination and commenting agency for the sustainable marine and estuarine fisheries and habitat
NC State Wildlife Resources Commission	Coordination and commenting agency that works to conserve and sustain the state's fish and wildlife resources
Local districts, cities, and counties and others	Permits or commenting agencies - Land Use, Coastal Development Permit, SEPA Environmental Review
Port of Wilmington	Coordination and commenting agency that manages commerce and goods and services to the State of North Carolina

Meeting with the necessary regulatory agencies early and often in the process is a critical component to officially identify lead agencies and roles and responsibilities and to obtain consensus on the project framework. Based on our experiences, streamlining project permitting involves listening to agency concerns and adapting recommended project components through design studies or changes. Initial agency meetings and discussions will provide important information regarding environmental considerations; required data, fisheries, wildlife, water quality, sediment, and specific agency-desired survey and study designs. To help with the efficiency of agency reviews and eliminate duplication of efforts throughout the project it is recommended that Memorandum of Understandings (MOUs) with clearly defined agency roles and responsibilities are executed by all agencies that assert jurisdiction.

During initial agency introductions, engaging in a discussion with the historic preservation and cultural resource agencies will be important. The New Inlet Dam is listed with the North Carolina Historic Preservation Office with site registry number BW0248 described as an 18,000 foot stone levee. Historical records indicate the New Inlet Dam contributed to the economy of the region. It appears that the structure may be eligible under criteria A for the listing on the National Register of Historic Places where the structure may be associated with events that have made a significant contribution to the broad patterns of United States history.

Following these agency meetings, the project management plan (PMP) and schedule will be revised with specific tasks, activities, milestones, resource allocations, and event durations then implemented. Cardno will work closely with the NCDEQ to inventory and gather existing data, past surveys, publications and peer reviewed literature regarding the surrounding areas for review. An electronic inventory of all data sources reviewed, content discovered, and

citations will be utilized to keep track of research, categorize information, and make it accessible to the project team. Data gaps and necessary survey and engineering studies will be identified and scopes of work will be developed. A general list of studies and surveys that most likely will be necessary are as follows, but not limited to:

- *Biological studies, including threatened and endangered species*
- *Sea turtles*
- *Benthic survey and assessment*
- *Avian surveys with emphasis on nesting shorebirds*
- *Fish population study*
- *Water quality assessment of water bodies associated with the project*
- *Hydrodynamic modeling*
- *Numerical coastal process modeling*
- *Sediment transport modeling*
- *Salinity modeling*
- *Habitat evaluations*
- *Mitigation planning*
- *FEMA Flood assessment*
- *Risk analyses*
- *Human and recreational use surveys*
- *Economic impact study*
- *Review of navigation data*
- *Historic structures review*
- *Review of satellite imagery, aerial photographs, meteorological, and socio-economic data*

Cardno is experienced working for government agencies and fortune 100 companies with managing large volumes of documents and content by implementing information management systems that serve as the system of record. These tools include project information management systems (PMIS), online document management systems, web GIS systems, and other database applications that are custom developed or implemented utilizing commercial off the shelf (COTS) software such as SharePoint©, Oracle, and other environmental compliance data management software.

The National Environmental Policy Act (NEPA) process is the evaluation of the relevant environmental effects of a federal project or action mandated by NEPA. This process begins when an agency develops a proposal addressing a need to take action. If it is determined that the proposed action is covered under NEPA, there are three levels of analysis that a federal agency must undertake to comply with the law. It is likely that this project will result in the preparation and drafting of an environmental impact statement (EIS). NEPA establishes this national environmental policy by requiring federal agencies to prepare an environmental impact statement to accompany reports and recommendations for Congressional funding. A project is required to meet NEPA guidelines when a federal agency provides any portion of financing for the project or review of a project by a federal employee can be viewed as a federal action which requires NEPA-compliant analysis. ***Cardno has prepared over 500 EA, EIS, and EIA documents, which demonstrates our extensive experience under NEPA****. We have extensive experience developing the project purpose and need, conducting scoping meetings and public meetings, and preparing the necessary and required*

Cardno was recently selected by the National Fish and Wildlife Foundation (NFWF) to support the development of NEPA documents for 46 grantees funded by the Hurricane Sandy Coastal Resiliency Grant program.

documentation in accordance with NEPA. To avoid the preparation of multiple EIS documents for different federal agencies, Cardno will work with NCDEQ and the lead NEPA agency to prepare the appropriate documentation. Cardno recommends holding monthly interagency coordination meetings during the NEPA process within the vicinity of the proposed project. This successful approach was administered on dozens of Cardno NEPA projects. Most recently, Cardno was selected by the National Fish and Wildlife Foundation (NFWF) to support the development of NEPA documents for 46 grantees funded by the Hurricane Sandy Coastal Resiliency Grant program. The program is funded by the U.S. Department of Interior (DOI) and supports projects that reduce communities' vulnerability to the growing risks from coastal storms, sea level rise, flooding, erosion, and associated threats from storm events. Grantees receiving NEPA assistance from Cardno include non-profit 501(c) organizations, state government agencies, local governments, municipal governments, Indian tribes, and educational institutions.

The New Inlet Dam is situated among many communities, public lands, and public access areas such that public outreach and engagement with these stakeholders will be an important component. Cardno has extensive public outreach and involvement experience related to regulatory and environmental actions. Our experiences provide us with the ability to easily facilitate communications with the public, communities, specific stakeholder groups, including legislators, NGOs and agencies. In addition to the environmental considerations, we understand this project occurs in an area with significant tourism, attracting visitors for the beach, historical tours, birding, fishing, and various other outdoor adventures such as kayaking and hiking. Cardno has extensive experience facilitating public meetings that address complex issues, and we understand how important it is to communicate complex concepts, issues, and challenges strategically and directly. It is our goal to achieve a shared understanding of the project and to engage the public during important project milestones. We regularly conduct public meetings on a national scale and have a successful public outreach track record in the State of North Carolina. One example is described in the table below titled Watershed Prioritization Tool which was developed to facilitate meaningful stakeholder input and enhance buy-in for a local watershed planning process, Cardno used Net Environmental and Community Benefit Analysis (NECBA), a rigorous, collaborative decision- making model that uses stakeholder-identified criteria to score potential mitigation projects and establish priorities.

Watershed Prioritization Tool, North Carolina	
Client:	
North Carolina Ecosystem Enhancement Program	
Summary:	Key Services:
To facilitate meaningful stakeholder input and enhance buy-in for a local watershed planning process, Cardno used Net Environmental and Community Benefit Analysis (NECBA), a rigorous, collaborative decision- making model that uses stakeholder-identified criteria to score potential mitigation projects and establish priorities. The NECBA approach has several benefits: • Provides a flexible platform for identifying and discussing goals and metrics for evaluating alternative projects. • Helps reduce conflict and build consensus by helping stakeholders articulate their preferences and understand the preferences of others.	> **Public meetings and facilitation** > **Benefit analysis** > **Decision support and prioritization tool**

Watershed Prioritization Tool, North Carolina	
• Facilitates stakeholder understanding of the trade-offs among alternative projects and explore compromise alternatives. For the Indian and Howard's Creek Local Watershed Plan, Cardno built the NECBA model through a series of stakeholder engagement activities, which included online surveys, stakeholder meetings, and webinars. Cardno employed a widely used statistical model to then infer the weight, in percentage terms, that the stakeholders gave to each metric and group.	

Question 2: Describe the firm's experience working with the types of permits, approvals, and environmental studies identified in Question 1 above. List all certifications and licenses the firm holds that are relevant to this work.

RESPONSE:

Cardno has a local understanding of the coastal communities and their culture with "boots on the ground" staff along the coast and our local offices in Raleigh and Charlotte. We understand the technical complexities of sensitive environmental issues, such as nesting sea turtles, and it is standard for us to present project details in an accurate and simplified manner, easily understandable to all types of public audiences.

Two brief project descriptions are provided below to illustrate our experience with permitting complex projects. The most similar project (Evaluation of Impacts of Additional Surface Water Withdrawals on the Lower Tar River and Pamlico Estuary) was evaluated through cooperative efforts with a Technical Advisory Committee that included various state and federal agencies (NC Division of Water Resources, NC Division of Water Quality, NC Wildlife Resources Commission, NC Division of Marine Fisheries, National Oceanic and Atmospheric Administration national marine fisheries unit, and the US Fish and Wildlife Service). The Castle Hayne Aquatic Resources Characterization project provides another example of a recent project that involved permitting, modeling, and ecological assessments. Many of the project examples that are included in other sections of this submittal also included a permitting component.

Evaluation of Impacts of Additional Surface Water Withdrawals on the Lower Tar River and Pamlico Estuary, North Carolina	
Client:	
Greenville Utilities Commission	
Summary:	Key Services:
Cardno is supporting Greenville Utilities Commission's (GUC) long-term water supply planning efforts by modeling the current and future flows and water availability in the Tar River and evaluating the environmental flow needs for fisheries and aquatic life, water quality, and other beneficial uses. Recent droughts and state-mandated 75% reductions in groundwater withdrawals from coastal Cretaceous aquifers in the North Carolina's Central Coastal Plain Capacity Use Area (CCPCUA) by 2018 are prompting greater use of surface waters in coastal North Carolina. Cardno is conducting an environmental flow study to determine the amount of water available from the Tar River for use by GUC for regional water supply purposes.	> **Technical advisory group consultation** > **Basin hydrologic analysis and modeling** > **Fish and habitat needs** > **Tidal freshwater habitats**

Evaluation of Impacts of Additional Surface Water Withdrawals on the Lower Tar River and Pamlico Estuary, North Carolina	
Designed and conducted in coordination with a multi-agency Technical Advisory Group (TAG) the results of the flow study will provide GUC with: (1) the ability to determine the amount of water available seasonally from the Tar River; (2) identify the environmental constraints to flow and withdrawals in the Tar River and provide the basis for impact analyses of habitat and aquatic resources; (3) address short-term and long-term water planning, permitting, and operational needs and develop flow strategies that balance water availability and protection of aquatic resources. The Flow Study consists of a series of interrelated tasks, including agency consultation, detailed study plan, river modeling, habitat analysis, reporting, agency meetings, and discussions and negotiations with the agencies in regard to flows appropriate for the Tar River. Simulation models and habitat analyses include a basin hydrologic model of existing and future flows in the Tar River, a hydrodynamic and water quality model that will simulate tidal conditions, flow, salinity, and water quality in the tidally-influenced sections of the river, and an aquatic habitat model.	> **Hydrodynamic and water quality modeling**

Castle Hayne Aquatic Resources Characterization, Northeast Cape Fear River, North Carolina	
Client:	
Titan America, LLC.	
Summary:	Key Services:
Cardno has conducted aquatic resource characterization surveys in the Northeast Cape Fear River and Island Creek, a tributary to the Northeast Cape Fear, and adjacent freshwater tidally influenced wetlands and canals on the former Ideal Cement Plant Mine property in Castle Hayne, NC. These studies were being conducted in support of a U.S. Army Corps of Engineers (USACE) Draft Environmental Impact Assessment (DEIS) for proposed mine expansions being prepared for Carolina's Cement LLC, a subsidiary of Titan America LLC. Aquatic resource elements being characterized within the project area include biological resources (fish, amphibians and benthic invertebrates), surface water quality, aquatic sediment chemical analyses, wetland, water and sediment quality, and aquatic habitat characterizations. In addition to aquatic resource evaluations Cardno coordinated with other consultants on risk assessment tasks associated with the DEIS, by developing approaches for estimating mercury concentrations in fish and applying available mercury data, assumptions and simple modeling approaches. Data collected from aquatic resource surveys and modeling efforts had been used to develop the aquatic resources section of the DEIS and to evaluate alternatives associated with the proposed mining expansion.	> **Biological resources characterization** > **Aquatic habitat characterizations** > **Water quality and sediment sampling and analysis** > **Hydrodynamic and water quality modeling**

A list of Cardno's Relevant Certifications and Licenses for North Carolina based staff (copies available upon request):

- *Professional Engineer (PE); North Carolina Board of Examiners for Engineers and Surveyors, License #032728 - Alix Matos*
- *Certified Wildlife Biologist (The Wildlife Society) - Olivia Munzer*
- *U.S. Army Corps of Engineers Wetland Delineation – Olivia Munzer*
- *Register of Professional Archaeologists; Certification ID 32554200 – Valerie Robbins*
- *North Carolina Board of Examiners for Engineers and Surveyors Business License for practicing engineering and land surveying, License #F-1316*
- *North Carolina Board for Licensing of Geologists, License #C-474*

- *In regards to General Business Licenses for the Cardno offices in North Carolina (as well as all other North Carolina municipalities), the Privilege License Tax has been repealed, effective July 1, 2015. As a result, the City of Raleigh no longer requires a Business License to operate a business within the Raleigh City Limits. The North Carolina General Assembly passed House Bill 1050 which eliminated the authority of municipalities to levy a business license tax. Cardno has two operational North Carolina based offices below:*
  - *7606 Whitehall Executive Center Drive, Suite 800, Charlotte, NC 28273*
  - *5400 Glenwood Avenue, Suite G-03, Raleigh, NC 27612*

2. Topic 2: Costs and Benefits Analysis

Question 1: Describe the firm's experience in conducting costs and benefits analyses. List all certifications and licenses the firm holds that are relevant to this work.

RESPONSE:

Cardno has a long and successful record of conducting objective and impartial economic and environmental studies. Our team is known for developing high quality, thorough analyses that involve quantifying and monetizing complex environmental goods and services. We excel at quickly identifying the key elements of an analysis and conducting thorough and incisive research that we communicate in clear, concise terms to our client and the public. Our team also has demonstrated experience eliciting stakeholder feedback and input, which is often a key component in evaluating difficult to quantify environmental and social impacts. Below we highlight several key projects with similar scopes of services, including those that demonstrate our ability and approach to conducting cost-benefit assessments in a variety of contexts.

Clients benefit from the wealth of knowledge and experience provided by our multi-disciplinary team of economists and environmental scientists.

The team assembled for this NCDEQ project represents the breadth of knowledge embodied in our international staff of economists, modelers, ecologists, archaeologists, and environmental scientists. Our Raleigh based team has a strong local understanding of the economy and environmental conditions unique to the Cape Fear River region. Together the core team members represent decades of experience performing complex economic and environmental analyses related to valuing complex environmental goods and services. Often relied on in both permitting and litigation settings, our work is recognized as both innovative and technically defensible. The table in Appendix A summarizes the experience and qualifications of our core team members that includes economists as well as environmental scientists, engineers and modelers. Combined, they have over 200 years of experience conducting environmental and economic valuation studies that estimate the environmental impacts resulting from natural or manmade activities as well as the benefits of outdoor recreation and changes in ecosystem services. Cardno's multi-disciplinary team with in-house staff will share responsibility for ensuring the delivery of a quality analysis that comprehensively and efficiently identifies and quantifies the economic benefits and costs associated with the removal of the southern portion of the New Inlet Dam. Three example projects are provided in the tables below that demonstrate the wide range of cost benefit analyses that Cardno has conducted. We provide

additional examples of our demonstrated experience throughout our responses to the questions under Topic 2.

Economic Benefits and Alternatives Evaluation of the Natural Resources Plan, Tennessee	
Client:	
Tennessee Valley Authority	
Summary:	Key Services:
Cardno worked closely with natural resource specialists at the Tennessee Valley Authority (TVA) to quantify the benefits and prioritize four Natural Resource Plan (NRP) management alternatives for recreation, cultural, biological, and water resources on 293,000 acres of TVA-managed lands. Based on extensive interviews with the TVA project team and analysis of the resource changes that would result from the NRP programs, the Cardno team defined six types of economic benefits generated by the NRP management alternatives. Cardno economists estimated the economic value of benefits in dollar terms using a broad array of environmental economics literature applied to the specific conditions of the TVA programs. Nearly all quantified benefits of facilities, resource enhancement, and educational programs were related to recreation, including trails, greenways, wildlife viewing opportunities, and overnight and day use facilities. Results from this process were used in a decision-making framework to compare the benefits of the four management alternatives under different future conditions.	> **Quantify benefits** > **Estimated value of economic benefits** > **Use a decision making framework to compare benefits**

Economic Impact of an Improved Chicago River, Friends of the Chicago River, Illinois	
Client:	
Friends of Chicago River	
Summary:	Key Services:
Cardno assisted a partnership of non-profit groups with estimates of the economic impacts and potential benefits of investments in river-improvement programs that generate economic activity in related industries and produce recreation, scenic, and real estate amenity benefits. The project team developed cost estimates for a green infrastructure capacity target, estimated the wastewater treatment costs saved by using green infrastructure, and conducted input/output modeling to estimate the economic activity associated with the investments. The team also conducted a survey of stakeholders regarding their uses of the River and opinions on how improved access contributes to quality of life. The project provided decision-makers with quantified estimates of the potential economic activity, cost savings, and public support generated by water quality investments.	> **Economic impacts and potential benefits** > **Evaluation of improved river access** > **Stakeholder surveys for use of the river**

Assessing the Costs and Benefits of Deep-Sea Mineral Mining, Secretariat of the Pacific Community, Fiji	
Client:	
State of Queensland/Griffith University	
Summary:	Key Services:

Assessing the Costs and Benefits of Deep-Sea Mineral Mining, Secretariat of the Pacific Community, Fiji	
Cardno conducted an in-depth cost-benefit analysis of deep-sea mineral (DSM) mining in three Pacific island countries: Papua New Guinea, the Cook Islands and the Republic of Marshall Islands. The cost-benefit analysis included the cataloguing, quantifying and monetization of various financial, social and environmental costs and benefits of mining projects including offsetting carbon dioxide emissions, restoring deep-sea ecosystem services, and accidental oil spills and/or releases to the citizens of the host country. As part of this analysis, Cardno conducted dozens of in-person interviews with relevant stakeholders in order to discuss the importance of difficult to quantify cultural and social impacts. Cardno also used IMPLAN© (Impact analysis for PLANing) input-out modeling software to measure the total economic impact of DSM mining to each country	> **Cost-benefit analysis** > **Stakeholder engagement** > **Modeling**

A list of Cardno's Relevant Certifications and Licenses for North Carolina based staff (copies available upon request):

- *Professional Engineer (PE); North Carolina Board of Examiners for Engineers and Surveyors, License #032728 - Alix Matos*
- *Certified Wildlife Biologist (The Wildlife Society) - Olivia Munzer*
- *U.S. Army Corps of Engineers Wetland Delineation – Olivia Munzer*
- *Register of Professional Archaeologists; Certification ID 32554200 – Valerie Robbins*
- *North Carolina Board of Examiners for Engineers and Surveyors Business License for practicing engineering and land surveying, License #F-1316*
- *North Carolina Board for Licensing of Geologists, License #C-474*
- *In regards to General Business Licenses for the Cardno offices in North Carolina (as well as all other North Carolina municipalities), the Privilege License Tax has been repealed, effective July 1, 2015. As a result, the City of Raleigh no longer requires a Business License to operate a business within the Raleigh City Limits. The North Carolina General Assembly passed House Bill 1050 which eliminated the authority of municipalities to levy a business license tax. Cardno has two operational North Carolina based offices below:*
  - *7606 Whitehall Executive Center Drive, Suite 800, Charlotte, NC 28273*
  - *5400 Glenwood Avenue, Suite G-03, Raleigh, NC 27612*

Question 2: Describe the firm's ability and approach to conduct a costs and benefits analysis on the following topics as they relate to the proposal to remove the Southern Component of the New Inlet Dam:

RESPONSE:

The ultimate goal of a cost-benefit analysis is to determine whether a proposed action or project results in an efficient allocation of society's scarce resources. It requires an accounting of all of the economic costs and benefits (i.e. direct and indirect effects) of the proposed activity from the perspective of society. The outcome will determine whether the benefits of the proposed activity outweigh the costs, and by how much relative to other alternative actions (i.e. status quo or do nothing). In other words, how will the benefits and costs of the proposed activity be distributed across different population groups? Who gains (receives the benefits) and who loses (bears the cost) from the implementation of the project, and by how much?

To answer these questions, Cardno's approach begins by cataloguing and quantifying all of the various negative (i.e. costs) and positive (i.e. benefits) impacts associated with the proposed

project action. The next step involves assigning a dollar value to these impacts. The dollar value is intended to reflect society's willingness-to-pay to obtain (in the case of benefits) or avoid (in the case of costs) the specific project-related changes. The intent of assigning each change a monetary value is to convert the disparate changes that may result from a project, such as increased tax revenue, decreased ecosystem function, increased risk of flood damage, into a common unit (dollars) to help decision makers evaluate the proposed change.

Some of these impacts can be monetized using market data (i.e. revenues, costs, etc.), whereas others require the use of non-market approaches to capture the value of environmental and social impacts to society. To quantify the impacts that are not captured by the market, Cardno offers the potential to use a combination of the following approaches: 1) benefits transfer, a technique where willingness-to-pay values are adapted from existing literature and studies and applied to the area under investigation, or 2) conduct primary site-specific research (i.e. onsite surveys, in-person interviews, stakeholder engagement etc.) to obtain monetary values where appropriate (i.e. recreational use, property values).

The output from the combined approaches is a list of the costs and benefits of project actions divided into two categories. Those that can and will be monetized will be included in the cost-benefit analysis. Those that cannot be monetized will be discussed qualitatively. For those that can be monetized, all monetary values of project impacts are adjusted to reflect their present value. The difference between the total present value of benefits and the total present value of costs is defined as the project's net social benefit. If the project has positive net social benefits, then it has the potential to make society better off relative to the status quo or "do-nothing" scenario. To account for the uncertainty inherent in these values, Cardno will specify changes and/or willingness-to-pay as probability distributions and use Monte Carlo[1] methods to perform the analysis.

a. Environmental impacts including hydrology (e.g., salinity regime, tidal prism, and currents), sediment dynamics, habitat distribution, species distribution and utilization, and water quality to the Zeke's Island Reserve, lower Cape Fear River, and other special economic and natural resource assets in the immediate vicinity of the New Inlet Dam;

RESPONSE:

The lower Cape Fear River and estuary is a well-studied system, and there are at least two hydrodynamic models of the system that have been developed (Figure 1). Cardno's hydrodynamic modelers would initially review existing empirical and hydrodynamic models to determine the feasibility of using existing models to simulate the impacts of removing the New Inlet Dam on the hydrology, salinity regimes, sediment dynamics, habitat distribution, and impacts to sensitive and economically important species.

[1] Monte Carlo simulation is a problem solving technique used to approximate the probability of certain outcomes by running multiple trial runs (simulations) where inputs are randomly drawn from a distribution.

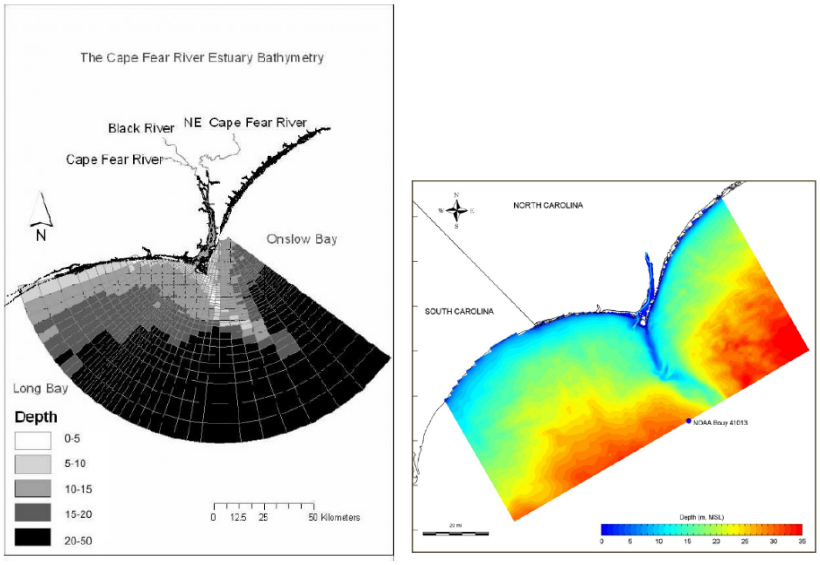
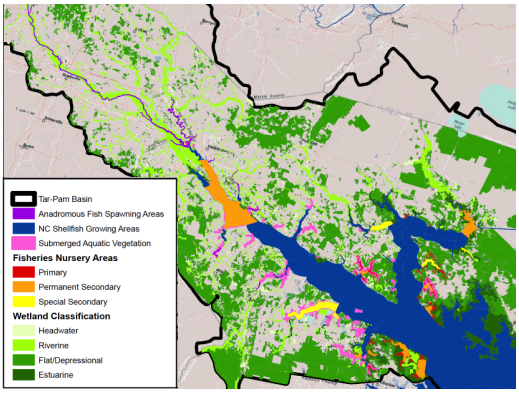


Figure 1 Existing hydrodynamic model grids of the study area: Left using the Environmental Fluid Dynamics Code and Right using the Delft3D model.

*We used a similar approach for a project for the **Evaluation of Impacts of Additional Surface Water Withdrawals on the Lower Tar River and Pamlico Estuary**. For this effort, we started with a hydrodynamic model developed by researchers at North Carolina State University and modified the model to address the specific questions related to permitting additional withdrawals from the river. For example, we conducted bathymetric surveys and collected side scan sonar images that allowed us to extend the model grid upstream from Washington, NC to Greenville, NC. To address the many complexities associated with the project, we worked with a Technical Advisory Committee that included various state and federal agencies (NC Division of Water Resources, NC Division of Water Quality, NC Wildlife Resources Commission, NC Division of Marine Fisheries, National Oceanic and Atmospheric Administration national marine fisheries unit, and the US Fish and Wildlife Service). At the end of our project, the NCDWR adopted our revised hydrodynamic model to address the mandate to develop hydrologic models of every river basin in NC. The State's existing model which relied on a mass balance approach using the OASIS model was not sufficient to address the Lower Tar and Pamlico estuary where the hydrodynamics of the system are dominated by tidal influences.*



A key output of this modeling project was determination of how the salinity regime in the lower Tar River and Pamlico estuary would change due to increased water withdrawals to meet 2050 and a hypothetical 2090 water use scenario. The results of these simulations were overlain on geographic datasets provided by the state agencies including high priority habitats and wetland areas. The salinity preferences and tolerances of the species associated with those areas was then compared to the frequency and duration of changing salinity regimes to determine the potential impacts to habitat and species. The hydrodynamic model was also used to assess impacts of altered water depths and velocities to address physical habitat changes.

We recommend a similar approach for the evaluation of the New Inlet Dam removal using one of two previously developed Cape Fear River Estuary hydrodynamic models developed by researchers at North Carolina State University (Xia et al. 2007) or by Olsen Associates, Inc. (2012). An initial scoping level evaluation of the model is recommended to determine if particular changes to input files and model development are needed to address the study questions (e.g., is the grid resolution fine enough to simulate the effects of removing this structure). Development and coordination with a Technical Advisory Committee will be critical to the project's success to ensure that the unique characteristics of the Lower Cape Fear River and estuary are properly addressed.

Once the impacts to physical and chemical habitat are understood, these environmental and ecological impacts will be further analyzed by Cardno's economists to evaluate the cost and benefits associated with these changes. In a similar project for the ***National Quantification of the Environmental and Social Impacts of Closed-Cycle Cooling, Electric Power Research Institute, Various locations****, Cardno was part of a team contracted by the Electric Power Research Institute (EPRI) to quantify on a national basis, the net environmental and social effects (adverse and beneficial) of retrofitting power plants with once through cooling to closed cycle cooling. Cardno's primary role on the project was the economic valuation of changes that would occur. These changes included reduction in the number of fish killed by power plants as well as changes in CO2 emissions, air quality, public safety, land use, water consumption, habitat quality, noise levels, and aesthetics. The impacts were quantified at individual nuclear and fossil fuel sites operating on a variety of water body types and under a range of geographic and socioeconomic conditions. Cardno used benefits transfer and bio-economic modeling methods to estimate social willingness to pay for the suite of associated environmental changes. The valuation included an assessment of the potential for non-use values based on existing literature and economic theory, interpretation and application of hedonics and travel cost literature, as well as application of agricultural economics paradigms.*

Cardno conducted a study on the ***Economic Impacts of the Sebastian Inlet, Sebastian Inlet Commission, Florida*** *that measured the regional economic benefits and impacts of maintaining the Sebastian inlet in Florida. The study is estimating how recreational boating and other activities are dependent on the inlet to support the economies of local communities within the political boundaries of the Sebastian Inlet District. A large component of the effort involved market surveys of boaters and marine recreation businesses. Cardno conducted a mail survey of 750 registered boaters and two online surveys – one for boaters and one for marine related businesses such as marinas, hotels, restaurants, and charter boats. Additional parts of the study measured the increase in costs for regional boaters and fishermen to access offshore waters via other inlets if the Sebastian Inlet were not navigable, and how the presence of the inlet influences local property values. Lastly, the analysis estimated the economic value of key natural resources sustained by the presence of the inlet. In particular, the inlet is vital for nearby seagrass ecosystems ("marine prairies").*

The project description provided in the table below provides an additional example of how Cardno evaluated the cost and benefits associated with designating critical habitat areas on public recreational lands for the US Fish and Wildlife Service and National Oceanic and Atmospheric Administrations.

Economic Impact to Recreation from Critical Habitat Designation for the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA)	
Client:	
USFWS and NOAA	
Summary:	Key Services:
Cardno estimated the economic impacts of proposed critical habitat designation for species listed under the Endangered Species Act. These analyses have included assessing the net cost and potential impact of critical habitat designation on public recreation lands and recreationists, including campers, boaters, wildlife-viewers, Off Highway Vehicle (OHV)-users, and anglers. This work has included reviewing site and region-specific recreation participation and use literature; estimating recreation user days; and analyzing the impact on recreationists of changes in instream flow on anglers and boaters, including changes in facility supply, recreation user days, and recreation benefit.	> **Assessing net costs** > **Evaluation of recreation participation and benefits**

b. Navigational access impacts to the Port of Wilmington and for other commercial and recreational vessels;

RESPONSE:

Cardno has extensive experience in planning navigation access for ports, commercial maritime and military terminals and recreational facilities, such as marinas. In so doing, Cardno economists, engineers and planners have provided estimates of costs for improvement (deepening and widening) and maintenance for dredging and dredge material disposal as well related infrastructure upgrades. Benefits are estimated by continuing or developing new capabilities to move waterborne commerce or attract/maintain water-dependent users. With improvements in navigation access, transportation cost savings are possible, which make up an important component of the benefits side of the analysis.

Cardno uses an in-house database of harbor and navigation improvement costs that are based upon actual bids and industry standards. Cost estimates from RS Means are used that adjust for local conditions. Surveys of local businesses, like dredging contractors, are also used to reflect the most recent bidding climate. Cost estimates are itemized by line and aggregated with appropriate escalation factors to account for the time value of money. It is envisioned that once the Dam is removed that accumulated sediment behind the Dam and subsequent sediment loads would flow downstream and enter the Lower Cape Fear River. As sediment is transported into the navigation channel for the Port of Wilmington, the amount of sediment at first flush of Dam removal and annual loads of upstream sediment would increase the amount of the periodic dredging needed to maintain the 42 feet navigation channel. Disposal of these increased loads would follow existing options of beach nourishment, upland and off shore placement. Costs for dredging (hydraulic and/or mechanical) and disposal would be the cost side of the cost and benefits analysis for the impacts of the Dam removal on the Port of Wilmington, other commercial users and recreational vessels.

Benefits calculations would follow the USACE's Institute of Water Resources procedures. There would likely be positive effects from an enhanced habitat and water quality perspective as the river would flow without impedance from the Dam. Potential land use changes currently below the Dam may occur and could include commercial maritime

operations that would be able to take advantage of close proximity to the open ocean. Transportation cost savings could be estimated based on potential waterborne trade that could result from the project. The resulting costs and benefits analysis would include use of a current discount rate that reflects the future value of money for civil works project such as the proposed Dam removal.

Cardno recently worked with the USACE, Galveston District in the re-evaluation of costs and benefits with a new ***Widening Proposal for the Navigation Channel to the Port of Freeport, TX****. Costs were estimated for deepening new areas of the channel and the upland disposal of an additional 2 million cubic yards of dredge material. Several altered infrastructure costs were also included such as the protection of existing flood protection barriers and the relocation of utilities. Benefits were estimated for the new ability to accommodate larger ships including container ships and petroleum carriers. Working with the USACE, the costs and benefits analysis showed a greater than 1.5 ratio. This work allowed the continuation of the process of consideration to re-evaluate the previously Congressional approved navigation improvement project in Port Freeport.*

Our ports and harbors staff have an in depth knowledge and understanding of big picture shipping routes, waterborne cargo forecasts, and vessel traffic at ports of call along the east coast including the Port of Wilmington. Our understanding of maritime routes and the needs of associated commercial vessels will help us to assess navigation access impacts and the potential viability of new routes. Cardno completed a ***Programmatic NEPA document for the US Maritime Administration (MARAD)*** *on the feasibility and evaluation of a maritime highway. The study included a marine highway evaluation of the east and west coasts of the United States. Elements of the project studied a potential shift of commercial cargo from trucks to domestic shipping routes. On a smaller scale pertaining to recreational vessel access, Cardno brings the qualifications and experience with regional economic benefit analysis of inlet structures on the viability, importance and use of coastal inlet areas from the recreational vessel and boating perspective like our project Economic Impacts of the Sebastian Inlet.*

c. Economic factors including cost and maintenance of removal, cost and maintenance of restored condition, and changes to commercial and recreational use of the area;

RESPONSE:

Cardno's team includes a geomorphologist, Dr. Andrew Simon, with over 30 years of experience in evaluating and management of sediment erosion and transport. Prior to joining Cardno, Dr. Simon has conducted his career with the US Geological Survey for 16 years and the USDA-ARS, National Sedimentation Laboratory for 15 years. Cardno's geomorphologist has an expertise in mechanistic analysis of unstable-channel systems, erosion, cohesive-sediment entrainment, the role of

riparian vegetation, "reference" sediment-transport rates, and river restoration, working on projects throughout the United States and around the globe. Mr. Simon and his team are experts in quantifying the effects of imposed channel and landscape disturbances, and mitigation measures on channel response and sediment loads. Cardno's geomorphologists and hydrodynamic modelers would work together to evaluate the existing information and modeling regarding sediment dynamics in the estuary before and after removal of the dam. Our staff's qualifications would perfectly enhance the analysis of sediment loads, physical characteristics and modeling reactions including effects on the existing navigation channel and the Lower Cape Fear River by the removal of the dam. Coupled with our overall approach and techniques of cost benefit analysis, Cardno's geomorphologists would consider the potential for adjustments and evolution of the channel in coordination with our navigation experts with respect to shifts in the navigation channel and how that may positively or adversely affect commercial and recreational vessel of the area and ingress/egress. In order to evaluate the economic factors for removal and maintenance of the Lower Cape Fear River and adjacent tributaries, Cardno would evaluate current and future sources and magnitudes of sediment delivery, quantify potential sediment-load reductions or additions, and determine "background" rates of sediment transport.

Two brief project descriptions are provided in the tables below that describe similar projects that included sediment modeling.

Murray River Mouth Barrage Removal and Dredging Program, Australia	
Client:	
Murray-Darling Basin Corporation and South Australia Department of Water, Land & Conservation	
Summary:	Key Services:
A 5 year study involving application of the Delft3D numerical modelling suite to simulate sediment transport and morphodynamics of the Murray River entrance (Australia's largest river with a catchment similar in size to the Mississippi River). Existing barrages that prevent saline ocean water ingress into Lake Alexandrina were assessed through simulating a range of options involving adjusting the dredging program and barrage operation and location. Optimal solutions were derived from a cost-benefit analysis.	> **Delft3D Numerical Modeling** > **Wave, tide and freshwater simulations** > **Dredging** > **Cost-benefit analysis**

Sediment Load Reduction to the Great Barrier Reef and Moreton Bay. Queensland	
Client:	
State of Queensland and Griffith University	
Summary:	Key Services:
The project, conducted in cooperation with the Australia Rivers Institute at Griffith University and the U.S. Army Corps of Engineers focuses on determining magnitudes and sources of sediment moving from three important Queensland catchments (Normanby, O'Connell and Upper Brisbane) to their respective outlets. In particular, the project focuses on using state of the art field and analytic techniques to measure and predict bank erosion using a new modeling framework that combines the industry standard HEC-RAS sediment-transport model with the Bank-Stability and Toe-Erosion Model (BSTEM) of which Dr. Simon is the senior developer. As lead scientist for Cardno, Dr. Simon designed and is conducting a multidisciplinary study using detailed geomorphic and numerical modeling investigations of the three representative	> **USACE partnership** > **Modeling** > **Sediment transport and erosion**

Sediment Load Reduction to the Great Barrier Reef and Moreton Bay. Queensland	
watersheds with reconnaissance-level evaluation of more than 300 sites to be used for extrapolation of erosion rates to un-modeled reaches.	

Boone Dam Remediation Socioeconomic Report and Environmental Assessment Tennessee Valley Authority, Tennessee	
Client:	
Tennessee Valley Authority	
Summary:	Key Services:
Boone Dam, owned and operated by the Tennessee Valley Authority (TVA), impounds Boone Reservoir, a multi-use reservoir primarily providing flood protection and recreation opportunities to a three-county region in northeastern Tennessee. In October 2014, a sinkhole was discovered near the base of the embankment at Boone Dam compromising the safety of the dam. TVA chose to remediate the problem by constructing a composite seepage barrier at Boone Dam over a period of 5 to 7 years. During the remediation period the reservoir pool elevation would be roughly 10 feet below winter pool levels, eliminating or severely limiting access to the reservoir. Cardno developed the socioeconomics assessment of TVA's action and wrote two sections for the EA; Recreation and Socioeconomics. The analysis focused on the impact that the reduced access to recreational amenities on the reservoir would have to visitors and shoreline property owners, both quantifying and qualifying the impacts. The report determined annual visitation to Boone Reservoir would decline between 24 percent and 52 percent of normal, reducing economic activity in the area by between $11 thousand and $290 thousand. And shoreline property owners' spending on recreation-related items would further reduce economic activity by between $630 thousand to $1.2 million	> **Analysis of reduced access to recreational amenities** > **Economic impact to recreation** > **Changes to recreational use**

d. Beach erosion and sand management for adjacent and surrounding beach communities; and

RESPONSE:

When beaches are narrowed by erosion there are multiple economic impacts: recreational opportunities may decrease, the quantity and quality of ecosystem services may be altered, and coastal infrastructure may be placed at greater risk. Some of the costs associated with these changes can be monetized using relatively straight-forward risk and engineering cost estimates. However, valuing changes in recreational opportunity and ecosystem service provision requires an extensive understanding of non-market valuation methods such as random utility models and conjoint analysis.

Working with biologists and physical oceanographers, Cardno economists will identify project-related changes in recreational opportunity and ecosystem service provision, quantify those changes in meaningful units such as lost beach trips, and assign a value to each change using benefits transfer methods that are both rigorous and technically defensible.

Alternatively, Cardno offers the option to collect site-specific visitation data at the beaches likely to be affected by the project. The visitation data would be used in combination with data on beach characteristics such as quality, width, etc., in a Random Utility Model (RUM) in order to estimate both the change in visitation and value per trip under current

and post dam removal conditions. This option has the advantage of producing a more precise estimate of the change in visitation and subsequent change in value associated with project related actions since it is based on specific data obtained at the affected sites as opposed to relying on data obtained from similar sites.

Cardno economists Jeff Wakefield, PhD and Kelley Myers, PhD have published empirical studies about the value of beach use in Delaware. Dr. Wakefield has also published work on the costs of nourishment on Delaware's ocean beaches. We have a partner relationship with Dr. George Parsons, University of Delaware, who has conducted multiple studies about the recreational use of beaches and recently assisted Delaware with an economic study of Bay beaches. Our combined experience in valuing the benefits of beach related activities and teaming relationships with leading academic experts in the field of recreational valuation will provide the State with scientifically sound and rigorous results. The table below provides an example of a cost benefit analysis that Cardno conducted in Australia for various coastal management strategies.

Quinn's Beach Long Term Coastal Management, Australia	
Client:	
The City of Wanneroo	
Summary:	Key Services:
Cardno was engaged to carry out a detailed coastal processes assessment, and investigate and prepare coastal management options for the long-term protection of Quinn's Beach. Shoreline evolution was modelled for both long-term trends and short-term storm-induced erosion using a number of 'best of breed' numerical model systems for waves, currents and sediment transport. This project represented the use of the XBeach model. Significant community engagement was facilitated through a Community Reference Group. Suitable coastal management options identified from a detailed cost-benefit analysis were assessed, and a preferred option selected based on a multi-criteria analysis that accounted for an extensive range of technical, economic, social and environmental considerations.	> **Coastal processes assessment** > **Shoreline evolution analysis** > **Modeling** > **Stakeholder engagement**

e. Storm vulnerability to the Zeke's Island Reserve, lower Cape Fear River, adjacent and surrounding communities, and other special economic and natural resource assets in the immediate vicinity of the New Inlet Dam.

RESPONSE:

Our firm has decades of experience with the preservation of coastal habitats and communities to ensure a resilient and sustainable future through evaluations and modeling in relation to vulnerability, natural hazards, climate change, and adaptive management measures. We have experience conducting a variety of vulnerability assessments in coastal habitats and communities. By focusing on storm vulnerabilities to community systems, Cardno can recommend reinforcement strategies and outline a multi-faceted approach to reduce community risk through measures that support infrastructure and ecosystem resilience while ensuring that actions are cost-effective and involve minimal reinvestment. The potential impacts related to storm surge, waves, and associated currents called storm vulnerability cannot be exactly determined; however,

with the use of modeling practices, potential scenarios can be simulated. Varying degrees of storm processes that may cause beach and dune erosion, overwash and onshore sediment transport can be evaluated along with associated risk factors. The Cardno team of coastal scientists, hydrodynamic modelers, and resiliency experts can utilize the most recently available information to evaluate the combined risk to the area from sea-level rise and storm surge. We use a high-resolution, site-calibrated, numerical model framework developed specifically for each project. Our models will quantify storm surge attenuation rates in the coastal community, including factors that contribute to vulnerabilities, and will provide information for management actions and resilience planning.

In addition, Cardno will evaluate the risks of the project and impacts from storm surges on threatened and endangered species, such as nesting sea turtles, as well as unique and sensitive natural areas, such as Zeke's Island Coastal Reserve. Our archeologists and historians will determine the potential impacts to cultural resources within the impact area.

The tables below provide examples of similar projects where Cardno evaluated storm surge, climate change, and/or coastal resiliency issues for NEPA compliance or to conduct cost benefit analyses.

NFWF Hurricane Sandy Coastal Resiliency Grant Program – Coastal Resiliency Assessments

Client:

National Fish and Wildlife Foundation

Summary:	Key Services:
NFWF, in partnership with DOI, is managing the Hurricane Sandy Coastal Resiliency Competitive Grants Program. The program selected 54 projects from Virginia to New Hampshire and as far west as Ohio - states that officially declared a natural disaster as a result of the Hurricane Sandy storm event. Grants were awarded to projects that assess, restore, enhance or create wetlands, beaches and other natural systems to help better protect communities and to mitigate the impacts of future storms and naturally occurring events on fish and wildlife species and habitats. DOI has invested funding in mapping, analysis, assessments, resiliency planning, and natural resource prioritizations that advance knowledge of the effects of climate change, sea level rise, and storm events on coastal natural ecosystems and communities. The assessments are designed to inform future management actions, policies and practices that can help natural resource managers and communities mitigate for the impacts of future storms and other naturally occurring events. The program will result in more than 6,600 acres of wetlands and marshes restored or created, 225 acres of beach restored, and over 216 million gallons of stormwater runoff reduced, as well as to benefit fish and wildlife. Cardno is providing technical assistance to these grantees by advising project managers on how to adequately document and perform quality control and quality assurance checks on their coastal resiliency assessment projects. Cardno's work with grantees ensures all data collection and processes funded by the grant meet agency regulations and are of the type and quality expected by NFWF, DOI, and other federal and state partner agencies.	> **Coastal resiliency assessment** > **NEPA guidance and documentation** > **Agency coordination**

Costs and Benefits analysis for Fraser Coast, Hervey Bay

Client:

Information that assists or otherwise relates to developing specifications for a solicitation by the State is deemed confidential until award of a contract in connection with such solicitation

Costs and Benefits analysis for Fraser Coast, Hervey Bay

Fraser Coast Regional Council

Summary:	Key Services:
Assessment of the costs and benefits of retreat versus protection of coastal infrastructure at risk from beach erosion. The Fraser Coast beaches have been retreating (in some locations at about 0.5 m per year) through erosion associated with tropical storms and hurricanes, which is being exacerbated by sea level rise. Significant infrastructure in the coastal zone is at risk and emergency evacuation plans are well developed to protect life during extreme events. Cardno assessed the costs and benefits of retreating (including methods for compensating coastal zone land owners) versus protecting coastal infrastructure over 20 and 50 year planning horizons	> **Costs and benefits analysis** > **Beach erosion** > **Storm vulnerability** > **Sea level rise**

Town of Broome Coastal Vulnerability Study, Australia

Client:

The Shire of Broome

Summary:	Key Services:
Cardno undertook the following assessments: storm surge and coastal inundation assessment, hydraulic assessment and shoreline stability assessment. Cardno developed a comprehensive coupled model system which simulated wind, atmospheric pressure, tide, rainfall and overland flow to investigate ocean inundation and catchment flooding. The study considered the impact of jointly occurring elevated ocean water levels and catchment flooding. The joint inundation and flooding model system also provided input to a hydro-geological model to assess interaction between surface water and ground water. The multidisciplinary team assembled by Cardno utilized the Delft3D model suite to provide rigorous model results in standardized formats that were readily transformed into visual products suitable for stakeholder engagement	> **Delft3D modeling** > **Hydraulic and shoreline stability assessment** > **Stakeholder engagement**

Southeast Florida Regional Vision and Blueprint for Economic Prosperity, Southeast Florida

Client:

South Florida Regional Planning Council

Summary:	Key Services:
Southeast Florida is on the cutting edge of global issues such as international immigration, trade, expansion of the Panama Canal resulting in increased commerce and trade at local Ports, growth and sustainability of coastal communities, communication, Everglades restoration, tourism and climate change. Under the Sustainable Communities Regional Planning Grant from the U.S. Department of Housing and Urban Development (U.S. HUD) solutions were developed to provide a model and blueprint for other regions for liveability and economic prosperity. With the growth of southeast Florida a plan was needed to couple growth and development through urban sprawl with the risks of storm vulnerability, aging infrastructure, population demands and affordable housing. Cardno supported this project through a rigorous science-based approach to sustainable planning through a sea level rise impact assessment, public engagement, and master planning and project management.	> **GIS mapping** > **Science-based approach to planning** > **Sea level rise impact assessment**

RESPONSE: *See responses to the above sub-elements of Topic 2.*

References

Olson Associates, Inc. 2012. Calibration of a Delft3D model for Bald Head Island and the Cape Fear River Entrance Phase I. Prepared for Village of Bald Head Island, April 2012.

Xia, Meng, Lian Xie, and Leonard J. Pietrafesa. Modeling of the Cape Fear River Estuary Plum. Estuaries and Coasts Volume 30, Number 4, p. 698-709.

ADDENDUM ACKNOWLEDGEMENT:

Cardno, Inc. acknowledges that we have received and incorporated the information included in Addendum 1 and Addendum 2.

Environmental Quality

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

BID ADDENDUM

FAILURE TO RETURN THIS BID ADDENDUM IN ACCORDANCE WITH INSTRUCTIONS MAY SUBJECT YOUR BID TO REJECTION.

Bid Number: 16-32314-WA Bid opening Date/Time remains: February 04, 2016

DISCRIPTION: **Analysis of removal of the Southern Component of the New Inlet Dam**

Addendum Number: 2

Addendum Date: January 11, 2016

INSTRUCTIONS:

On addendum number 1, the captions of the pictures are not clear and some of the letters have been cut off. The pictures are in the correct order. I have copied the captions on to a separate document as addendum number 2. It is not necessary for this addendum to be signed and returned along with your completed RFI but it is acceptable should you chose to do so.

APPENDIX A

Table A. Cardno Core Team Qualifications

Economists

Staff	Experience
Susan Burke, PhD ***Senior Consultant*** **PhD, Agricultural and Natural Resource Economics, Oregon State University** **MS, Agriculture and Natural Resource Economics, University of California – Davis** **BS, Finance/Business, California State University**	Dr. Susan Burke's nearly 20-year environmental management career has been devoted to water resource management and planning, specifically incorporating economics into resource management decisions. She is widely recognized for developing innovative ideas to problems faced by resource managers and skilled at working across various disciplines and with various governmental agencies – federal, state and local. Dr. Burke has served as the technical expert and lead on projects that evaluate the economic benefits of flood control, dam removal, watershed and estuary restoration, and outdoor recreation. Dr. Burke has extensive experience collaborating with hydrogeologists, biologists and ecologists. Her relevant experience includes: > Water Resource & Management > Water Economics > Cost-Benefit Analysis
Jeffrey Wakefield, PhD ***Senior Consultant, Principal*** **PhD, Economics, University of Delaware** **MS, Marine Biology & Biochemistry, University of Delaware** **BS, Biology, Rochester Institute of Technology**	Dr. Jeffrey Wakefield has over 15 years of experience actively managing and performing intergovernmental and private sector projects related to the valuation of natural resources and the modeling of economic impacts. He has carried out cost benefit analyses related to beach nourishment projects, Environmental Protection Agency (EPA) permitting activities and regional development plans. He has led numerous socioeconomic analyses for the Federal Energy Regulatory Commission (FERC), United States Coast Guard, U.S. Department of State, and the National Marine Fisheries Service which included implementation and/or review of multiple input/output modeling efforts. His relevant experience includes: > Economic Modeling > Cost-Benefit Analysis > Recreational Impact Assessment > Statistics
Heath Byrd ***Senior Economist*** **MS, Agricultural and Natural Resource Economics, Colorado State University** **BS, Environmental Economics and Management, University of Georgia**	Mr. Heath Byrd has over 16 years of experience developing socioeconomics analyses as part of environmental assessments (EAs) and environmental impact statements (EIS). He is currently leading an assessment of socioeconomic, recreational, and tourism impacts as part of a programmatic policy review concerning potential changes to TVA regulations. Mr. Byrd also has extensive experience estimating outdoor recreation-based visitation, including statistical analysis and sampling design as well as complex computer modeling. These skills have been applied to several high profile Natural Resource Damage Assessments (NRDAs), including the assessment of potential impacts to Florida recreation and tourism stemming from the Deepwater Horizon oil spill. His relevant experience includes: > Outdoor Recreation Visitation Estimation > Economic Value of Outdoor Recreation > Visitation Surveys > Statistics and Sampling Design > Computer Modelling

Staff	Experience
Kelley Myers, PhD ***Senior Economist*** **PhD, Marine Studies, University of Delaware** **MS, Economics, University of Delaware** **BS, Economics, Millersville University**	Dr. Kelley Myers is a senior economist with 10 years of experience in the economic valuation of natural resources. She has considerable experience in survey design and programming, facilitating one-on-one interviews and focus groups, stakeholder engagement and the valuation of complex environmental goods and services. She has also published her work and presented in the scientific and technical community. Since Joining Cardno she has designed several online surveys to estimate the benefits of outdoor recreation and water quality improvements, facilitated over 100 one-on-one interviews, helped develop a framework for a cost-benefit analysis of Clean Water Act regulations, and served as the technical lead on a cost-benefit study of mining for deep-sea minerals in the Pacific Island region. Her relevant experience includes: > Cost-Benefit Analysis > Stakeholder Engagement > Valuation of Ecosystem Services > Survey Design and Administration
Jessie Sutphin ***Economist*** **MA, Economics, Duke University** **BA, Business Administration, UNC-Charlotte**	Ms. Jessie Sutphin is a local economist whose technical experience includes data management, survey design and administration, and statistical data analysis. Ms. Sutphin has project related experience in estimating the benefits of outdoor recreation and property valuation as it relates to support for litigation. Her education includes formal training in theoretical and applied computational economics Her relevant experience includes: > Natural Resource Economics > Survey Development > Econometrics > Data Analysis
Oliver Pahl ***Senior Staff Economist*** **BS, Environmental Economics Policy & Management, minor in Natural Resource & Environmental Law & Policy, Oregon State University**	Mr. Oliver Pahl is a Senior Staff Economist with over four years of environmental consulting experience. He has experience working on Natural Resource Damage Assessments and NEPA environmental reviews with a focus on land use, recreation, visual resources and socioeconomics. He also has experience in land use planning and permitting, oil and gas leasing, and railroad operations management. His skills include economic impact analysis, data management, and data analysis including the use of the statistical software STATA. Since joining Cardno Oliver has worked in permitting, focusing on land use and socioeconomics, and natural resource damage assessment, focusing on human use valuation His relevant experience includes: > Environmental Economics > Natural Resource Damage Assessment > Land Use Planning > Natural Resource Valuation

Environmental Sciences

Andrew Simon ***Geomorphologist*** **PhD, Earth Resources, Colorado State University** **BA, Geography, State University of New York at Buffalo**	Dr. Andrew Simon is a geomorphologist with 30 years of experience in mechanistic analysis of unstable-channel systems, streambank erosion, cohesive-sediment entrainment, the role of riparian vegetation, "reference" sediment-transport rates, and river restoration, working on projects throughout the United States and around the globe. His interests are in quantifying the effects of imposed channel and landscape disturbances, and mitigation measures on channel response and sediment loads. He is an internationally recognized scientist and project manager, designing field, laboratory and numerical-modeling studies, leading and participating in field data collection, analyzing and synthesizing data, and preparing technical reports. He is the author of more than 100 technical publications and the editor of several books. His relevant experience includes: > Fluvial geomorphology > Streambank mechanics and modeling > Watershed scale evaluations of sediment transport > Effects of management actions on sediment dynamics
Paul Leonard ***Technical Director*** **MS, Fisheries Science/Statistics, Virginia Polytechnic Institute & State University;** **BS, Aquatic Science/Biology, Allegheny College**	Mr. Paul Leonard is a Technical Director with 30 years of experience managing and performing environmental assessments, restoration, and permitting related to energy, utility, transmission, land, and water resource development projects. Mr. Leonard regularly manages the activities of multi-disciplinary teams of fisheries biologists, hydrologists, water quality experts, planners, recreation specialists, and other environmental and resource specialists on large and complex projects. A well-regarded team leader, he directs major assignments with complex requirements for agency consultation, regulatory approvals, and alternative analysis. Mr. Leonard is a water resource specialist a recognized national expert in hydroelectric project licensing, NEPA compliance, watershed studies, and instream flow investigations. He specializes in instream flow studies of large rivers that require unique solutions for modeling of complex hydrologic and fisheries issues and assessment of multiple alternatives and project operations scenarios. His relevant experience includes: > Aquatic ecology > Ecological assessments > Environmental permitting and NEPA compliance > Instream flow analysis
David Van Senden, PhD ***Senior Principal*** **University of Western Australia;** **BSc(Hons), Flinders University of South Australia**	Dr. David van Senden has a PhD in coastal engineering and is a Senior Principal with Cardno. He has more than 25 years of experience and has lead the modelling component of multidiscipline projects to assess impacts of proposed developments, provide engineering design criteria for water infrastructure and developed models for the assessment of eutrophication effects in freshwater, estuarine and marine systems. Projects include assessment of the effects of desalination plant brine discharges into estuarine waterways, cold water pollution effects downstream of reservoirs and groundwater extraction fields, saline intrusions into upper estuarine reaches, mixing and stratification effects on water quality and ecosystem responses. He is proficient in the use of a number of numerical models including the Delft suite of 1-, 2- and 3- dimensional flow, transport (FLOW3D) and water quality models (DELWAQ) and the EFDC and wave models (SWAN and Boussinesq). He has also undertaken sediment transport modelling for rivers and coastal zones. His relevant experience includes: > Hydrodynamic and coastal modeling > Ecological effects of dredging on harbors > Assessment of dam removal projects > Natural Resource Valuation

Michael Hughes, PhD **Honorary Research Fellow, School of Geosciences, University of Sydney** **Editorial Board, Journal of Coastal Research**	Dr. Michael Hughes has over 30 years' experience across industry, government and university sectors. Michael has a strong technical background in coastal and ocean processes including internationally significant research; he has more than 100 publications and more than 1,000 citations in the Thomson-Reuters Science Citation Index. He has completed numerous projects involving science translation for policy makers. These include authoring the NSW Government's Coastal Hazard and Risk Assessment Manual and papers for the National Climate Change Adaptation Research Facility's CoastAdapt tool for local government authorities. Michael is an internationally recognized expert in coastal oceanography, morphodynamics (geomorphology) and sediment transport, and has worked on numerous coastal management projects. His relevant experience includes: > Integration and analysis of diverse data sets and model types to identify robust and cost effective solutions > Climate change and sea level rise impacts > Coastal hazard risk assessments and risk management plans > Beach and dune erosion, beach nourishment and dune rehabilitation
Steve Bartell **PhD, Oceanography & Limnology, University of Wisconsin** **MS, Botany (Plant Ecology), University of Wisconsin** **BA, Biology (Magna cum laude), Lawrence University**	Dr. Steven Bartell has extensive experience and technical skills in quantitative ecosystem analysis and ecological modeling. He has demonstrated modeling skills that include individual-oriented models, demographic population models, bioenergetics-based models of populations, communities, and ecosystems, and spatially-explicit watershed models. Dr. Bartell has applied these skills in assessing ecological risks posed by a variety of physical, chemical, and biological environmental stressors. He has also used his modeling skills in evaluating the likely outcomes of ecosystem management and restoration, quantifying population viability of endangered species, and characterizing basic ecosystem dynamics. Dr. Bartell has demonstrated experience in the development and application of methods for assessing the response of ecological and environmental models to inaccuracies and imprecision in model structure, model formulations, and parameter estimation. He has demonstrated expertise in Monte Carlo methods, interval analysis, fuzzy arithmetic, and computationally intensive methods (e.g., bootstrap, jackknife). His relevant experience includes: > Ecological Modeling and Risk Analysis > Science-Based Sustainability > Risk-Based Decision Analysis > Numerical Sensitivity & Uncertainty Analysis
Sharon Niemczyk ***Senior Consultant*** **BS, Biology/Marine Biology, Florida Institute of Technology**	Ms. Sharon Niemczyk has over 18 years of experience in the environmental sciences, natural resources management and regulatory review of complex environmental projects. She has developed an expertise in regulatory review of a broad spectrum of projects and management of coastal resources. She has experience with the NEPA process in both the public and private sector. She has proven experience in planning and strategic positioning for water and natural resource projects. She advises clients on environmental resource protection measures, streamlined project approaches and regulatory guidance with additional focus on minimization of resource impacts and water quality protection measures. Previously Ms. Niemczyk has worked for the Florida Department of Environmental Protection (FDEP) and the U.S. Army Corps of Engineers (USACE) where she primarily handled complex regulatory issues such as shore protection and ports and harbors projects. Her relevant experience includes: > Environmental permitting > Environmental impact assessment > Project and public meeting facilitation

Alix Matos ***Environmental Engineer*** **MS, Civil Engineering, North Carolina State University** **BS, Environmental Engineering, North Carolina State University**	Ms. Alix Matos, PE, is an environmental engineer with 15 years of experience assessing the impacts of human activities on the natural environment. She has developed hundreds of Total Maximum Daily Load (TMDL) studies across the country. Ms. Matos has expertise in water quality, wasteload allocation, and watershed modeling including evaluations of nutrient loading, eutrophication, fecal coliform, sediment, dissolved oxygen dynamics, and mercury transformations. Her experience in field monitoring studies includes flow measurement, sediment oxygen demand and re-aeration, time of travel determinations, water body surveying, streambank erosion assessment, and use of biological integrity indices. Much of this work has centered around predicting the impacts of land use changes, water withdrawals, pollutant discharges, and pollutant management strategies on water quality in streams, lakes, and estuaries. Her relevant experience includes: > Water quality and hydrologic modeling > Environmental impact assessment > TMDL assessment and modeling > Regulatory and permitting support
Robert Wardwell, MS, AICP ***Planner*** **MS, Science in Environmental Science, University of New Haven** **MS, Business Administration in Transportation/Logistics, University of Maryland** **BA, Economics, Marietta College**	Mr. Robert Wardwell is a Senior Professional with over 30 years of consulting experience in the fields of environmental planning, port planning and dredge material management. Mr. Wardwell is a Certified Planner through the American Institute of Certified Planners. He has managed many Environmental Assessments for infrastructure projects. He has continually worked as an environmental consultant and managed over 200 environmental documents, served over a decade as an Adjunct Professor at the Graduate School level and provided expert witness in state and federal court. He has specialized in undertaking technical studies and assisting in obtaining permits for dredging and navigation projects, having successfully worked with military and industry clients in completing dredging projects totally over 20 million cubic yards of marine sediment over the past 20 years. His relevant experience includes: > Economics > Transportation and navigation expert > Dredging and dredge material management expert > Certified Planner

Coastal Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

BRAXTON DAVIS
Director

November 30, 2015

Ms. Erica Seiden
Program Manager
Ecosystems and NERRS Program
NOAA Office for Coastal Management
1305 East-West Highway, Silver Spring, M.D. 20910

Dear Ms. Seiden,
The purpose of this letter is to inform you that the North Carolina Department of Environmental Quality intends to study the removal of the southern component of the "New Inlet Dam" along the western boundary of the Zeke's Island component of the N.C. National Estuarine Research Reserve in accordance with Section 14.6.(h) of the 2015 Appropriations Act (NC Session Law 2015-241), entitled "Cape Fear Estuarine Resource Restoration" (for full text of the Act, please see http://www.ncleg.net/Sessions/2015/Bills/House/PDF/H97v9.pdf).

In summary, Section 14.6.(h) instructs the Department of Environmental Quality to conduct the following (paraphrased):

(1) Notify the U.S. Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam;
(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removing the Southern Component of the Dam, including necessary permits and approvals;
(3) Request approval from the National Oceanic and Atmospheric Administration (NOAA) to adjust the boundary for the Zeke's Island component of the N.C. National Estuarine Research Reserve by moving the western boundary of the Zeke's Island Reserve 200 feet seaward and removing the area that lies between the current and new boundary from the Reserve, and adding equivalent acreage to the northern boundary of the Reserve from adjacent acreage at the Fort Fisher State Recreation Area; and
(4) If NOAA approves the boundary adjustment described above, the NC Coastal Resources Commission is then required to amend the Reserve Components Rule (15A NCAC 070 .0105) as further described in the Act.

The Division of Coastal Management is responsible for carrying out the steps outlined above. As such, I request specifics on the process and information that NOAA requires to consider a boundary change to a Reserve within the National Estuarine Research Reserve System. A report on the implementation of this Section is due to the General Assembly by April 1, 2016 and therefore, I would appreciate a response by January 15, 2016.

Please contact me at 252.808.2808 or Braxton.Davis@ncdenr.gov with any questions or comments that you may have on this study.

Sincerely,

Braxton Davis

Attachment

cc: Tom Reeder, Assistant Secretary, Department of Environmental Quality
Rebecca Ellin, Coastal Reserve Program Manager, Division of Coastal Management
Stephanie Robinson, Coastal Management Specialist, The Baldwin Group at NOAA Office for Coastal Management

(22) The Secretary of Environment and Natural Resources for the waiver or modification of non-State cost-share requirements under G.S. 143-215.73G."

CAPE FEAR ESTUARINE RESOURCE RESTORATION

SECTION 14.6.(h) The General Assembly finds that the New Inlet Dam or "The Rocks" was constructed by the United States Army Corps of Engineers in the late 19th century. The New Inlet Dam is composed of two components, a Northern Component that extends from Federal Point to Zeke's Island and a Southern Component that extends southwestward from Zeke's Island and separates the New Inlet from the main channel of the Cape Fear River. The General Assembly further finds that the Southern Component of the New Inlet Dam impedes the natural flow of water between the Cape Fear River and the Atlantic Ocean that occurred prior to emplacement of the dam. The General Assembly further finds that it is necessary to consider removal of the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean. To this end, the Department of Environment and Natural Resources shall do all of the following:

(1) Notify the United States Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam.

(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam, including an inventory of all necessary State and federal permits and approvals needed to develop and implement a removal plan. Identification of a capable firm pursuant to this section shall be done in accordance with Article 8 of Chapter 143 of the General Statutes.

(3) Request approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island for both of the following changes:

a. Moving the current western boundary 200 feet seaward and removing the area that lies between the current boundary and the new boundary from the North Carolina National Estuarine Research Reserve.

b. Compensating for any loss of acreage pursuant to sub-subdivision a. of this subdivision by adding a corresponding amount of acreage to the northern boundary of Zeke's Island from adjacent acreage at Fort Fisher State Recreation Area.

(4) If the Department obtains approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island as described in subdivision (3) of this subsection, the Coastal Resources Commission shall amend 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) as follows:

a. Definitions. – "Reserve Components Rule" means 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) for purposes of this section and its implementation.

b. Reserve Components Rule. – Until the effective date of the revised permanent rule that the Coastal Resources Commission is required to adopt pursuant to sub-subdivision d. of this subdivision, the Commission and the Department of Environment and Natural Resources shall implement the Reserve Components Rule, as provided in sub-subdivision c. of this subdivision.

c. Implementation. – Notwithstanding the Reserve Components Rule, the Commission shall adjust the boundary established for Zeke's Island in conformance with any boundary change that is approved by the National Oceanic and Atmospheric Administration pursuant to subdivision (3) of this subsection.

d. Additional rule-making authority. – The Commission shall adopt a rule to replace the Reserve Components Rule. Notwithstanding G.S. 150B-19(4), the rule adopted by the Commission pursuant to this subdivision shall be substantively identical to the provisions of sub-subdivision c. of this subdivision. Rules adopted pursuant to this subdivision are not subject to Part 3 of Article 2A of Chapter 150B

of the General Statutes. Rules adopted pursuant to this subdivision shall become effective as provided in G.S. 150B-21.3(b1) as though 10 or more written objections had been received as provided by G.S. 150B-21.3(b2).

e. Effective date. – Sub-subdivision c. of this subdivision expires when permanent rules to replace sub-subdivision c. of this subdivision have become effective, as provided by sub-subdivision d. of this subdivision.

Notwithstanding any other provision of law, the Department of Environment and Natural Resources may use funds from the Deep Draft Navigation Channel Dredging and Maintenance Fund, established pursuant to G.S. 143-215.73G, as enacted by subsection (c) of this section, to implement this subsection. No later than April 1, 2016, the Department shall report to the Environmental Review Commission, the chairs of the Senate Appropriations Committee on Natural and Economic Resources and the House Appropriations Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division regarding its implementation of this subsection, including a copy of the Request for Information required by subdivision (2) of this subsection and any responses received to the Request. Neither the Department nor any State agency may proceed with the removal of the New Inlet Dam until (i) the Environmental Review Commission has reviewed the report required by this section and (ii) a bill expressly providing authorization for the removal becomes law.

CLARIFY COASTAL COUNTY AUTHORITY OVER ABANDONED VESSELS

SECTION 14.6.(n) Section 1 of S.L. 2013-182 is repealed.

SECTION 14.6.(o) G.S. 153A-132(i), as rewritten by S.L. 2013-182, reads as rewritten:

"(i) A county may by ordinance prohibit the abandonment of vessels in navigable waters within the county's ordinance-making jurisdiction, subject to the provisions of this subsection. The provisions of this section shall apply to abandoned vessels in the same manner that they apply to abandoned or junked motor vehicles to the extent that the provisions may apply to abandoned vessels. For purposes of this subsection, an "abandoned vessel" is one that meets any of the following:

(1) A vessel that is moored, anchored, or otherwise located for more than 30 consecutive days in any 180 consecutive-day period without permission of the dock owner.

(2) A vessel that is in danger of sinking, has sunk, is resting on the bottom, or is located such that it is a hazard to navigation or is an immediate danger to other vessels.

Shipwrecks, vessels, cargoes, tackle, and other underwater archeological remains that have been in place for more than 10 years shall not be considered abandoned vessels and shall not be removed under the provisions of this section without the approval of the Department of Cultural Resources, which is the legal custodian of these properties pursuant to G.S. 121-22 and G.S. 121-23. This subsection applies only to the counties set out in G.S. 113A-103(2)."

EROSION CONTROL STRUCTURES

SECTION 14.6.(p) The Coastal Resources Commission shall amend its rules for the use of temporary erosion control structures to provide for all of the following:

(1) Allow the placement of temporary erosion control structures on a property that is experiencing coastal erosion even if there are no imminently threatened structures on the property if the property is adjacent to a property where temporary erosion control structures have been placed.

(2) Allow the placement of contiguous temporary erosion control structures from one shoreline boundary of a property to the other shoreline boundary, regardless of proximity to an imminently threatened structure.

(3) The termination date of all permits for contiguous temporary erosion control structures on the same property shall be the same and shall be the latest termination date for any of the permits.

(4) The replacement, repair, or modification of damaged temporary erosion control structures that are either legally placed with a current permit or

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office for Coastal Management

January 11, 2016

Mr. Braxton Davis
Director, Division of Coastal Management
NC Department of Environmental Quality
400 Commerce Avenue
Morehead City, NC 28557

Dear Mr. Davis,

This letter is in response to your correspondence dated November 30, 2015, in which you asked for specific information about the process and information that the National Oceanic and Atmospheric Administration (NOAA) requires in consideration of a boundary change to a reserve within the National Estuarine Research Reserve System (NERRS). You explained that the North Carolina Department of Environmental Quality intends to conduct a study regarding a proposed boundary change to the Zeke's Island component of the N.C. NERR. The process and required information for consideration of the proposed boundary change are outlined below. For more information, please refer to Section 315 of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1461; Title 15 Code of Federal Regulations (C.F.R.) Part 921; and the 2013 Reserve System Management Plan Guidelines and Resources ("Guidelines") (attached).

Under 15 C.F.R. § 921.33, a boundary change requires written approval from NOAA. Guidelines at p. 47. 'Proposed additions for inclusion in a NERR' should meet the following criteria: (1) the boundary should encompass an adequate portion of the key land and water areas of the natural system to approximate an ecological unit; (2) adequate state control of the site(s) must be established; and (3) the site should be suitable for long-term research and be important for education and interpretive efforts. Guidelines at p. 47; 15 C.F.R. §§ 921.1(e), 921.11(c)(3)-(4).

NOAA requires the following specific information to be submitted by a reserve proposing a boundary modification: 1) describe the proposed lands to be added or deleted by defining the location, acres, habitats, and existing uses, and state the total acreage of the new boundary, after explaining why lands and/or waters are proposed for addition or deletion; 2) provide a map depicting original boundary and new (expansion or contraction) boundary; 3) provide a brief history of the additional lands (if expanding); 4) provide the rationale for expansion – the benefits these lands and/or waters provide to the reserve from an ecological and/or programmatic perspective; 5) depict core and buffer zones on the new boundary map; 6) identify land ownership and type on the new boundary map; 7) identify how lands will be managed and the responsible parties for management; 8) identify how lands will be used, e.g. value to program efforts, public access, or otherwise. Guidelines at p. 47.

As an initial step, the State and reserve managing agencies should coordinate with NOAA to transmit the above information, and to conduct discussions on additional issues. With respect to the proposed boundary modification to the Zeke's Island component, additional issues for discussion include (1) the change to the core area of the reserve and (2) the disposition of the parcel potentially proposed for removal. These issues are discussed in more detail here.

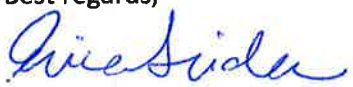
First, it is important to note that the area potentially proposed for removal, as part of the Zeke's Island component, is designated as a "core area" of the reserve – a key land and water area within the reserve that is so vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the reserve for research on natural processes. N.C. NERR Management Plan 2009-2014, Fig. 4 at p. 153 (depicting the core areas of the reserve); 15 C.F.R. §§ 921.11(c)(3), 921.30(a)(2). Accordingly, should this parcel be proposed for removal, it is important that the State and reserve managing agencies coordinate closely with NOAA, including preparation of appropriate documentation, to ensure that the continued designation of the reserve is viable and that the intent of the regulations is met.

Second, because NOAA provided funds for the purchase of the Zeke's Island component, if the parcel is proposed for removal, NOAA would need to consult with the State and the reserve managing agencies on potential disposition of the property, including retention of title. 15 C.F.R. § 921.21(e)(2). Accordingly, the State and reserve managing agencies should coordinate closely with NOAA on this issue as well.

In addition to the above, the following steps are also included in the boundary modification process under the applicable regulations. Public notice and an opportunity for public comment on the proposed modification should be provided; NOAA would place a notice in the Federal Register, and the State would be responsible for publishing an equivalent notice in local media. 15 C.F.R. § 921.33(a). Review for compliance with the National Environmental Protection Act would need to be completed, including, if required, preparing a categorical exclusion document, an environmental assessment, or an environmental impact statement, as well as conducting any resulting consultations with other federal, state, or tribal entities that may be determined to be necessary. 15 C.F.R. § 921.33(a). Federal consistency review under the CZMA may also be required. 15 C.F.R. §§ 921.4(b), 921.30(b). A memorandum of understanding (MOU) must be drafted between the state agency and the land managing partners, if different from the state agency, to affirm that the lands will be managed in accordance with Reserve System regulations, and the MOU must be included as an appendix to the management plan revision. Guidelines at p.47; 15 C.F.R. § 921.13(a)(11). Finally, if the boundary modification is approved, notice of the approval must be published in the Federal Register, and if necessary, NOAA will revise the designation document for the site. 15 C.F.R. § 921.33(a).

Thank you for contacting me about this early in the process. I have attached the Reserve System regulations and Management Plan Guidelines and Resources to support the above references. Please contact me at 240.533.0781 or at Erica.Seiden@noaa.gov if you have questions and/or to discuss further.

Best regards,



Erica Seiden

cc: Tom Reeder, Assistant Secretary, Department of Environmental Quality
Rebecca Ellin, Coastal Reserve Program Manager, Division of Coastal Management
Joelle Gore, Stewardship Division Chief, NOAA Office for Coastal Management
Stephanie Robinson, Coastal Management Specialist, The Baldwin Group at NOAA Office for Coastal Management

NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM

Reserve System Management Plan Guidelines and Resources

2013

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Appendices

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Acronyms

ADCNR	Alabama Department of Conservation and Natural Resources
CCIP	Climate Change Implementation Plan
CFR	Code of Federal Regulations
CICEET	Cooperative Institute for Coastal and Estuarine Environmental Technology
CTP	Coastal Training Program
CZMA	Coastal Zone Management Act
EA	Environmental Assessment
EIS	Environmental Impact Statement
ENOW	Economics: National Ocean Watch
GRF	Graduate Research Fellowship Program
GTM	Guana Tolomato Matanzas
HVAC	Heating, ventilation, and air conditioning
KEEP	K-12 Estuarine Education Program
LEED	Leadership in Energy and Environmental Design
LID	Low Impact Development
MOU	Memorandums of Understanding
NEPA	National Environmental Policy Act
NERR	National Estuarine Research Reserve
NERRS	National Estuarine Research Reserve System
NOAA	National Oceanic and Atmospheric Administration
NPED	National Policy and Evaluation Division
NRCS	Natural Resources Conservation Service
NSC	NERRS Science Collaborative
PAC	Procurement, Acquisition, and Construction
PAR	photosynthetically active radiation
PEA	programmatic environmental assessment
PRISM	Parameter-elevation Regressions on Independent Slopes Model
SMART	specific, measurable, attainable, relevant, and time-bound
SOVI	Social Vulnerability Index
STICS	Spatial Trends in Coastal Socioeconomics
SWMP	System-Wide Monitoring Program
SWOT	strengths, weaknesses, opportunities, and threats
USFWS	U.S. Fish and Wildlife Service

Introduction

The National Estuarine Research Reserve System (NERRS or Reserve System) is a network of 28 areas representing different biogeographic regions and estuarine types within the United States that are protected for long-term research, monitoring, education, and coastal stewardship. Established by the Coastal Zone Management Act of 1972, as amended, the Reserve System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states.

As part of this partnership, federal regulations require reserves to have a NOAA-approved management plan that is updated every five years (15 C.F.R. Part 921.13). NERRS management plans serve as the foundation and guide for reserve activities; collectively they describe the capacities of the Reserve System. These documents can be used as source documents for other internal and external partner programs such as the National Estuary Program and the Coastal Zone Management Program, as well as national efforts such as the National Climate Assessment. NOAA works collaboratively with each reserve to support the development and approval of its management plan, and to ensure compliance with federal regulations and alignment with national priorities and programs.

These guidelines are organized into two parts. **Part I** provides information about the process and timeline for writing a management plan and provides a suggested framework and preparatory steps for writing an integrated strategic plan as part of completing the management plan. **Part II** provides specific information required in each component of the plan, including questions to promote thinking about current status and opportunities, required and optional elements, case studies, references, tools, and resources.

Purpose of a Reserve Management Plan

Reserves are increasingly confronted with anthropogenic and natural stressors and must plan for the continued protection and use of the reserve for research, education, and public access. Reserves are also grappling with complex questions regarding new uses in or near reserves that may or may not be compatible with the Reserve System's mission. A comprehensive management plan will provide a foundation for addressing the challenges of protecting and managing a reserve. Therefore, the purpose of a reserve management plan is to

- Provide the vision and framework to guide reserve activities during a five-year period;
- Present opportunities to discuss reserve niche and strategic collaborations with partners;
- Communicate how the reserve is addressing priority coastal management issues through their stated goals, objectives, and strategies;
- Highlight reserve priorities and staff capabilities to address those priorities;
- Demonstrate how Reserve System programs are locally relevant and nationally significant;
- Enable the reserve and NOAA to track progress and determine opportunities for growth; and
- Position the reserve to acquire facilities construction and land acquisition funds.

Key Changes from 2006 Reserve Management Plan Guidelines

Within the last six years, almost all reserves have revised a management plan. This experience provides information to draw from about the process of creating management plans. Additionally, the Reserve System has grown and matured in the areas of strategic planning and program development and is addressing new challenges such as climate change. This guidance is intended to support each reserve in creating a management plan to meet current challenges. Therefore, this document contains several updates to and modifications of the *NERR Management Plan Guidelines 2006*:

- This guidance promotes a **query-based approach** by providing thought provoking questions to help reserves craft components of the management plan.
- The Reserve System created the "2011-2016 Reserve System Strategic Plan" which outlines three focus areas: water quality, habitat protection, and climate change. While water quality and habitat protection have been a focus of the Reserve System since its inception, **climate change is a new focus**. A changing climate will have profound impacts on coastal resources, communities, and infrastructure. It will be imperative to understand impacts and consider options for adapting to and mitigating these impacts. Considering climate change in all aspects of planning and programming is encouraged.
- Coastal management within the context of these three focus areas is sufficiently complex to require an **adaptive management approach that guides** strategic planning**.** This approach is emphasized and encouraged because , it supports collaborative learning, application of management actions based on current knowledge, and evaluation of actions that result in improved resource management.
- Creating an **integrated strategic plan** that leverages these skills and assets to address local priorities and system-wide goals is encouraged. An adaptive management approach can effectively support an integrated planning process where each reserve sector contributes expertise to comprehensively assess the issues and create solutions to coastal management challenges.
- While an integrated approach to strategic planning is encouraged, the **system-wide foundational programs** in research and monitoring, education and outreach, and coastal training help define the reserve niche. Foundational programs provide context for why and how the reserve will address their coastal management issues and support reserve goals by implementing integrated strategies. It is important to discuss these programs in a national and local context.
- It is important to understand why the objectives within the management plan have or have not been achieved during the five-year period. This will inform future management choices and focus for revisions to the plan. While not required, reserves are encouraged to **develop reserve-based performance measures** to track program performance and outcomes. Performance measures and their outcomes should be directly related to reserve objective statements.
- Understanding both the **natural and social context of the reserve** is necessary to effectively manage the resources. Improved coastal management starts with educated citizens making informed choices about natural resources. Therefore, it is essential to understand the dynamics of both natural and human communities.
- **References and resources** are included in each section of the guidance that provide information, tools, and additional guidance for adequately addressing specific topic areas.

Components of a Management Plan

Per federal regulations, 15 C.F.R. Part 921.13, management plans must describe the reserve's most pressing coastal management issues; goals, objectives, and actions for addressing those issues; plans for administration, research, education/interpretation, public access, construction, acquisition, and resource protection;, restoration and habitat manipulation, if applicable; and they must include a memorandum of understanding between NOAA and the state agency.

Required and optional components for management plans are listed below.Additional information, including a checklist for each required component can be found in Part II: Guidance for Reserve Management Plan Components.

Required Components	Optional Components
• Executive Summary • Introduction to the Reserve System • Introduction to the Reserve Strategic Plan • Program Foundations* – Research and Monitoring – Education – Coastal Training • Administrative Plan • Resource Protection Plan • Public Access and Visitor Use Plan • Facility Development and Improvement Plan • Acquisition Plan • Resource Manipulation Plan (If applicable) • Restoration Plan (If applicable) **Appendices:** • NERRS Regulations • Memorandum of Understanding between State Host Agency and NOAA • All Memorandums of Understanding between land managers within the reserve • Federal Consistency Determination • Public involvement and comments * See Program Foundations Chapter for options regarding organization of this material.	• Communications Plan • Volunteer Plan • Vessel and Vehicle Plan • Habitat Mapping and Change Plan • Contingency or Hazard Response Plans • Special Area Plans

Figure 1 illustrates the relationship between reserve management plan components that is necessary to meet reserve target audience needs. 'Introduction to the Reserve System' and 'Introduction to the Reserve' provide context for all subsequent components of the plan. The reserve strategic plan, which includes reserve goals, objectives, and actions, is at the heart of the management plan. Reserve people (i.e., administration), infrastructure (i.e., facilities), and the management authorities that protect the reserve serve as foundations for establishing and accomplishing goals and objectives. Reserve research and monitoring, education, training, and stewardship sectors work together in an integrated fashion to support implementation of the strategic plan. Stewardship functions are captured within the research and

monitoring, resource protection, public access, and land acquisition components, as well as in the optional restoration and resource manipulation components. The Program Foundations component captures information for each system-wide program including context, capacity, delivery, needs, and opportunities. Finally, it should be noted that reserve programs operate within the context of the Reserve System and state agency priorities that are relevant to the reserve. Evidence of alignment with these priorities should be apparent throughout the plan.

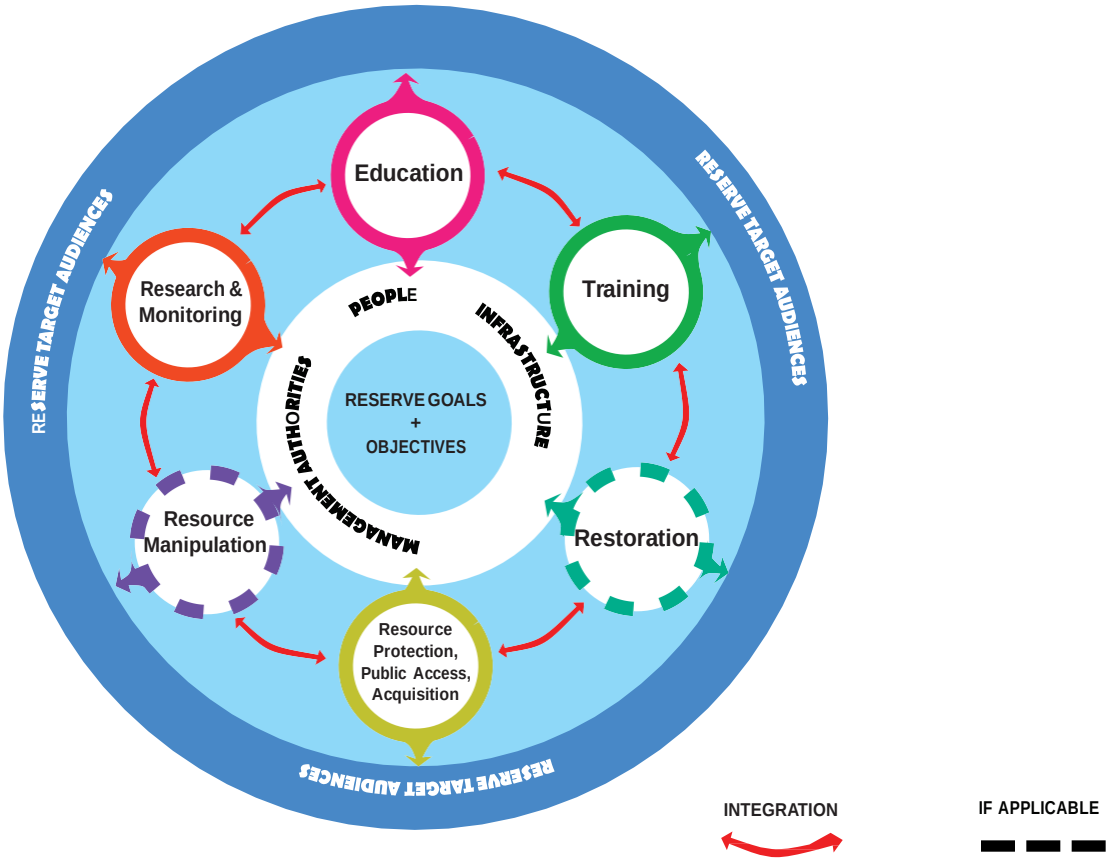


Figure 1. Relationship of Reserve Management Plan Components

How to Use These Guidelines

These guidelines are broken into two parts. **Part I** provides information to help reserves as they prepare to write or update their management plans, with particular focus on strategic planning. This section also includes information about the process, timeline, and responsibilities for the reserve and NOAA.

Part II provides specific information to support development of each component of the plan, including:

- questions to promote thinking about current status and opportunities
- required and optional elements
- case studies
- references
- tools and resources

NOAA will use the thought-provoking questions in this section as a guide when reviewing management plans. Each management plan revision should be a close collaboration between NOAA and the reserve. The revision process should begin with a discussion between the NOAA liaison and the reserve manager to discuss this guidance, the approach to the plan, and the timeline for completing the plan.

These guidelines can be found on the NERRS Intranet, under NERRS Guidance, Policy and Planning documents, sub-tab Management Plans (*www8.nos.noaa.gov/nerrsintranet/home.aspx*).

Part I: Process and Approach for Developing or Revising a Reserve Management Plan

Part I provides information regarding the process, timeline, and approach for writing a management plan, including: creating and implementing a strategy for plan revision, confirming priorities and achieving integration, engaging stakeholders, and tips for writing the strategic plan component. A process map and timeline is included that outlines steps and staff involved. Federal requirements include Federal Consistency, environmental compliance, public involvement, and the approval process.

The Process of Writing a Management Plan

Creating a Strategy for Plan Revision

Before beginning the management plan revision, reserves should have a strategy for determining primary coastal management issues; reserve and program niche and impacts; how to interact with the public throughout the management plan revision process; and the roles and responsibilities related to completing the plan (the next section provides a list of guiding questions to help establish the coastal management issues relevant to the reserve that also support national priorities).

A. Managing the Process

Reserves may decide to develop their plans in-house or through a contract, or a combination of both may be applied. There are advantages and disadvantages to each approach.

If reserves choose to develop the plan without outside support, they have complete control over the process and the quality. However, it is very time consuming for the entire staff. To ensure a smooth process, reserves should assess whether their staff has the appropriate skills (writing, editing, project management, facilitation) and the time to dedicate to the project. The plan will benefit from a lead that establishes clear expectations, consistent writing assignments, and keeps the group working toward an agreed upon timeline. If chapters are to be written by separate staff, establish a common outline for those chapters before beginning to write and make sure an editor or the plan lead will be making revisions so that the document is consistent in style and voice.

Contracting out part or all of the process means that some of this work will be done by other people, saving reserve staff time. Reserve staff will still have a big time commitment to provide the content and perspectives needed, and if the reserve is not satisfied with the contractor, the process can be expensive and unproductive. Interview contractors ahead of time, be clear about what the reserve needs help with (is it facilitating the strategic thinking, writing, editing, graphical support, etc.) and make sure they have the expertise to support those needs. Based on a 2007 survey of managers, over half of reserves employ

outside expertise to complete their plans. Additional results of this survey regarding management plan process and content can be found on the NERRS intranet homepage, under NERRS Guidance, Policy and Planning documents, sub-tab Management Plans.

B. Confirming Your Priorities

The first step in revising a management plan is to establish the priorities that reflect the reserve's unique niche and complement other management efforts in the area. First steps for identifying priorities are:

1. Review existing state or agency priorities, the Reserve System Strategic Plan, site- specific needs assessments, program strategies, site profiles, and other planning documents.

2. Use existing advisory groups or set up a Management Plan Advisory Group to ground truth coastal management issues and niche.

3. Use surveys and/or focus groups with thought leaders, surrounding community, key partners, etc. to determine coastal management issues and niche.

Narragansett Bay Reserve: Finding Their Niche

At the start of their management plan development process, the Narragansett Bay Reserve conducted a survey with the public and ran a series of focus groups with key partners to provide input on the niche of the reserve in their watershed. For a description of their process and information about the questions they used, see the appendix in their 2010 Management Plan (*www.nerrs.noaa.gov/Doc/PDF/Reserve/NAR_MgmtPlan.pdf*).

C. Planning Strategically

Once the reserve identifies the priority issues and their niche, the reserve should identify the desired impact reserve programs will make during the five years that the plan is in effect. There are many tools available to help organizations think strategically about where they want to be and what they want to change. Examples familiar to reserves include SWOT (strengths, weaknesses, opportunities, and threats) analysis, Logic Models, Structured Decision-Making, issue-based planning, etc. NOAA encourages reserves to research different options for approaching strategic planning, and to choose one appropriate for the reserve. Basic steps in the process are included within the "Preparing to Write a Strategic Plan" section of these guidelines. Reserve strategic planning processes should result in development of goals that identify how the reserve will influence the priority coastal management issues of the local area by using and strengthening existing programs to address gaps and needs. The strategic plan component of the management plan should not be a list of current reserve activities. Reserves should articulate desired impacts and achievable actions using a set of goals, objectives and strategies. This is often a challenging process, and may benefit from facilitation expertise. It is important to involve staff and key partners, as appropriate, in this process.

D. Achieving Integration

If reserve strategic goals are focused on the impact the reserve will have on priority coastal management issues in the next five years, those goals are likely to require the effort of many staff members in a coordinated way.

Chesapeake Bay, Virginia Reserve: Program-Based Strategic Planning

The Chesapeake Bay Virginia management plan is organized by foundational program chapters. Those chapters are linked to priority coastal management issues identified in the beginning of the plan through the use of symbols. Goals and objectives in each chapter have one or more symbols next to it, indicating which coastal management issues that goal or objective supports (*http://nerrs.noaa.gov/Doc/PDF/Reserve/CBV_MgmtPlan.pdf*).

While NOAA regulations require plans for research, monitoring, and education, reserves are encouraged to create a strategic plan that shows how an objective is accomplished by multiple sector specific actions/strategies. As long as actions are associated with a sector or multiple sectors, this approach meets the regulations. If reserves start with the goals related to the coastal management issues and then think about how foundational programs and staff support those goals, there is a higher chance of being able to illustrate connections between your coastal management issues and foundational programs.

San Francisco Bay and GTM Reserves: Issue-Based Strategic Planning

The San Francisco Bay, California, and Guana Tolomato Matanzas (GTM), Florida, management plans provide information on the programmatic descriptions separate from identification of issue areas with associated integrated goals, objectives and actions. This approach allows for clear leadership of actions to be provided within the context of an issue, goal and objective important to the entire reserve (*http://nerrs.noaa.gov/Doc/PDF/Reserve/SFB_MgmtPlan.pdf and http://nerrs.noaa.gov/Doc/PDF/Reserve/GTM_MgmtPlan.pdf*).

E. Engaging Stakeholders

It is important to involve key stakeholders in the management plan development and/or revision process, Including the people that can help the reserve accomplish its goals, close working partners, groups that may be doing similar or related work, and the reserve's biggest supporters or detractors. A plan should involve these people at appropriate stages throughout the process. Involving existing advisory boards or creating new ones specifically for this task can help reserves refine their local role, engage the public, guide programs, tap local expertise , and identify duplicative efforts or opportunities to partner and increase effectiveness. Be explicit with advisory board members about their role, time commitment, and how their input will be used.

Engaging staff throughout the management plan process is critical to success, not only in completing the document but in implementing the plan. Be clear about time expectations and deliverables with staff in the beginning of the process, use good facilitation to make sure staff views are heard and incorporated into the plan, and set up regular meetings and/or agreed upon communication avenues to make sure everyone stays on track and is aware of new developments. Understanding the many demands upon staff time and creating incentives for participation will be important.

Public involvement is very useful in developing a management plan. Engaging the public throughout the process (e.g. a kick off public meeting, a meeting to go over a draft, and a final public comment meeting) will ensure that people feel a part of the process and have an opportunity to comment on the direction of the plan as it evolves and becomes more detailed. If you anticipate that contentious issues may arise, NOAA should be informed. It may be helpful to engage a neutral facilitator or mediator who has experience with public conflict resolution.

Review and Approval Process

Timeline

Developing or revising a management plan should take no more than 12-18 months. Some reserves may assess and modify their management plans continuously, which reduces the time investment when a revision is due. Revised management plans should be approved by NOAA on or before the previous plan's expiration date, which is five years after the current plan's notice of approval in the Federal Register. The timeline in the table below lists the steps for developing or revising the plan. Reserves are encouraged to develop a timeline for the management plan revision that includes these steps and any other steps needed to meet local and/or state requirements. NOAA will be a partner in completing the management plan, so all correspondence and progress should be documented by both NOAA and the reserve to ensure continuity of operations, regardless of staff turnover.

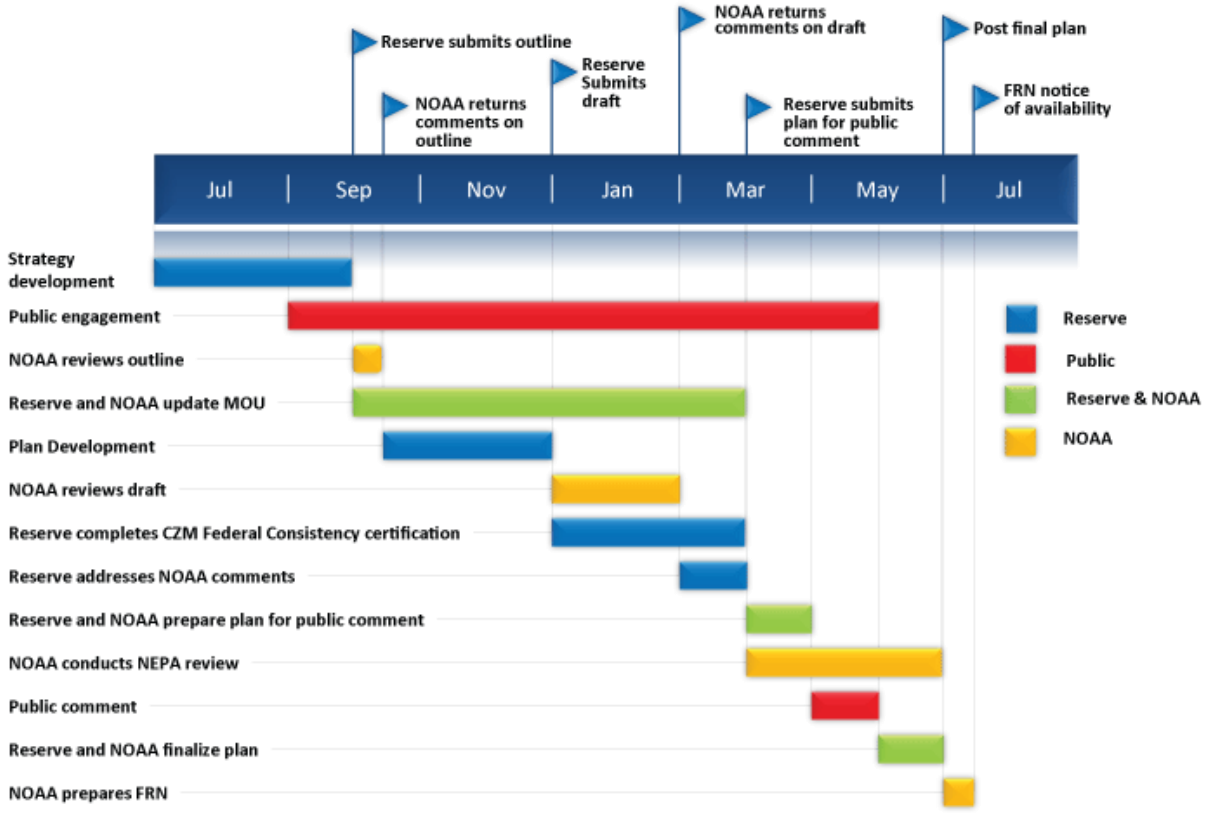
The plan is considered complete and ready for approval after all comments have been addressed. NOAA will then draft a Federal Register Notice announcing the availability of the approved plan. NOAA will also send a letter of approval to the state agency, with a copy to the reserve. The approval letter and Federal Register Notice is filed at NOAA. The official management plan approval date is the day that the Federal Register Notice is published. Plans should be made available on the reserve and NERRS website.

Reserve Management Plan Development Timeline

Action	Reviewer	Time
Reserve discusses strategy for plan development and creates timeline for project with NOAA liaison	Reserve NOAA liaison	Variable: 12 to 18 months before expected completion date
Reserve submits outline to NOAA liaison	NOAA liaison	NOAA liaison will provide consolidated comments within two weeks of receipt of outline
Reserve involves stakeholders/public to inform plan contents (at discretion of reserve)	Reserve/stakeholders	Throughout the revision process
Reserve identifies all Memorandums of Understanding (MOU) that require updating and works with partners to update Note: the MOU between the state host agency and NOAA should follow the template provided in Appendix 1	Reserve Program partners NOAA (if applicable): NOAA liaison will coordinate appropriate reviewers	Variable Note: MOUs can take several months to review due to legal review procedures
Reserve develops plan	Reserve Stakeholders (optional) NOAA liaison	Variable
Reserve submits drafts of chapters for preliminary NOAA feedback (optional)	NOAA liaison	NOAA liaison provides comments within two weeks per chapter submission
Reserve submits complete draft of plan to NOAA electronically	NOAA liaison NOAA coordinators for research, monitoring, education, training, and stewardship General Counsel for Ocean Service (GCOS)	NOAA liaison will provide consolidated comments within two months of receipt of draft

Action	Reviewer	Time
Reserve submits complete draft to state agency	State agency representatives	Variable
Reserve submits complete draft to Coastal Zone Management Program representative for Federal Consistency certification Note: Please use Federal Consistency template found in Appendix 2	Coastal Zone Management Program representative	Variable
NOAA and Reserve manager/staff discuss comments on plan and resolve outstanding questions/issues based on NOAA, state agency and state coastal zone management plan reviews	NOAA liaison Reserve manager/staff	Variable
Reserve submits final plan for approval	NOAA liaison NOAA program lead	Two to four weeks
NOAA conducts National Environmental Policy Act (NEPA) review of plan and prepares findings. Appendix 3	NOAA liaison NOAA NEPA coordinator	Three months
NOAA prepares a Federal Register Notice providing a 30-day public comment period on the plan and NEPA assessment	NOAA liaison NOAA program lead	Two weeks
Reserve simultaneously prepares a similar notice for 30-day public comment period and posts draft plan to reserve website (plan must include Appendix 4)	Reserve manager/staff	Same week as above
Reserves are encouraged to hold a public meeting to brief stakeholders on the management plan	Reserve manager/staff	One day

Action	Reviewers	Time
NOAA liaison brief NOAA program lead	NOAA liaison NOAA program lead	One day
After the 30 day comment period, Reserve addresses all comments receive and adds appendix to plan that outlines how comments were addressed. NOAA amends, as applicable, the site specific environmental assessment. A template for public comment can be found in Appendix 4.	Reserve manager/staff NOAA liaison NOAA NEPA coordinator	Reserve and NOAA work together to address comments within one month of receipt of comments
Reserve posts final plan on Reserve Website; NOAA posts final plan on NERR Website (note: Reserve should submit updated boundary map to CDMO)	Reserve manager/staff NOAA liaison	One day
NOAA approves final NEPA documentation	OCRM NEPA coordinator	Two Weeks
NOAA prepares Federal Register Notice announcing the availability of the plan and sends to Federal Register for publication	NOAA liaison NOAA division chief OCRM director	Two weeks
NOAA prepares and submits letter of approval to state host agency/university director with cc: to appropriate state host agency and coastal management plan representatives	NOAA liaison NOAA program lead	One week


Reserve submits outline
NOAA returns comments on outline
Reserve Submits draft
NOAA returns comments on draft
Reserve submits plan for public comment
Post final plan
FRN notice of availability
Jul
Sep
Nov
Jan
Mar
May
Jul
Strategy development
Public engagement
NOAA reviews outline
Reserve and NOAA update MOU
Plan Development
NOAA reviews draft
Reserve completes CZM Federal Consistency certification
Reserve addresses NOAA comments
Reserve and NOAA prepare plan for public comment
NOAA conducts NEPA review
Public comment
Reserve and NOAA finalize plan
NOAA prepares FRN
Reserve
Public
Reserve & NOAA
NOAA

Following the Regulations

Specific requirements involved in revising a management plan (including MOUs, NEPA, Federal Consistency, and the public involvement and plan approval processes) include:

1. Memorandums of Understanding

A memorandum of understanding between the state and NOAA regarding the federal- state relationship that expresses the long-term commitment by the state to maintain and manage the reserve in accordance with Section 315 of the Coastal Zone Management Act, 16 U.S.C. 1461, and applicable regulations, is required. Additionally, all other necessary MOUs must be included in the plan (15 CFR Part 921.13 (a)(11)). Examples of additional MOUs are those agreements between the state agency and other entities that manage land within the reserve. These agreements should ensure that all lands within the reserve are managed for the purposes by which the reserve was established and are coordinating management activities. The template for the MOU between NOAA and the reserve host agency can be found in Appendix 1.

2. Federal Consistency

If the state has a federally approved coastal management program, the final plan must include a certification that the National Estuarine Research Reserve is consistent to the maximum extent practicable with that program. This is required by our regulations; see Sections 921.13 (a), 921.4(b) and 921.30(b). To satisfy this requirement, the reserve and state coastal management program should work together to ensure that the plan is consistent to the maximum extent possible with the enforceable policies. The reserve will submit the template (Appendix 2) and NOAA will review and certify the consistency certification, if in agreement. For additional information on Federal Consistency, please see *http://coastalmanagement.noaa.gov/consistency/welcome.html*.

3. Environmental Compliance

The National Environmental Protection Act (NEPA) is the tool NOAA will use to evaluate environmental compliance with applicable rules and regulations. NEPA requires federal agencies to undertake an assessment of the environmental effects of their proposed actions prior to making decisions. The NEPA review can result in one of three determinations:

(1) If the action is unlikely to cause any environmental harm, it is qualified as a categorical exclusion.

(2) If it is uncertain if there will be environmental effects, an Environmental Assessment (EA) is conducted by NOAA.

(3) If significant environmental effects may or will occur, an Environmental Impact Statement (EIS) must be prepared.

National Administrative Order 216-6 determined that management plans cannot be categorically excluded. NOAA's General Counsel Ocean Service and NOAA's Program, Planning and Integration Division also determined that NOAA should develop a programmatic environmental assessment (PEA) to cover all reserve management plan revisions. NOAA will work with the designated NEPA coordinator to draft this assessment. Once this assessment is complete, it will be applied to all management plan revisions. Plan components potentially requiring additional assessment if and when funded by NOAA include all construction activities (including trail development), land manipulation activities, invasive species control activities, restoration activities, and boundary changes. Each operations, construction, and land acquisition award will be assessed for environmental compliance and may require additional topic specific environmental assessments. Additional resources on NEPA can be found at *www.epa.gov/compliance/basics/nepa.html* and *www.nepa.noaa.gov*.

4. Public Involvement

Community members are important constituents and partners to reserves. Developing a public involvement strategy for developing your management plan is important to engage the community in your work, seek their advice and expertise in your programming, and ensure that you are aware of any potential conflicts. Ideally, public input would be sought at several points in the process of developing a management plan and responses to those comments would be easily accessible to the public during the process. Management plan revisions will be published in the Federal Register Notice for a 30-day public review and comment period. The reserve is responsible for publishing an equivalent notice in the local media to provide a 30 day public comment period when the draft is completed. If comments are submitted during the public review comment period, they should be addressed, as reasonable, and incorporated into the plan. These comments and a description of the public process should be included as an appendix of the final plan. An example can be found in Appendix 4.

5. Approval Process and Compliance

The plan is complete and ready for approval after NOAA and public comments have been addressed. NOAA will draft a Federal Register Notice announcing the availability of the approved plan. NOAA will send a letter to the state agency (cc: reserve) notifying them of the approval date. The day that the Federal Register Notice announcing the plan is released is the official management plan approval date. The plan is valid for five years from that date. The next draft plan should be submitted to NOAA prior to that expiration date. The approval letter and Federal Register Notice is filed at NOAA.

Adaptive Management Approach to Strategic Planning

About This Section

The Reserve System addresses complex coastal management issues by integrating and applying research, education, training and stewardship expertise within the current network of 28 protected areas. The Reserve System is focusing investment and expertise to address climate change, water quality and habitat protection challenges. These nationally significant issues require specific and strategic local response best achieved through adaptive management whereby improved understanding of resources leads to improved management choices and ultimately improved protection of the resources. (Williams, et al. 2009) This section describes the elements of adaptive management and the relevance to the Reserve System. This framework is provided as background to consider when conducting strategic planning.

What Is Adaptive Management?

As defined by the National Research Council, adaptive management is "a decision process that promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood." It is a structured approach for improving resource management by learning from these outcomes. (Sexton, et. al., 1999)

"Ecosystems are not only more complex than we think; they're more complex than we can think."

– Egler

Why Is Adaptive Management a Good Choice for the Reserve System?

The Reserve System has a mandate to protect and preserve estuarine environments for specific purposes and is well suited and designed to monitor and apply knowledge in a long-term capacity to improve coastal management. The Reserve System's place-based network provides an ideal platform for iterative decision-making whereby clear objectives can be identified, monitored, and adapted. Furthermore, reserves are well suited to undertake this approach given the criteria and key elements discussed in the next section. We have a mandate, mission, and institutional capacity to address many of the pressing coastal issues, such as climate change, that create implicit uncertainty in environmental conditions and hence require a flexible approach to dealing with them.

"Knowledge has to be improved, challenged, and increased constantly, or it vanishes."

– Drucker

Key Elements of Adaptive Management

When applying an adaptive management approach, two key conditions should be met: (1) there must be a necessary mandate to take action in the face of uncertainty and the problem must be important enough to require action of some kind and (2) there must be institutional capacity and commitment to sustain an adaptive program that includes long-term measurement and evaluation of outcomes. (Lee, 1993; Wilhere, 2002) In addition to these two overarching conditions, there are additional elements or conditions for adaptive management that must be in place to be successful. (Williams et al. 2009) These are referenced in Figure 2 and include:

1. **Adequate baseline understanding and assumptions about the system** being managed as a foundation for learning. From this understanding, appropriate management objectives and actions can be determined.

2. **Clear and measureable management objectives** should be identified to measure progress and understand when it is appropriate to re-evaluate actions.

3. **Opportunities to select from a range of management actions** to meet objectives. The use of current information based on prediction rather than assumption to make these determinations is important in an uncertain environment. Actions should be multi-disciplinary, participatory and should be evaluated for impacts and consequences. Additionally, where feasible, it is important to explain uncertainty using testable models- conceptual, qualitative and/or quantitative depending on capacity.

4. **Mechanisms for incorporating learning to inform future actions** should be used throughout the process. This assumes that the process, institutions, and actions themselves are flexible enough to account for learning and the application of that knowledge. It is ideal when responses to management actions can be assessed before a decision about the next management action is made. Organizations must monitor, assess and re-evaluate.

5. **Monitoring that can be established and maintained** to evaluate outcomes of actions. Adaptive management requires measuring the response to actions taken to determine if the program is on track to meet objectives or needs to re-evaluate actions.

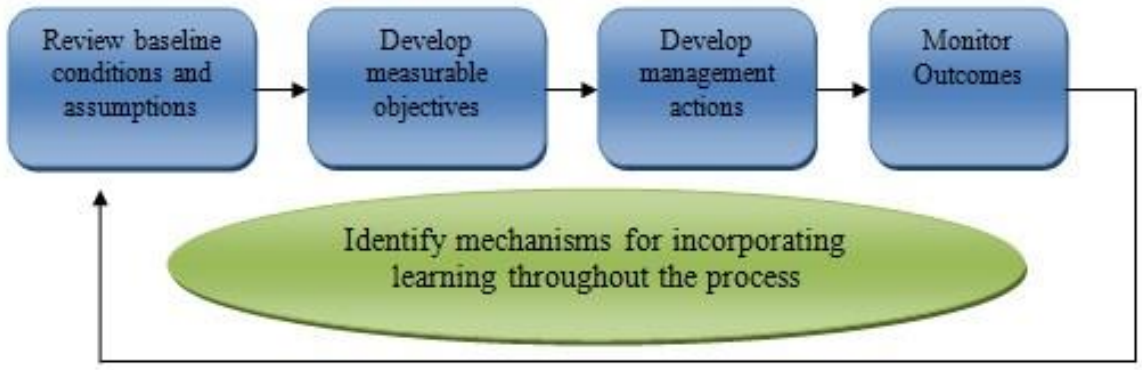


Figure 2. Adaptive Management Approach to Strategic Planning for the Reserve System

In order to create informed objectives, it is important to understand the baseline conditions and actions that have brought the system to its current state. Reserves have resources (e.g., ecological characterizations, System-Wide Monitoring Program (SWMP) data and syntheses, and stakeholder information from Education and Coastal Training Program activities) that provide a baseline of information to create measurable objectives, implement management strategies, monitor and assess their efficacy, communicate success and/or challenges and re-evaluate to determine subsequent management actions. Flexibility is important in the decision- making process where management actions are re-visited in response to measured outcomes. (Doremus et.al. 2001) Figure 2 above shows how adaptive management is applied to the Reserve System strategic planning framework.

Linking Local and National Priorities in the Context of Adaptive Management Planning

Using management plans and the concept of adaptive management is contingent on knowing the context of what you want to achieve in terms of the local reserve priorities and how they relate and contribute to the priorities of the state agency and the Reserve System. These priorities provide the context for reserve planning and contribute to work that is complementary, not duplicative, of other state and local programs. More information about defining the reserve's niche within the context of local, state and national priorities is identified in the next section 'Preparing to Write a Strategic Plan'.

The questions below, as well as the information above on adaptive management, are good starting places to help the reserve conceptualize the scope and scale of the management plan and to begin preparing the reserve to identify niche, goals, and objectives.

Waquoit Bay Reserve: Aligning National and Local Priorities

The 2011-2016 Reserve System Strategic Plan describes three areas for strategic focus and investment, including water quality. For Waquoit Bay, this national priority is also a local priority; specifically nitrogen pollution. The communities surrounding Waquoit Bay are facing difficult decisions as they grow. Current septic systems are not doing a good enough job keeping nitrogen out of Cape Cod's waters; and this is leading to water pollution that threatens the environment, quality of life, and the livelihood of this tourist destination. Over the past twenty years, the Waquoit Bay Reserve has attracted researchers from around the world to study the sources and impacts of nitrogen in the bay. CICEET and GRF projects have focused on this topic, reserve-led monitoring is linked to this topic, and reserve-led research and synthesis of research has contributed to a wealth of information and new questions. Reserve K-12 education programs, community education programs, and CTP have focused on communicating the science of nitrogen pollution to the public and are focusing on what people can do as citizens or as decision makers to be a part of developing or implementing the solution. Integrated work by staff at the reserve is addressing a locally important coastal management issue that contributes directly to the national priorities of the system. To learn more, visit *www.waquoitbayreserve.org*.

- What are the expectations, mandates, and important goals of the state partner?
- What are the critical ongoing/existing local estuarine environmental issues that are not covered by the partner goals?
- What are the local emerging issues or threats that are likely to become increasingly important in the next five years?
- What science, education, training, stewardship, or leadership is needed to address the most pressing local issues relevant to the reserve?
- Who else is working on these issues near the reserve?
- What are the working relationships with key state programs such as the coastal management program on these issues?
- What topics and functions are appropriate for the reserve to work on, given staff strengths, limitations or constraints, infrastructure, resources, and state partner priorities?

The Reserve System Strategic Plan focuses its core strengths of research, stewardship, education, and training on three national priorities – climate change, habitat protection, and water quality. Because of the state-federal partnership inherent to the Reserve System, management plans must articulate both how reserves address local coastal management issues and how local work also contributes to the national system.

Nationally, the Reserve System is working toward all of the objectives stated in the strategic plan. Some objectives will be achieved through coordinated national programs, like the System-Wide Monitoring Program. Others represent a collective vision for the work individual reserves do, such as implementing research projects that use reserves as sentinel sites for detecting and understanding the effects of climate on estuaries. It is unlikely that an individual reserve will address all of the objectives in the Reserve System Strategic Plan, but it is expected that a significant portion of the reserve's work contributes to the system-wide goals and objectives. The following questions will help reserves align their plan to address goals and objectives within the Reserve System Strategic Plan:

- Which Reserve System Strategic Plan objectives and strategies can the reserve address?
- How is the reserve addressing climate change, water quality, and habitat issues? How are national programs like SWMP, CTP, GRFs, NSC, and KEEP contributing to filling the gaps, reducing stressors, and meeting the needs identified by the reserve? Could they better support local needs?
- What are the critical stressors, information needs or gaps, etc. related to habitat, water quality, and climate at your reserve? What is your role in addressing those gaps, both as a reserve and within your programs (research, education, training, etc.)?

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Resources

U.S. Fish and Wildlife Service Training at National Conservation Training Center Introduction to Structured Decision-making: Training that provides an introduction to structured decision-making in the context of natural resource management challenges. The training also provides hands-on experience with decision tools, decision trees, multiple objective ranking techniques and expert panels covering critical thinking, logic, and reasoning strategies. Adaptive Management: Structured Decision-Making for Recurrent Decisions: Training where adaptive management is framed within the context of structured decision-making, with an emphasis on information and tools to address uncertainty regarding responses to management actions and the value of reducing uncertainty to improve management.

Ecosystem-Based Management Tools Network provides focus questions, suggested reading, case studies, approaches, tools, and links to other core elements of ecosystem-based management tools.

Adaptive Management: A Tool for Conservation Practitioners provides steps in the process and principles of adaptive management

Adaptive Management Technical Guide provides a scoping key and focus questions for successful implementation.

Learning for Sustainability: Adaptive Management - Learning While Doing provides information, guides and selected readings on the use and application of adaptive management with uncertainty – including selections on adaptive management increasing resiliency to climate change.

Preparing to Write a Reserve Strategic Plan

Strategic Planning Process

Strategic planning is a systematic process to assess an organization's direction and priorities. A good strategic planning process requires time and effort to gather and analyze data and trends to set a baseline of understanding; assess target audiences related to all program areas; identify organizational niche and priority goals, objectives, and actions; implement actions to meet objectives; and monitor and evaluate progress towards meeting objectives.

To create an effective strategic plan that meets coastal management needs, reserves must understand the social, economic, political and cultural dynamics of the community in which the organization operates, and must engage all stakeholders.

The strategic planning pyramid below identifies the elements of strategic planning from the initial step of assessing the target population through the final step of implementing and evaluating progress. All staff should participate in each step of this process to create a sense of ownership of the plan, which ultimately leads to successful implementation.

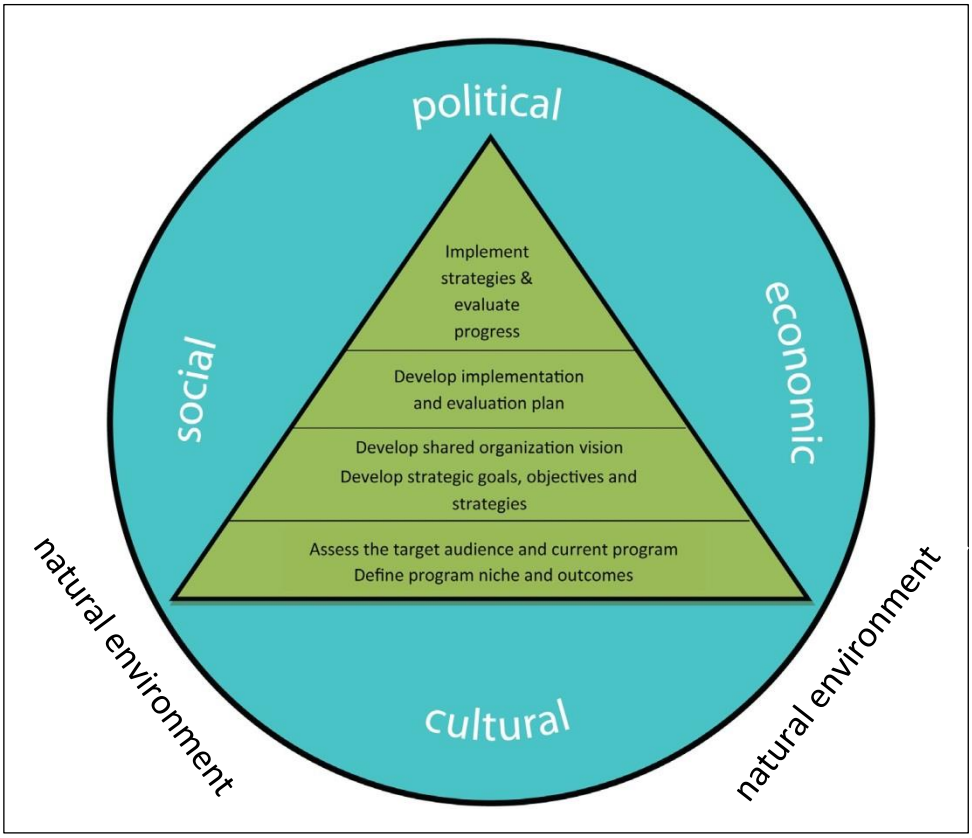


Figure 3. Strategic Planning Pyramid

Identifying Program Target Audiences

It is important to first identify the target audiences for a program's efforts. Target audiences may be within or outside the host agency and comprised of individuals who have the ability to influence and support the reserves' major resource issues. Each program at the reserve should assess their target audiences by understanding their skills and needs, as well as the activities and products currently employed to serve that audience. It is important to understand emerging issues and needs that these audience may need to address and/or influence. This step can be accomplished via formal needs assessments, focus groups, or surveys, etc. Note: The state coastal management program is a key partner in identifying audiences and an audience themselves.

Assessing Skills and Capacities of Reserve Programs

The next step should be to assess reserve program capacities because this will affect what can be accomplished. One way to approach this step is via a SWOT (strengths, weaknesses, opportunities, and threats) analysis. Programs can answer certain questions to provide information about program expertise, contributions to target audiences, trends, and resources the program may need in the future to be successful (Mind Tools, 2009). Questions to inform this analysis include:

Strengths: What are the reserve program's unique characteristics and resources? What does the target audience view as the program's main strengths? What trends can the program build on?

Weaknesses: What does the program lack that the target audience needs? What resources do reserve programs need to meet current target audience needs?

Opportunities: What could the reserve program offer that meets the needs of the target audience to effectively manage coastal resources? How are other programs addressing target audience needs?

Threats: Because of program weaknesses, what threatens reserve programs? What expertise do reserve programs lack to meet future target audience needs?

Figure 4. SWOT Chart

To complement this approach, NOAA has developed questions for each system-wide program to help identify strengths, weaknesses, and opportunities to then identify the niche for each program. Although the questions for each program are binned similarly and contain many of the same questions to provide consistency in approach, there are differences between the programs. And key documents for each program are suggested as references when considering these questions

A. Research and Monitoring Program

Priority Issues – What are the priority coastal management issues for your reserve that your research program can address? How did you identify them? Do they align with the broader issues being identified at your reserve for this plan? Do they align with the Reserve System Strategic Plan, SWMP plan, and other system-wide documents?

Priority Audiences – How does the research program currently support reserve, coastal management program, local community, and regional science priorities? Who are the target audiences that interact with and benefit from the research program? How were these audiences identified? What do you know about the skills, abilities, and current level of knowledge of the target audiences?

Program Alignment and Delivery – How have you or do you plan to adopt and adapt system-wide programs (e.g., biological monitoring and sentinel sites) to address the reserve's priority issues and reach target audiences? How does the research program support and align with system-wide plans and efforts (e.g., Climate Change Initiative Implementation Plan, SWMP Plan, Research and Monitoring Plan, Community Education efforts)? What major activities will the research program engage in that addresses the priority issues identified above, within the next 5 years? How does the research program coordinate with and build upon other programs/initiatives at the reserve and within the Reserve System (e.g., coastal training programs, education products or programs)?

Program Needs and Gaps – What are the major program needs and gaps that may or may not be addressed during the period of this management plan? How will these needs and gaps affect research programming and what are the consequent impacts to the research program?

Program Impacts – What are the major impacts and outcomes you envision as a result of research activities? How will human communities and natural ecosystems benefit from these activities? Current and Anticipated Partnerships - Who are your partners and why do you partner with them? Who do you hope to partner with in the future? Do you partner with NOAA offices? If so, please describe. If not currently partnering, are there opportunities to build partnerships?

Program Monitoring and Evaluation – How do you evaluate the success of your research program? What are your expected outcomes?

Dissemination of Program Results – How will you communicate program impacts and results? Please remember that the current Reserve System Research and Monitoring Database provides a mechanism for developing a library of research projects that can be shared. In this section, we are also interested in knowing about other mechanisms (e.g., conferences, journal publications, newsletters, social media, etc.) you can use to disseminate program results and information beyond the audiences immediately involved in the project.

Supporting Documents:

We recommend the following documents for guidance: 2011-2016 Reserve System Strategic Plan, Climate Change Implementation Plan, Research and Monitoring Plan, System-Wide Monitoring Program Plan, and Reserve System Sentinel Sites Program Guidance, Coastal Management Program Section 309 Assessment and Strategies.

B. Education Program

Priority Issues – What are the priority issues for your reserve that your education program can address? How did you determine them? Do they align with the broader issues identified at your reserve for this plan? Do they align with the Reserve System Strategic Plan, K-12 Estuary Education Program, Community Education Framework, NOAA Education Strategic Plan?

Program Context – What have you learned since the last management plan that has affected this plan? What have you learned, after completing a market analysis and needs assessment, which has affected this plan? What is your program's geographic scope?

Priority Audiences – Who are the target audiences that interact with and benefit from the education program? How were these audiences identified? What do you know about the skills, abilities, and current level of knowledge of the target audiences? Are underserved and underrepresented populations a target audience for your programs? What is the total population of the audience you plan to target? What percentage of that population do you plan to target within the next 5 years? What do you know in terms of (1) your current reach (number of counties, districts, and inland areas), (2) the areas you plan to target with your distinct programs and (3) why? Most reserves can characterize their education programs as one or several of the following program categories that serve different target audiences: professional development programs, student programs, public programs, outreach programs, and/or community education programs.

Program Alignment and Delivery – How have you or how do you plan to adopt and adapt system-wide programs to address the reserve's priority issues and reach target audiences? How does the education program support and align with system-wide plans and efforts (e.g., Climate Change Implementation Plan, SWMP Plan, Research and Monitoring Plan)? What major activities will you undertake that will address the priority issues you identified above within the next 5 years? What type of programming will you emphasize and why? (Type of programs: professional development programs, students programs, public programs, outreach programs, and/or community education programs). What methodologies do you plan to employ in your program? How do you work with and build upon other programs/initiatives at the reserve and within the Reserve System (e.g., specific reserve research products that are used)?

Program Needs and Gaps – What are the major program needs and gaps that may or may not be addressed during the period of this management plan? How will these needs and gaps affect potential programming and subsequent impacts? What education gaps are identified and required to address issues in the next 5 years?

Program Impacts – What are the major impacts and outcomes that will result from education activities? What will human and natural communities gain from these activities? What is the desired change in the target audience's behavior?

Current and Anticipated Partnerships – Who are your partners and why do you partner with them? Who do you hope to partner with in the future? Do you partner with NOAA offices? If so, please describe. If not, are there opportunities to build partnerships? We highly recommend outlining project partners such as curriculum coordinators, school principals, state science teacher associations, teachers, supervisors, department chairs, state science supervisors, as well as other key education administrators.

Program Monitoring and Evaluation – How do you evaluate your success? Have you developed a logic model for your program? Do you have an evaluation plan in place? What are your expected outcomes within the next 5 years?

Dissemination of Program Results – How do you plan to communicate program impacts and results? Please remember that the current Reserve System Performance Measure Database provides a mechanism for sharing your success stories and program results with other reserves. In this section, we are also interested in knowing about other mechanisms you have to disseminate your stories beyond the audience immediately involved in the activities of the project. Are you planning to present at local, regional, or national education conferences? If so, which ones? Do you have a newsletter? Do you use social media to communicate? Will you publish your results in a journal, and if so, which one(s)?

Other Considerations:

Guiding principles used in the design and implementation of reserve education programs:

- Educate audiences about estuaries holistically by including ecological, cultural, historical, and scientifically relevant facts and concepts;
- Promote a sense of stewardship and individual responsibility;
- Address coastal issues from a local, state, regional, national, and global perspective;
- Approach estuary education through a perspective that includes watersheds and biogeographic regions; and
- Increase understanding and appreciation of the Reserve System research conducted at reserves and the use of System-Wide Monitoring Program data.

Supporting Documents:

We recommend the following documents for guidance: 2011-2016 Reserve System Strategic Plan; K-12 Estuary Education Program (KEEP) Framework document; Teachers on the Estuary Program Description Community Education Framework Document; Education Sector Performance Measurement Guidance; and the NOAA Education Strategic Plan 2009- 2029. All approved Education Program Descriptions can be found on the Reserve System Intranet. Additional Reserve System guiding documents include the Climate Change Implementation Plan, System-Wide Monitoring Program Plan, Reserve System Sentinel Sites Program Guidance. Coastal Management reference documents include the Coastal Management Program Section 309 Assessment and Strategies.

C. Coastal Training Program

The CTP Program Strategy should provide much of the material for this section, especially if the Program Strategy was developed in an integrated manner with other reserve programs and assets.

Priority Issues – What are the priority issues for your reserve that your Coastal Training Program can address? How did you determine them? Do they align with the broader issues identified within the management plan and the Reserve System Strategic Plan?

Program Context –What have you learned since the last management plan that has affected your plan? What have you learned that has affected your ideas for this plan after completing a market analysis and needs assessment? What is the geographic scope for the program and why is this scope identified?

Priority Audiences – Who are the target audiences that interact with and benefit from the CTP? How were these audiences identified? What are the skills, abilities, and current level of knowledge of the target audiences?

Program Alignment and Delivery – How does the CTP support and align with system-wide plans and efforts (e.g. Climate Change Implementation Plan, SWMP Plan, Research and Monitoring Plan, Community Education) What major activities will you undertake that will address the priority issues you've identified within the next 5 years? What methodologies do you plan to employ in your training? How do you work with and build upon other programs/ initiatives at the reserve and within the Reserve System (e.g., specific reserve research programs or products)?

Program Impacts – What are the major impacts and outcomes you anticipate resulting from training activities? What will human communities and natural ecosystems gain from these activities? What is the desired change in the target audience's behavior?

Program Needs and Gaps – What are the major program needs and gaps that may or may not be able to be addressed during the period of this management plan? How will these needs and gaps affect potential programming and subsequent impacts? What training gaps are identified and required to address issues in the next 5 years?

Current and Anticipated Partnerships – Who are your partners and why do you partner with them? Who do you hope to partner with in the future? Do you partner with NOAA offices? If not, how might you build better partnerships in the future?

Program Monitoring and Evaluation – How do you evaluate the success of your CTP? Have you developed a logic model for your program? What are your expected outcomes?

Dissemination of Program Results – How do you plan to communicate program impacts and results? Please remember that the current Reserve System Performance Measure Database provides you a method by which you can share your success stories and program results with other reserves. In this section, we are also interested in knowing what other mechanisms you have to disseminate your stories beyond the audience immediately involved in the activities of the project. Are you planning to present at local, regional, or national conferences? If so, which ones? Do you have a newsletter? Do you use social media to communicate? Will you publish results in a journal? If so, which ones?

Supporting Documents:

We recommend the following documents: 2011-2016 Reserve System Strategic Plan, Climate Change Implementation Plan, System-Wide Monitoring Program Plan, and Reserve System Sentinel Sites Program Guidance, and Coastal Management Program Section 309 Assessment and Strategies. All approved CTP Program Strategies can be found on the Reserve System Intranet.

Developing Reserve Program Niches

Assessing the information above allows each program to develop their niche, which is the intersection where the capabilities and activities of the program are uniquely suited to meet the needs of the target audience (Figure 5). This information should be shared with all reserve staff, ideally in a meeting where all programs are represented and can discuss how they can work together collectively.

Reserve Niche

The unique suite of functions the reserve provides to meet target audience needs that are not met by others.

A. Where's Stewardship?

Due to the complexity and variability of the ways that stewardship programs are focused and operated at each reserve, this program has not been identified as system-wide program with a specific program niche as identified for research, education and coastal training. Stewardship functions are included in the research and monitoring, resource protection, public access, and land acquisition components, as well as in the optional restoration and resource manipulation components of a management plan. The skills and assets of the stewardship staff are applicable and inter-related to all other components of reserve management. Figure 1, Relationship of Reserve Management Plan Components, illustrates how the functions of stewardship are manifested in the planning paradigm. Reserves should answer similar questions for the stewardship program as those asked for research and monitoring, education, and training.

B. What about Other Programs?

This guidance only focuses on the system-wide programs for the Reserve System. While there are several other programs at the reserve that will contribute to this strategic planning process, NOAA is only providing thought questions for those programs with consistent processes, protocols and evaluation mechanisms. It is strongly advised that additional programs ask similar questions to determine the program niche. The approach should be appropriate and flexible for each reserve's structure.

C. Developing the Reserve Niche

When each program understands their niche, the reserve can integrate the characteristics of these niches to develop the niche of the reserve. The program's combined efforts meet the needs of a wider, more complete target audience. It is important to understand the unique role that the reserve will play in meeting target audience needs, as there may be several local providers offering similar products and services. It is beneficial to either partner with other organizations, or to focus unique skills and services of the reserve on meeting specific target audience needs.

Questions to inform niche development include:

What will the target audiences needs be in the future? Which target audience needs can be filled by other organizations? Based on program strengths, which needs can the programs best meet? What are the unique products and services the reserve offers that the target audiences cannot get elsewhere?

Figure 5. Organization Niche

Developing Shared Vision and Mission Statements and Goals, Objectives and Actions

Once a niche is determined, the reserve will develop a shared vision, mission, goals, objectives and actions, culminating into the strategic plan. This is further discussed in Part II in the Strategic Plan element.

Part II: Components of the Reserve Management Plan

Part II provides specific guidance for developing each component of a reserve management plan. Each section also provides supporting references, resources, and case studies to help illustrate the content required for that component. Each section contains a checklist of required and optional elements (indicated by ♦) and questions to help develop those elements.

Required components, and elements within components, may be organized to suit the reserve's needs. All required elements must be included in the plan and follow a logical order so that they can be easily identified and understood. The questions provided in each section are meant to guide development of the plan. Some may be easy to answer while others may prove more challenging. Reserves should address as many of these questions as possible.

Elements within the "Program Foundations" component (i.e., Research and Monitoring, Education, and Training) may be organized in one chapter or included as separate chapters. The strategic plan should clearly identify which sector is leading an action, and it is also suggested that a sector be identified to lead each objective, coordinate multi-sector actions, and evaluate progress. Reserves may decide how information within the strategic plan and Program Foundations element is organized.

Required and Optional Elements Checklist

♦ indicates an optional element

Executive Summary

__ Plan purpose and scope
__ Reserve context
  __ Designation date and acreage
  __ State agency
  __ Location of reserve
  __ Boundary modification (if applicable)
__ Priority coastal management issues
__ Reserve niche and goals
__ Reserve programs Overview

Introduction to Reserve System

__ Mandatory Text

Introduction to the Reserve

__ History and local management
__ Ecological attributes
  __ Geomorphology
  __ Hydrology
  __ Climate and weather
  __ Key habitats and species
__ Social attributes
  __ Population demographics
  __ Jobs and employment trends ♦
  __ Ecosystem services ♦
__ Archaeological and cultural resources ♦
  __ Archaeological sites ♦
  __ Cultural sites or resources ♦
  __ Value of resources ♦
__ Threats and stressors
  __ Natural and anthropogenic stressors
  __ Climate phenomena and impacts
  __ Reserve sensitivity to impacts ♦
  __ Reserve vulnerability ♦
__ Boundary description
  __ Core and buffer rationale
  __ Boundary map
  __ Core and buffer
  __ Land ownership
  __ Habitat types
  __ Land use type
  __ Targeted watershed map including land use and land cover
  __ Boundary expansion rationale and GIS layers (if applicable)

Reserve Strategic Plan

__ Vision
__ Mission
__ Priority coastal management issues
__ Goals, objectives, and actions
__ Performance measures for each objective ♦

Program Foundations

<u>Research and Monitoring Program</u>

__ Mandatory system-wide text
__ Program context, capacities, and delivery
__ Needs and opportunities
__ Research related objectives and actions♦
__ Monitoring and evaluation strategies♦

<u>Education Program</u>

__ Mandatory system-wide text
__ Program context, capacities, and delivery
__ Needs and opportunities
__ Education related objectives and actions♦
__ Monitoring and evaluation strategies♦

<u>Coastal Training Program</u>

__ Mandatory system-wide text
__ Program context, capacities, and delivery
__ Needs and opportunities
__ Training related objectives and actions♦
__ Monitoring and evaluation strategies♦

Administrative Plan

__ Organizational framework
__ Current staffing and needs
__ Strategic partnerships
__ Advisory committees
__ Administrative objectives and actions
__ Volunteer plan ♦
__ Vessel and vehicle plan ♦
__ Communication plan ♦

Resource Protection Plan

__ Management authorities
__ Allowable and unallowable uses
__ Map of allowable uses
__ Surveillance and enforcement capacities
__ Resource protection challenges
__ Resource protection objectives and actions♦
__ Monitoring and evaluation strategies ♦

Public Access and Visitor Use Plan

__ Current public access
__ Map of public access points
__ Public access challenges
__ Public access and visitor experience opportunities
__ Public access objectives and actions♦
__ Monitoring and evaluation strategies♦

Facility Development and Improvement Plan

__ Purpose of facilities
__ Current facilities
__ Map of facility locations
__ Facility challenges and gaps
__ Planned facilities, facility upgrades, and exhibits
__ Climate and non-climate stressors
__ Facility descriptions
__ Operations and maintenance manual as appendix ♦
__ Long-term facility plan as appendix ♦

Land Acquisition Plan

__ Reserve acquisition values ♦
__ Priority acquisition areas
__ Description of acquisition areas
__ Map of acquisition areas
__ Prioritization process ♦
__ Climate and non-climate stressors
__ Map of non-ecological acquisition values within priority areas ♦
__ Priority areas acquisition strategy
__ Tract acquisition strategy
__ Tract ecological and/or programmatic values
__ Preferred methods for establishing state control
__ Fair market value estimates
__ Potential acquisition partners♦
__ Funding sources ♦
__ Estimated acquisition timeline
__ Map detailing land uses on public and private tracts outside the reserve boundaries ♦
__ Management and/or stewardship considerations for acquisition priorities ♦
__ Description of collaborative process used in joint acquisition projects ♦

Resource Manipulation Plan (if applicable)

__ Current and proposed resource manipulation activities
__ Map of manipulation activities
__ Permitting/approval requirements
__ Climate and non-climate stressors
__ Current and potential partners
__ Impacts of activities
__ Monitoring and evaluation strategies ♦

Restoration Plan (if applicable)

__ Priority restoration areas
__ Description of restoration areas/habitats
__ Map of restoration areas
__ Climate and non-climate stressors
__ Prioritization process and criteria
__ Priority restoration projects
__ Acres and outcomes
__ Partners
__ Monitoring and evaluation strategies ♦

Executive Summary

About This Section

The executive summary should provide an overview of the plan, and must identify all elements as stated in the Federal Code of Regulations 15 CFR 921.13. It should define the purpose and scope of the plan, describe reserve context, identify priority coastal zone management issues that the reserve will address, and provide an overview of the goals and objectives, as well as indicate the programs that will be used to address the goals and objectives.

Plan Contents

Executive Summary

__ Plan purpose and scope
__ Reserve context
__ Designation date and acreage
__ State agency
__ Location of reserve
__ Boundary modification (if applicable)
__ Priority coastal management issues
__ Reserve niche and goals
__ Reserve programs overview

A. Plan Purpose and Scope

This section should illustrate the purpose and scope of the plan and provide the national and local context for the plan. This section should outline:

- The lifespan and geographic scope of the plan
- The priorities, general approach, and how the reserve will measure progress
- The intersection with state, regional, and local partner goals, plans, and programs

B. Reserve Context

This section should describe reserve location and administrative structure to provide a sense of place and context for reserve work. This section should outline:

- Reserve designation date, acreage, general location, and lead state agency
- Primary influences on the reserve (see Figure 3)
- Reserve's role in addressing coastal management issues and context within system
- Expansion, if applicable, including acres added, where it will be added, value of the addition, and the total acreage of the reserve after the boundary expansion

C. Coastal Management Issues and Reserve Goals

This section should outline the priority coastal management issues the reserve is addressing, as well as identify the reserve's niche and goals.

D. Reserve Programs Overview

This section should provide a brief overview of reserve programs and how they will broadly contribute and coordinate to achieve the goals. (See Figure 1, page 4)

Introduction to the National Estuarine Research Reserve System

About This Section

The following text should be included verbatim in the management plan to ensure that all reserves are consistently describing the framework for the Reserve System. This section includes information about the goals of the Reserve System, how reserves are designated and described, and how they work administratively as single units and as a system.

Plan Contents

This section contains mandatory text which must be used verbatim in the plan to ensure a level of consistency when discussing the Reserve System.

(Mandatory text begin)

Introduction to the National Estuarine Research Reserve System

The National Estuarine Reserve System was created by the Coastal Zone Management Act of 1972, as amended, to augment the National Coastal Zone Management Program which is dedicated to comprehensive, sustainable management of the nation's coasts.

The Reserve System is a network of protected areas representative of the various biogeographic regions and estuarine types in the United States. Reserves are established for long-term research, education and interpretation to promote informed management of the Nation's estuaries and coastal habitats. (15 C.F.R. Part 921.1(a)) The Reserve System currently consists of 28 reserves in 23 states and territories, protecting over one million acres of estuarine lands and waters (Figure 6).

The Reserve System is a partnership program between the National Oceanic and Atmospheric Administration (NOAA) and the coastal states. NOAA provides funding, national guidance and technical assistance. The state partner manages reserve resources on daily basis working collaboratively with local and regional partners.

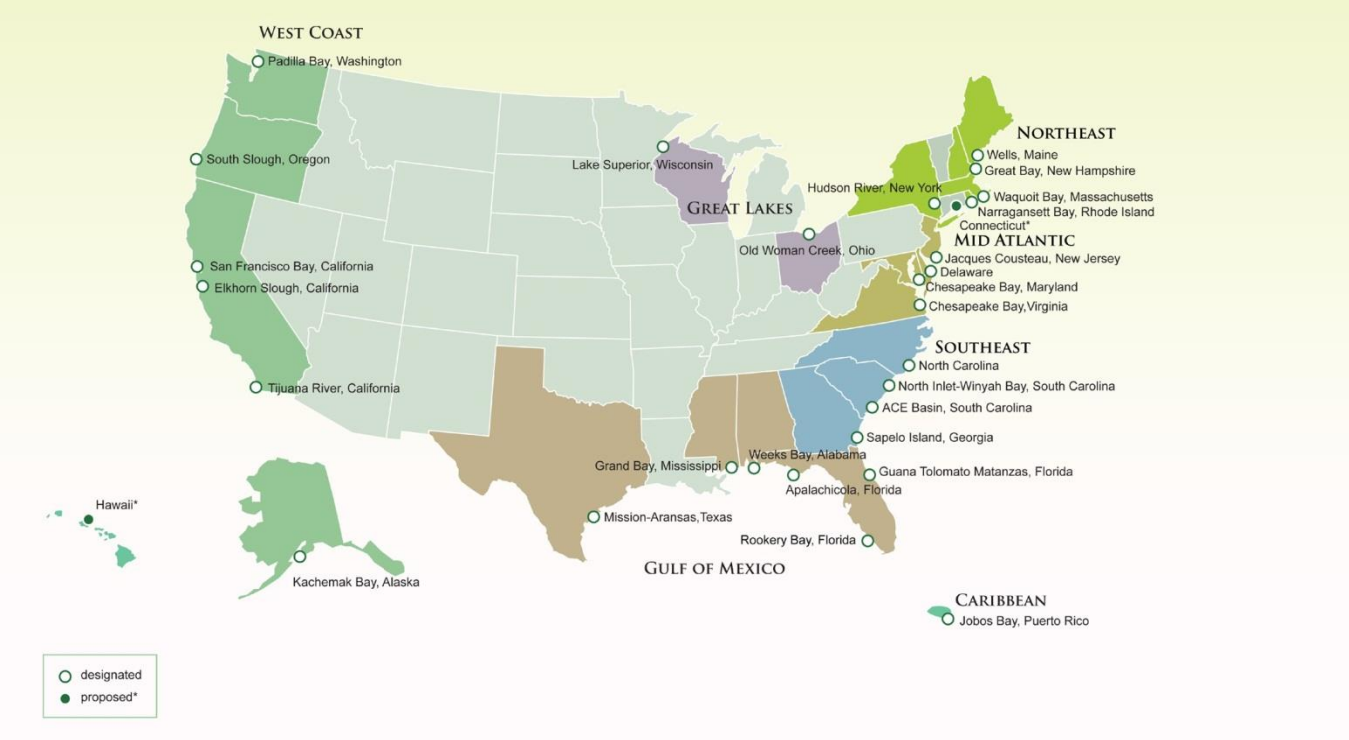


Figure 6. National Estuarine Research Reserve System Map

National Estuarine Research Reserve System Strategic Goals

Estuaries are biologically rich, economically valuable, and highly vulnerable ecosystems. The vision and mission of the Reserve System reflect the importance of these systems within our communities.

Vision: Resilient estuaries and coastal watersheds where human and natural communities thrive.
Mission: To practice and promote stewardship of coasts and estuaries through innovative research, education, and training using a place-based system of protected areas.

The program goals, per Federal regulations 15 C.F.R. Part 921.1(b), outline five specific goals for the Reserve System:

1. Ensure a stable environment for research through long-term protection of National Estuarine Research Reserve resources;
2. Address coastal management issues identified as significant through coordinated estuarine research within the system;
3. Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;
4. Promote Federal, state, public and private use of one or more Reserves within the System when such entities conduct estuarine research; and
5. Conduct and coordinate estuarine research within the system, gathering and making available information necessary for improved understanding and management of estuarine areas.

These foundational goals are complemented by those that are systematically set by the program every five years. Strategic planning has been an integral part of the National Estuarine Research Reserve System for nearly twenty years. The planning process is designed to bridge national program direction with local coastal management needs through a representative and participatory process that supports NOAA's mission of science, service, and stewardship. The 2011-2016 Reserve System Strategic Plan focuses reserve core strengths of research, education, and training on three core issues: climate change, habitat protection, and water quality. The Reserve System Strategic Plan Goals are:

1. **Protected Places**: Estuaries and coastal watersheds are better protected and managed by implementing place-based approaches at reserves.

2. **Science**: National Estuarine Research Reserve System scientific investigations improve understanding and inform decisions affecting estuaries and coastal watersheds.

3. **People**: National Estuarine Research Reserve System education and training increases participants' environmental literacy and ability to make science-based decisions related to estuaries and coastal watersheds.

Biogeographic Regions and Boundaries of the National Estuarine Research Reserve System

NOAA has identified eleven distinct biogeographic regions and 29 subregions in the United States, each of which contains several types of estuarine ecosystems (15 C.F.R. Part 921, Appendix I and II). When complete, the Reserve System will contain examples of estuarine hydrologic and biological types characteristic of each biogeographic region. As of 2012, the Reserve System includes 28 reserves and two states in the process of designating a reserve.

Reserve boundary size will vary greatly depending on the nature of the ecosystem. Boundaries must include an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation. Reserve boundaries encompass areas for which adequate state control has or will be established by the managing entity over human activities occurring within the reserve. Reserve boundaries include a "core" area which is comprised of key land and water encompassing resources representative of the total ecosystem, which if compromised could endanger the research objectives of the reserve, as well as a "buffer" area designed to protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. Buffer areas may also include areas necessary for facilities required for research and interpretation. Additionally, buffer areas are identified to accommodate a shift of the core area as a result of biological, ecological or geo-morphological change which reasonably could be expected to occur. (15 C.F.R. Part 921.11 (c)(3))

National Estuarine Research Reserve Administrative Framework

The process for federal designation of a National Estuarine Research Reserve has many steps and involves many individuals and organizations. While each reserve is a partnership program between NOAA and a coastal state, there are many entities that collaborate to support designation of a reserve. Other partners include federal and state agencies, non-profit groups, universities and members of the local community. For more information on the designation process see nerrs.noaa.gov/background.

Upon designation, the reserve implements the approved management plan and is eligible for NOAA financial assistance on a cost-share basis with the state. A reserve may apply to NOAA for funds to help support implementation of the management plan largely funding operations, research, monitoring, education/interpretation, training, stewardship, development projects, facility construction, and land acquisition. Management plans provide a vision and framework to guide reserve activities during a five year period and enable the reserves and NOAA to track progress and realize opportunities for growth. Each management plan contains the reserve goals, objectives, and strategies supported by programs focused on research and monitoring, education and outreach, training, and stewardship. They also outline administration, public access, land acquisition and facility plans and needs, as well as restoration and resource manipulation plans, if applicable. Reserves are increasingly confronted with complex questions regarding new uses in or near reserves that may or may not be compatible with the Reserve System's mission. A thoughtful and comprehensive management plan provides a foundation for addressing these challenges to protect and manage reserve resources wisely and ensure the public and coastal decision makers value and protect coastal resources.

NOAA administers the Reserve System and establishes standards for designating and operating reserves, provides support for reserve operations and system-wide programming, undertakes projects that benefit the Reserve System, and integrates information from individual reserves and programs to support decision-making at the national level. Additionally, NOAA periodically evaluates reserves for compliance with federal requirements and with the individual reserve's federally approved management plan, as mandated under Section 312 of the Coastal Zone Management Act (15 C.F.R. Part 921.40).

NOAA currently provides leadership and support for three system-wide programs including the System-Wide Monitoring Program, the K-12 Estuarine Education Program, and the Coastal Training Program, as well as the NERRS Science Collaborative. They also provide support for initiatives focused on the Reserve System's priorities: climate change, water quality and habitat protection.

(Mandatory Text End)

Introduction to the Reserve

About This Section

It is important that reserves are managed with an understanding of how the three sectors of influence intersect and impact coastal resources (Figure 7). It is important to provide context for reserve strategic actions by providing information about reserve ecosystems (ecological attributes) and reserve communities and economies (social attributes and cultural resources), as well as geographic and administrative context for the reserve. It is imperative to understand the inextricable link between natural resources and humans as it greatly influences program management and decision-making.

By understanding the human context, we can better understand relationships between humans and natural resources and in turn use this information to develop a robust strategic plan.

It will also be important to understand threats and stressors facing the reserves and how these stressors may impact or alter these sectors and hence influence strategic planning and implementation of the plan.

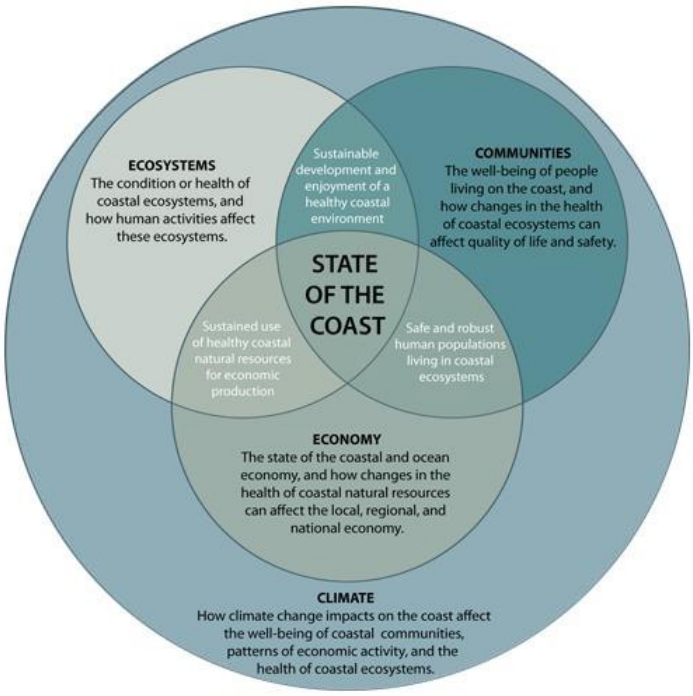


Figure 7. State of the Coast

The purpose of this section is to provide:

- Overview of history of reserve designation and general administrative structure;
- General and brief description of the reserve's ecological and social attributes to provide context for the plan;
- Description of climate and climate impacts to the extent possible; and
- Description of the reserve boundary, adjacent influences, and boundary expansion (if applicable).

Plan Contents

A. History and Local Management of the Reserve

This section should describe the impetus for and parties involved in the designation, as well as brief overview of process and rationale used to designate lands included within the reserve. It should also describe the lands identified for protected status and any acquisitions made specifically during the designation process. This section should also include the general management structure for the reserve, the state agency and department responsible for management, and the relevant land management partners.

B. Ecological Characteristics

The description of the natural setting should provide a general overview of the location and extent of key physical and environmental characteristics of the reserve including geography, geology, hydrology, biological resources, climate, and weather. This information should be a very brief synopsis of the reserve's ecological characterization as described in the site profile. A link to the site profile can then be provided for more detailed information.

Geography and geology includes general description of the topography and geomorphology that creates the unique reserve ecosystem, as well as geological setting and classification. Hydrology should be characterized by the average tidal conditions the reserve experiences, the major inputs of fresh and salt water to the estuary, and any water quality or quantity issues potentially affecting the reserve. The reserve's climate and weather should be characterized by the climate regime the estuary is situated in, key weather patterns (e.g., El Niño, hurricanes) that may influence the reserve, and weather trends the reserve experiences. Trends can be gathered from reserve SWMP data and may include average annual minimum and maximum air temperature range and average annual rain fall. The reserve's key habitats, based on the Reserve System habitat classification scheme, should be described.

Introduction to the Reserve

♦ = optional element

__ History and local management
__ Ecological attributes
  __ Geomorphology
  __ Hydrology
  __ Climate and weather
  __ Key habitats and species
__ Social attributes
  __ Population demographics
  __ Jobs and employment trends ♦
  __ Value of ecosystem services ♦
__ Archaeological and cultural resources ♦
  __ Archaeological sites ♦
  __ Cultural sites or resources♦
  __ Value of resources♦
__ Threats and Stressors
  __ Natural and anthropogenic
  __ Climate phenomena and impacts
  __ Reserve sensitivity to impacts ♦
  __ Reserve vulnerability ♦
__ Boundary description
  __ Core and buffer rationale
  __ Boundary map
  __ Core and buffer
  __ Land ownership
  __ Habitat types (include map)
  __ Land use type (include map)
  __ Targeted watershed (include map that indicates land use and type)
  __ Boundary expansion rationale and GIS layers (if applicable)

A map should be included that identifies the habitats within the reserve boundary, as well as the targeted watershed. The reserve many also identify the most common and/or dominant animal and plant species in, as well as key species of importance or concern, including those that may be endangered or threatened.

C. Social Attributes

Understanding the social framework within and adjacent to the reserve will inform management of coastal resources and protect the reserve. An understanding of the social framework within the reserve's targeted watershed or defined geographic area of interest should include a brief description of population demographics. Additional information includes employment trends and social vulnerabilities, such as large populations of aged or low income residents. Population demographics can be characterized by population density, age, gender, ethnicity, education level and housing information. Ocean and coastal related jobs can be described by reviewing jobs by sector and job trends which are integrally related to gross domestic product for the area.

D. Archaeological and Cultural Resources

In addition to biological and social resources, the reserve may contain archaeological, cultural and historical resources that provide information and research opportunities about past settlements. These resources provide a sense of place and historical context and should be identified and preserved.

If the reserve includes this section, it should provide a brief overview and description for the archaeological and cultural resources within the reserve, including the value and general location of these resources. If an evaluation of these resources has been done, please include information about priority sites and any efforts to protect them. Collaboration with the state archaeologist or State Historic Preservation Office and state maritime archaeologist is recommended, if one exists.

E. Threats and Stressors

While reserves were designated under the premise that they are relatively pristine, representative estuarine ecosystems, they are and will likely be increasingly exposed to human and environmental stressors that must be understood in order to manage and adapt to changing conditions. This section should describe the primary stressors on the reserve.

1. Natural and Anthropogenic Stressors

Natural and anthropogenic threats and stressors affect all reserve environments. Each reserve is subject to different stressors depending on their geographic location and relationship to urban and rural communities, as well as exposure to weather and climate-related hazards. This section should address threats to both biological and social resources within and adjacent to the reserve. Threats such as sedimentation, nonpoint source pollution, invasive species, population growth, episodic storm events, flood exposure, etc. all provide unique challenges and should be described thoroughly to provide background and focus for the reserve's strategic plan.

2. Climate Change Impacts

Coastal societies and ecosystems are dependent upon unique resources and subject to hazards that inland landscapes may not be exposed to. Understanding these dependencies and threats is critical to management of these systems. Climate change stressors interact with other stressors within natural and social systems, and may alter their effects.

This section should provide an overview of any expected climate change impacts the reserve may face, as well as an overview of results and products from efforts to understand the current and projected impacts of climate change on the natural and social landscape of the reserve. For general information on climate stressors and expected changes and impacts that may result, please see *Appendix 6 Summary of Climate Change Phenomena with Observed and Projected Changes* and *Appendix 7 Summary of Observed and Projected Regional Climate-related Changes.*

Reserves should use available data, see "Resources" section below, to support this section, and are encouraged to mine local data and information sources to further augment this description. Per the resources below, reserves should describe flood exposure and assess impacts to human and ecological communities, as well as infrastructure within the flood zone. Reserves should assess land cover changes, and associated flood exposure, within the floodplain, as well as the risk and impacts of natural disasters on reserve resources.

3. Reserve Sensitivity and Vulnerability to Climate Change

As we try to understand and plan for the impacts of climate change on natural resources and communities, it is important to be aware of the general sensitivity, exposure, and adaptive capacity of our natural resources and the communities that depend on them. The Intergovernmental Panel on Climate Change defines vulnerability as a function of the sensitivity of a system to climate changes, its exposure to those changes, The Reserve System Climate Change Implementation Plan (CCIP) objective 'NERRS assess community and ecological sensitivity and vulnerability to climate change' sets a course for more than half of the reserves in the System to understand vulnerability assessment methods by 2015, and to apply those to assess the ecological and

Not considering climate change in management is akin to traveling in unknown territory without a map—one is not likely to arrive at the desired destination.

– *Scanning the Conservation Horizon*

social vulnerabilities of reserve ecosystems and communities. Additionally, the report *Climate Sensitivity of the National Estuarine Research Reserve System* (see Appendix 8), which explores the biophysical and social sensitivity of reserves and related communities, provides a resource for in-depth vulnerability assessments.

Ecological and Social Sensitivity

If reserves have not conducted a comprehensive vulnerability assessment of ecosystems and communities, existing data and information that describes natural resource sensitivity and exposure within the reserve should be included, as feasible. The Reserve System's Climate Sensitivity report noted above should be a resource for this data. The climate sensitivity report analyzes existing SWMP and national census data to determine relative reserve ecosystem and social sensitivity to climate change stressors across the Reserve System.

SWMP water quality data were analyzed in the climate sensitivity report to determine their relative responses to climate stressors such as precipitation and sea level rise. SWMP data analysis in the report indicates that there is temporal and spatial variability in reserve responses to climate stressors such as precipitation. This report can help reserves understand how sensitive their reserve is to climate stressors relative to other reserves in the region and country.

From a social perspective, a modified Social Vulnerability Index (SOVI) was used to determine relative sensitivity of reserves to climate impacts based on the geographic area of interest defined by each reserve. By better understanding current social sensitivity and trends, reserves can develop targeted research and education activities to promote resilient communities.

For general information on reserve sensitivity, please refer to the report in Appendix 8, *Climate Sensitivity of the National Estuarine Research Reserve System*.

Reserve Vulnerability

For those reserves that have completed and/or will complete a vulnerability assessment prior to the revision of their management plan, we encourage including a summary of the assessment. Reserves with the capacity to do so are encouraged to conduct a vulnerability assessment prior to updating the management plan, as it will affect the scope and scale of research, education and stewardship activities. For more information about the general process for conducting a vulnerability assessment, please see Appendix 9 Conducting a Reserve Vulnerability Assessment. If a vulnerability assessment cannot be done prior to revising the management plan, it is advisable to identify this effort within the strategic plan if feasible.

F. Reserve Boundary

This section should describe the reserve in the context of the state, region, and watershed. The reserve should identify the type of estuary it is (e.g. coastal plain, bar-built, deltaic system, tectonic, fjord) and the major physical attributes that define the reserve.

1. Core and Buffer

The boundary should be clearly defined and a description of how core and buffer areas were determined should be included. Adequate control, by the managing entities, over human activities occurring within all areas of the reserve boundary must be established. (15 CFR(c)(3)) Reserve boundaries will encompass two areas: key land and water or core zone, and a buffer zone. These different areas will likely require differing levels of control.

Core designated areas must be "vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the reserve or research on natural processes." Key land and water areas, which comprise the core area, are those ecological units of a natural estuarine system which preserve, for research purposes, a full range of significant physical, chemical and biological factors contributing to the diversity of fauna, flora and natural processes occurring within the estuary. The determination of which land and water areas are ''key'' to a particular reserve must be based on specific scientific knowledge of the area. A basic principle to follow when deciding upon key land and water areas is that they should encompass resources representative of the total ecosystem, and which if compromised could endanger the research objectives of the Reserve. Buffer zones protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. When determined appropriate by the state and approved by NOAA, the buffer zone may also include an area necessary for facilities required for research and interpretation. Additionally, buffer zones should be established sufficient to accommodate a shift of the core area as a result of biological, ecological or geomorphologic change which reasonably could be expected to occur.

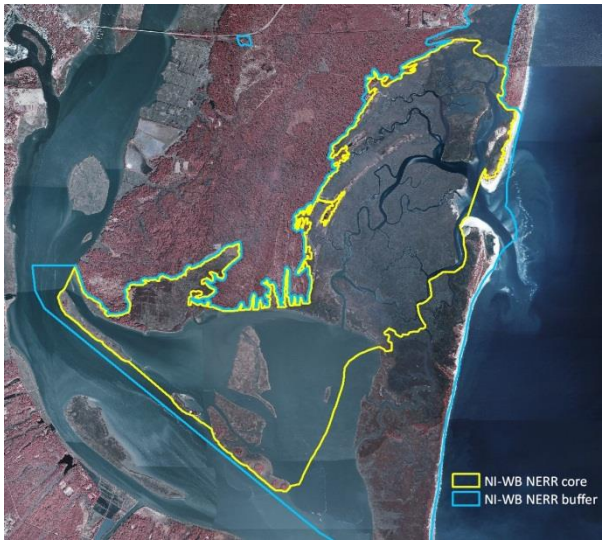


Figure 8. North Inlet-Winyah Bay Core and Buffer

In order to objectively and systematically delineate these areas 'within' reserve boundaries, the step-wise review of the data layers was derived by a NERRS workgroup and may help reserves define these areas. These areas may shift over time and should be reviewed and validated as appropriate and when reserves will be adding land to the boundary.

1. Habitat types that comprise the "estuarine system" (core) versus "non-estuarine system" (buffer).
2. Levels/types of control/protection status. For example, those areas with state and federal protection, preserve or refuge, would provide higher level of protection which should be afforded in core areas.
3. Public trust areas.
4. Potential areas of impact from climate change to help understand potential shifts of core and subsequently, buffer.

2. Land Ownership and Type

Land ownership and land use type should be described for all areas within the boundary. The number of acres should be attributed to each land owner. Federal lands already in protected status may not comprise a majority of the key land and water areas of a reserve, per 15 CFR 921.1(g). Land use adjacent to the reserve should also be identified with description of potential impacts and challenges. A map should be included that identifies land ownership within and adjacent to the reserve boundary.

3. Boundary Modifications

If a reserve plans to expand the boundary, they should propose to do so at the time of their management plan revision. While a boundary can be expanded outside of this process, it is not recommended unless circumstances necessitate this.

Reserves may expand their boundary to include those lands and/or waters that are necessary to protect the ecological units of the natural estuarine system for research purposes. Areas adjacent to these key land/waters that are essential to maintain the integrity of the ecological unit may also be incorporated into the boundary. An important consideration is the potential for habitat migration due to climate change. The lands/waters identified for inclusion in the boundary must either be contiguous to the original boundary or the plan must demonstrate how these areas are necessary for reserve research and/or education programs. Additions should not be proposed for inclusion until they meet the criteria below:

1. Boundary should encompass an adequate portion of the key land and water areas of the natural system to approximate an ecological unit
2. Adequate state control of the site(s) must be established
3. Site should be suitable for long-term research and be important for education and interpretive efforts.

Reserves are also encouraged to factor climate change impacts, (e.g. potential habitat and species migrations) into boundary modification decisions.

The reserve must include the following if proposing to modify the boundary:

- Describe the proposed lands to be added or deleted by defining the location, acres, habitats, and existing uses. State the total acreage of the new boundary, after explaining why lands and/or waters are proposed for addition or deletion.
- Provide a map depicting original boundary and new (expansion or contraction) boundary
- Provide a brief history of the additional lands (if expanding)
- Provide the rationale for expansion – the benefits these lands and/or waters provide to the reserve from an ecological and/or programmatic perspective.
- Depict core and buffer on the new boundary map
- Identify land ownership and type on the new boundary map
- Identify how lands will be managed and the responsible parties for management
- Identify how lands will be used, e.g. value to program efforts, public access, etc.

Additionally, an MOU must be drafted between the state agency and the land managing partners, if different from the state agency, to affirm that the lands will be managed in accordance with Reserve System regulations. The MOU must be included as part of the management plan revision in an appendix.

Please note that GIS layers for boundary additions should be submitted to NOAA so that Coastal Change Analysis Program data can be updated.

Resources

Natural Data Sources

Benthic Cover data provides nearshore benthic habitat polygons derived from aerial optic or swath acoustic imagery as part of NOAA's Digital Coast.

Coastal Change Analysis Program (C-CAP) data is a source of coastal land cover and change information, including inventories of intertidal areas, wetlands, and adjacent uplands, for use in GIS. Also see the C-CAP Land Cover Atlas to explore the data on-line and print summary data sheets.

Coastal Lidar provides data sets contributed by many different entities and groups, distributed in user-specified formats, resolutions, and datums as part of NOAA's Digital Coast. Also see the Topobathy Data Inventory to see where high-resolution elevation data is available for coastal and marine areas.

Data.gov provides geospatial data from several federal agencies applicable to understanding coastal biophysical landscapes.

National Estuarine Research Reserve Site Profiles characterize the environmental features, habitat types, species distribution, biological communities and current research available as well as research gaps for each reserve.

Climate Sensitivity of the National Estuarine Research Reserve System (also Appendix 8) is a report that explains the extent of relative climate sensitivity in the reserves by looking at five factors: social, biophysical, and ecological sensitivity, and exposure to temperature change and sea level rise. High social sensitivity to climate change is indicated where there is higher employment within natural resource-dependent industries, lower per capita income and median home values, higher percentages of minority populations, and a higher percentage of individuals lacking a high school education. Biophysical sensitivity for each reserve is based on the relationship between annual spring atmospheric temperature with rainfall data and water quality factors such as water temperature, dissolved oxygen and pH.

Social Data Sources

There are several existing sources of information that provide socio-demographic information for Reserve targeted watersheds. While the targeted watersheds may not include all of the human communities that

relate to and/or impact the reserve, they provide a standard database of information for reserves. Additional site specific data is encouraged to complete a picture of the socio-demographic landscape appropriate for each reserve.

NOAA's Spatial Trends in Coastal Socioeconomics (STICS) Web site holds a plethora of information to assist you in describing the social and economic landscape within reserve targeted watersheds. The Web site contains demographic information from the U.S. Census Bureau, personal income and employment from the Bureau of Economic Analysis, demographic projections developed by Woods and Poole Economics, Inc., and marine recreation from the National Survey on Recreation in the Environment. The Quick Report Tool on the STICS Website offers a map-based interface to quickly determine estimates of demographic and economic characteristics, many of which are clipped to the reserve targeted watersheds. STICS offers:

Census data is available by state coastal zone boundary and includes population, population density, race, sex, age and household information. You can also clip this data by zip code.

National Center for Education Statistics allows users to view maps of states and school districts, while overlaying statistics on population and housing, race and ethnicity, economics and social characteristics.

Bureau of Economic Analysis data is available for NERRS targeted watersheds and includes population, personal income, per capital personal income and earnings by industry.

Woods and Poole Economics, Inc. data is available for NERRS targeted watersheds and includes projections to 2040 for population, population density, race, sex, total employment and earnings, personal income, household income and total food service and retail sales.

National Ocean Economics Program coastal economy data is available for NERRS targeted watersheds and includes number and types of industries, numbers employed per industry, wages per industry, Gross Domestic product per industry.

NOAA's Economics: National Ocean Watch (ENOW) describes six economic sectors that depend on the oceans and Great Lakes including living resources, marine construction, marine transportation, offshore mineral resources, ship and boat building, tourism and recreation. Annual time series data are available for 448 coastal counties, 30 coastal states, and the nation, derived from the Bureau of Labor Statistics and the Bureau of Economic Analysis. The economic indicators include establishments, employment, wages, and gross domestic product. Also see the ENOW Explorer for easy on-line exploration of the data.

NOAA's Coastal County Snapshots turns complex data into easy-to-understand stories and includes charts and graphs to illustrate relationships. The data is organized by coastal state and county and provides information on flood exposure including county demographics, infrastructure, and environment within the flood zone; ocean jobs including economic value
of jobs depending on ocean and Great Lakes resources; and wetland benefits such as how they contribute to safer, cleaner, and more productive coastal communities.

NOAA's State of the Coast Web site provides quick facts and detailed statistics through interactive visualizations that highlight what we know about coastal communities, ecosystems, and economies, as well as how climate change might impact the coast. Information about communities includes populations living in

coastal watershed counties from 1970 projected to 2030 and water uses and sources in coastal counties for each state from 1985-2005. Coastal economy data includes coastal gross domestic product from 1999-2010 state recreation fishing data from 1981-2009 and commercial fishing data from 1950-2010, information on the top 150 ports, and energy production estimates from 1960-2009. This site also includes ecosystem statistics on coastal ecosystem health, invasive species, nutrient pollution, contaminants and wetlands, as well as information on climate vulnerability. There is an index for coastal vulnerability to sea level rise; populations in the 100 year flood zone for 2000-2020, including those at elevated risk such as the aged and impoverished; and 2010 federally insured assets.

Social Vulnerability Index for the United States was developed by the Hazards and Vulnerability Research Institute at the University of South Carolina and synthesizes 32 socioeconomic variables, which the research literature suggests contribute to reduction in a community's ability to prepare for, respond to, and recover from hazards. The data were culled from national data sources, primarily those from the United States Census Bureau. Scores for variables identify visually those counties most and least vulnerable. The numerical social vulnerability score contends that nine significant components explain 76% of the variance in the data. Among them are socioeconomic status, elderly and children, rural agriculture, housing density, black female-headed households, gender, service industry employment, unemployed Native Americans, and infrastructure employment.

Climate Sensitivity of the National Estuarine Research Reserve System (also Appendix 8) is a report that explains the extent of relative climate sensitivity in the reserves by looking at five factors: social, biophysical, and ecological sensitivity, and exposure to temperature change and sea level rise. High social sensitivity to climate change is indicated where there is higher employment within natural resource-dependent industries, lower per capita income and median home values, higher percentages of minority populations, and a higher percentage of individuals lacking a high school education. Biophysical sensitivity for each reserve is based on the relationship between annual spring atmospheric temperature with rainfall data and water quality factors such as water temperature, dissolved oxygen and pH.

Climate Data Sources

Climate Wizard provides a user friendly way to access leading climate change information and visualize the impacts anywhere on Earth. The user can choose a state or country and can assess how climate has changed over time and project what future changes are predicted to occur in a given area. You can view historic temperature and rainfall maps, view future predictions of temperature and rainfall, and download climate maps.

Ecoclim is a series of almost 10,000 future climate surfaces downscaled to 10 square kilometer resolution for the terrestrial surface of Earth. Ecoclim data are available either globally or clipped to seven major zoogeographic regions –so very broad scale, but perhaps useful for big picture overview. Another tool that does not operate on a GIS platform, but Web interface, is Climate Wizard.

NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer tool shows how various levels of sea level rise will impact coastal communities. The current project areas include Mississippi, Alabama, and parts of Texas and Florida, with additional coastal counties to be added in the near future. Visuals and the accompanying data

and information cover sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.

PRISM climate mapping system PRISM (Parameter-elevation Regressions on Independent Slopes Model) is a unique knowledge-based system that uses point measurements of precipitation, temperature, and other climatic factors to produce continuous, digital grid estimates of monthly, yearly, and event-based climatic parameters. PRISM data sets are recognized world-wide as the highest-quality spatial climate data sets currently available.

Sea Level Rise Affecting Marshes Model simulates the dominant processes involved in wetland conversions and shoreline modifications during long-term sea level rise. It is a complex decision tree incorporating geometric and qualitative relationships is used to represent transfers among coastal classes. The process accounts for inundations, erosion, overwash, saturation, and accretion. It is applied to 26 land categories derived from the National Wetlands inventory and covers a span from dry land to open water. Model incorporates Intergovernmental Panel on Climate Change projections as well as fixed rates of sea level rise to create sea level rise scenarios.

U.S. Global Change Research Program provides regional and sectoral climate change information and data, as well as a resource library for better understanding of climate science and climate impacts.

WorldClim is a set of global climate layers (climate grids), including past observed data, past modeled data, and future modeled data with a spatial resolution of a square kilometer. They can be used for mapping and spatial modeling in a GIS or other computer programs.

The Strategic Plan: Adaptive Management through Issue-Based Planning

About This Section

Per the Federal Code of Regulations 15 CFR 921.13 (a)(1), management plans are required to identify management issues, reserve goals and objectives, and actions for meeting the goals and objectives. These items should be embodied in the strategic plan element of the management plan. The strategic plan will provide direction and structure for the reserve to take cohesive action towards meeting objectives over the next five years. This section outlines the elements of the strategic plan; these include vision, mission, coastal management issues, goals, objectives, and actions. There should be a clear link between the issues outlined and the goals and objectives created to address them. The objectives will form the basis for evaluation of progress and success, and the actions will inform how the plan is implemented. Examples, resources, and case studies are provided to support the reserve strategic planning process. Part I of the Management Plan Guidelines provides direction and advice on a process for developing many of the elements within the strategic plan, please refer to Part I prior to crafting the strategic plan.

Plan Contents

A. Reserve Vision

The reserve vision statement is the overarching description of what the reserve would like to achieve or accomplish. Vision statements should be forward looking and reflect how the reserve wants to be distinguished.

Example: Vibrant estuaries cherished by their communities –San Francisco Bay Reserve

B. Reserve Mission

The reserve mission statement should describe the reserve's core purpose and focus, the reserve's reason for existence. This is a short static statement written in the present tense that describes the organizations unique contributions.

Example: To provide a basis for informed stewardship of estuaries in Southwest Florida through research and education – Rookery Bay Reserve

Strategic Plan

__ Vision
__ Mission
__ Priority coastal management issues
__ Reserve goals, objectives, actions
__ Performance measures for each objective ♦

C. Reserve Coastal Management Issues

Part I of this document provides guidance on identifying and selecting reserve priority issues, and Part II provides important information about stressors on the reserve to consider as described in the 'Introduction to the Reserve.' This section should be a succinct summary and prioritization of issues for the reserve. The

most pressing and pertinent coastal management issues facing the reserve need to be identified in order to develop relevant goals and meaningful objectives. Reserve issues should be included that relate to one of the issue areas identified in the Reserve System Strategic Plan. There are many ways to determine the primary issues including research findings, needs assessments, focus groups, surveys, etc. It is advantageous for all reserve staff to be involved in the process of engaging stakeholders and identifying the most pressing issues the reserve will address.

D. Creating Relevant Goals

A goal is a broad statement of what the organization plans to do and/or enable in the future. Goals should advance the mission of the program. They may be written for a five year time frame or longer, but ultimately, they should be written so that significant progress toward meeting them can be achieved. During a plan revision, it may be common for goals to remain the same, but objectives and actions to change given the amount and type of progress made towards that goal.

Goals should be written to address the most pressing coastal management issues, be based on the reserve niche, and be supported by the program. A manageable number of goals, approximately 3-6, should be written to capture the breadth and depth of the reserve's niche. Part I of this document encourages and integrated strategic planning process for multiple programs to contribute to the development and achievement of goals. Hence, all reserve programs should contribute their skills and expertise to developing and accomplishing reserve goals.

Tips for Writing Goals

- Goals describe a desired future state that the organization attempts to achieve.
- Goals should reflect conditions that can be changed and addressed via programs.
- Goals should be directional and leave room for continual improvement. Use words that identify improvement –increase, improve, reduce, etc.

Example Goal Statements

- Reduce the impact of watershed land use on reserve resources
- Improve natural biodiversity within the reserve
- Reduce the impact of invasive species and habitat loss on reserve biodiversity

E. Creating Meaningful Objectives

An objective is a specific statement of expected results that contribute to the goal(s). Objectives establish the standards of achievement in terms of some measure of improvement in existing condition. Reserves should strive to create SMART objectives: specific, measurable, attainable, relevant, and time-bound. They should be results oriented and describe the desired changes in the target audience, resource, or organization. These statements are the most important statements in strategic planning and should first focus on ensuring they are attainable and measurable within the time period of the plan. Objectives provide a measuring tool for progress towards the goals; the reserve should be able to quantitatively measure progress based on these statements that can then be communicated to stakeholders and leadership. Writing strong objectives takes judgment and skill; and devoting the necessary time and effort pays off in better

planning, better results, and effective evaluation of progress. Each goal may have several objective statements. While objectives will likely require several skill sets, or sector skills, to accomplish, it is advisable that one sector take leadership for each objective, ensuring the coordination of integrated, multi-sector actions and evaluation of progress. This is the level where adaptive management becomes important. Certain actions may not yield the desired result and may need to be tweaked. As understanding of an issue increases, more appropriate strategies may need to be employed. It will be important for the objective lead to understand whether the actions are effective or alternatives are required. Hence, it is suggested that objectives have a designated sector lead to track progress.

Tips for Writing SMART Objectives

- "Specific" means using strong action verbs to focus on what you want to do. Statements reflect clearly "what" needs to done, "why" it's important, "who" is doing it, and "when" it will be done.
- "Measurable" means ensuring that there is a quantitative way to measure the change the reserve wants to realize.
- "Attainable" means that they need to stretch the organization, but not so far that people lose motivation. They should be realized within the five year period of plan.
- "Realistic" means having the appropriate resources including the right people with the right skills, money, equipment, and capacity.
- "Time-bound" means they should create motivation and urgency to accomplish them within the five year period of the plan.

Example Objective Statements

Who/What *Target*	Change *Action Verb*	In What *Expected Results*	By When *Time Frame*
Local community planners	improve	their capacity to write climate change adaptation plans	within 1 year
Watershed management	are developed to	coordinated conservation strategies focused on sustainable ecosystems	by 2013
Unauthorized activities	are reduced	on the trail system to promote safe user experiences	by 2014

F. Creating Clear Actions

Actions should support achievement of the objectives. An action statement explains "how" an objective will be met. Actions may be undertaken by one or multiple sectors, but should be coordinated by the objective lead, so that as new information arises about the impacts of the actions, management decisions can be adjusted or maintained. Sector leads for each action should be indicated. Adaptive management focuses on learning and adapting, through partnerships between reserve staff, resource managers, coastal decision makers and stakeholders, who learn together how to create and maintain sustainable resource systems. It is more than monitoring activities and changing direction when failure arises. When developing actions, several alternatives should be explored, the outcomes of these alternatives should be predicted based on the current state of knowledge and then using professional judgment, those actions that are predicted to be the most effective should be written into the plan. During the course of the plan, evaluation of results should be ongoing to adapt when necessary.

Tips for Writing Actions

- Actions describe how you work and what you are working on.
- Actions describe collaborations and mechanisms for achieving work products.

Example Action Statements

- Provide training to community planners on understanding vulnerability and developing adaptation plans focused on protecting resources within the reserve targeted watershed.
- Partner with land owners within the reserve to identify existing conservation strategies, their compatibility with one another, and options for improvement.
- Coordinate with county land partners to place signs in high traffic areas of the trail system to increase public awareness of authorized activities.

G. Developing Practical Performance Measures

Performance measures track if and how well a program is meeting its objectives and ultimately its mission. They provide data on trends and can inform future plans, policy and program budgeting. They provide a quantitative means to communicate those trends and progress toward objectives to key audiences. In addition to the Reserve System national performance measures developed to track Reserve System progress, reserves are encouraged to develop site specific performance measures and targets for reserve objectives will help quantify progress and facilitate communicating success to key stakeholders.

"If you can't measure it, you can't manage it."

– Kaplan

The three measures that relate to high priority management plan objectives identified per guidance from NOAA's former National Policy and Evaluation Division (NPED) should be included. (Note: If during the period that the management plan is active the objectives change and the measures are not applicable or it became challenging to collect that data due to extenuating circumstances, then NOAA and the reserve will work to identify a new measure and target.) During an evaluation, NOAA will review the original measure and target as well as the status of the new measure and target.

While the above measures are the only ones required, it is advisable that performance measures and associated targets are established for as many objectives as possible. Performance measures should help the reserve understand the key benefits of their activities to specific audiences and should illustrate why the programs matter and to whom. It is important to have a baseline, set targets, and identify the unit of measurement and how it will be counted. If baseline data isn't available, it may be more appropriate to collect data for a baseline than establish measures, so that measures can be created in the future.

Example Performance Measures

Objective:	**Strategy:**	**Performance Measure:**	**Target:**
Local community planners will improve their capacity to write climate change adaptation plans by 2017.	The Reserve's Coastal Training Program will develop targeted workshops promoting the understanding and use of climate change science and monitoring, including information gained from the Reserve sentinel site monitoring, to inform adaptation activities.	Number of new targeted workshops that build coastal decision- maker capacity and promote the use of recent research results that address climate change impacts and adaptation alternatives. Performance Measure: Number of new targeted workshops that build coastal decision-maker capacity and promote the use of recent research results that address climate change impacts and adaptation alternatives.	Ten workshops focused on building coastal decision-maker capacity to use and apply climate data and information to develop adaptation alternatives.

Resources

Program Development and Evaluation: Provides knowledge, skills and tools to design and implement projects that have measurable impacts on a target audience. Tools include models that provide situational analysis, priority setting, program action – the logic model – and evaluation.

www.csc.noaa.gov/training/ and *www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html* and *www.uwex.edu/ces/pdande/progdev/index.html*

NOAA's Conducting Needs Assessments Course: Provides an online self-guided course offering an introduction to needs assessments and how to conduct one.

NOAA's Meaningful Evaluation Course: Provides an understanding of all elements of program and project evaluation so programs can develop evaluation plans.

NOAA's Focus Groups, Facilitation, and Engagement Publications: Provides information on conducting focus groups, facilitating effective meetings, survey design and delivery, preparing to write your strategic plan, stakeholder engagement, understanding risk behavior, and resiliency planning.

NOAA's Preparing to Write Your Strategic Plan Publication: Provides a multi-step process to systematically assess the direction and priorities of an organization, as well as tools and job aids for assessing target populations, performing SWOT assessments, developing niche, and identifying program outcomes.

All About Strategic Planning: Provides information, guidance, and tools about the benefits and process of strategic planning.

Strategic Planning in the Public Sector: Provides information and examples of process and approaches to strategic planning.

Stakeholder Involvement: Environmental Protection Agency provides information on stakeholder involvement evaluation and research, including lessons learned, barriers, and innovative approaches to stakeholder involvement.

Perspectives on Strategic Planning in Public Sector: Report on strategic planning approaches, philosophies, and processes to achieve desired results.

Mind Tools, Ltd.: Provides information about how to undertake a SWOT analysis, discover new opportunities, as well as manage and/or eliminate threats. Mind Tools also provides information about strategy tools, project management, problem solving, team management, and communication skills.

Structured Decision-Making: Provides an organized approach to identifying and evaluating creative options and making choices in complex decision situations.

Reserve System Program Foundations

About This Section

Each reserve contributes to Reserve System-wide programs and priorities, as well as defines local programs and priorities to address site specific needs and issues. It is important to understand the key elements of system-wide programs that contribute to national and local efforts. Information about these programs has historically been included in management plans in a variety of ways; this section offers a consistent approach for describing system-wide programs.

This section provides a standard format for describing the system-wide programs, including mandatory text and key questions to organize information on program context, capacity, delivery, needs, and opportunities. .Part I 'Preparing to Write a Strategic Plan' section two 'Assessing Skills and Capacities of Reserve Programs' discusses how reserves may conduct program SWOT analysis. Information within each program category- context, capacity, delivery, needs and opportunities- should be readily available if the programs undertake a SWOT analysis. Reserves should try to respond to all of the questions below to the best of their ability. This information should provide readers a clear picture of program capacities and focus, as well as how the program is supporting achievement of reserve goals and objectives. Together they create a complete picture for how the system works nationally and locally.

While stewardship is a sector program at many reserves and there are national efforts to support stewardship functions, this section concentrates on those sectors with system-wide programs. Foundational capacities for stewardship vary across sites and will be captured within research and monitoring, as well as the resource protection, land acquisition, public access and visitor use components, and if applicable, the restoration and/or resource manipulation components.

Each program description can be organized in separate chapters or be culminated into a single "Program Foundations" chapter. If reserves choose to create a sector based strategic plan (i.e. sector based goals), each of these descriptions should be included with that sector based goal chapter.

Program Foundations		
Research and Monitoring Program __ Mandatory system-wide text __ Program Context, capacities, and delivery __ Needs and Opportunities __ Research related objectives and actions♦ __ Monitoring and evaluation strategies♦	Education Program __ Mandatory system-wide text __ Program context, capacities, and delivery __ Needs and Opportunities __ Education related objectives and actions♦ __ Monitoring and evaluation strategies♦	Coastal Training Program __ Mandatory system-wide text __ Program context, capacities, and delivery __ Needs and Opportunities __ Training related objectives and actions♦ __ Monitoring and evaluation strategies♦

Plan Contents

A. Research and Monitoring Program

(Mandatory text begin)

The National Estuarine Research Reserve System's mission provides that reserves are protected and managed to afford opportunities for long-term research. Research at each reserve is designed to fulfill the Reserve System goals as defined in the regulations (15 C.F.R Part 921(b)):

- Address coastal management issues identified as significant through coordinated estuarine research within the system;
- Promote federal, state, public and private use of one or more reserves within the system when such entities conduct estuarine research;
- Conduct and coordinate estuarine research within the system, gather and making available information necessary for improved understanding and management of estuarine areas.

To sustain these system goals, the 2011-2016 Reserve System Strategic Plan outlines research objectives that support the focus areas of climate change, habitat protection, and water quality:

- Expand capacity to monitor changes in water quality and quantity, habitat, and biological indicators in response to land use and climate change drivers.
- Improve understanding of the effects of climate change and coastal pollution on estuarine and coastal ecology, ecosystem processes, and habitat function.
- Characterize coastal watersheds and estuary ecosystems and quantify ecosystem services to support ecosystem-based management of natural and built communities.
- Increase social science research and use of social information to foster coastal stewards that value and protect estuaries.

The Reserve System's research and monitoring programs provide the scientific basis for addressing coastal management challenges. Reserve research and monitoring activities provide valuable information about estuarine resources to increase understanding and awareness of their importance to a variety of audiences including scientists, resource managers, educators, and the general public.

Reserve System Research Programs

Currently, there is one focused effort to fund estuarine research in the Reserve System.

The National Estuarine Research Reserve System Science Collaborative is a program that focuses on integrating science into the management of coastal natural resources. Through an adaptively managed program, the Science Collaborative funds collaborative research and science transfer programs and projects that develop and apply science-based tools to better understand how to detect, prevent, and reverse the impacts of coastal pollution, habitat degradation and ecosystem processes in a time of climate change. The program is designed to

enhance the Reserve System's ability to support decisions related to coastal resources through collaborative approaches that engages the people who produce science and technology with those who need it. In so doing, the Science Collaborative seeks to make the process of linking science to coastal management decisions, practices, and policies more efficient, timely, and effective and share best practices and examples for how this can be done.

Reserve System Monitoring Program

The System-Wide Monitoring Program provides standardized data on national estuarine environmental trends while allowing the flexibility to assess coastal management issues of regional or local concern and is guided by the Reserve System-Wide Monitoring Program Plan. The principal mission of the monitoring program is to develop quantitative measurements of short-term variability and long-term changes in water quality, biological systems, and land use/ land cover characteristics of estuaries and estuarine ecosystems for the purposes of informing effective coastal zone management. The program is designed to enhance the value and vision of the reserves as a system of national references sites and focuses on three ecosystem characteristics:

1. Abiotic Characteristics: Abiotic measurements are supported by standard protocols, parameters, and approaches that describe the physical environment including weather, water quality, hydrological, and sediment related parameters. The monitoring program currently provides data on water temperature, specific conductivity, percent saturation of dissolved oxygen, pressure, pH, turbidity, salinity, concentration of dissolved oxygen, and pressure corrected water depth. Meteorological data include air temperature, relative humidity, barometric pressure, wind speed, wind direction, rainfall, and photosynthetically active radiation (PAR). In addition, the program collects monthly nutrient and chlorophyll a samples and monthly diel samples at one SWMP data logger station. Data is Federal Geographical Data Committee compliant and available via the *Reserve System Centralized Data Management Office*.

2. Biotic Characteristics: As funds are available, reserves are focusing on monitoring habitats and biodiversity.

3. Watershed and Land Use Classifications: The Reserve System is examining the link between watershed land use and coastal habitat quality by tracking and evaluating changes in coastal habitats and watershed land use/cover. This element is guided by the Reserve System Habitat Mapping and Change Plan.

Building on these foundational elements, the Reserve System is developing a network of sentinel sites and the capacity to assess the impact of sea level/lake level changes and inundation on the diverse set of coastal vegetative habitats represented in the system. Reserves are implementing a suite of activities, as described in the 2012 Reserve System Sentinel Site Guidance Document, to assess the relationship between vegetative communities (marsh, mangrove and submerged aquatic vegetation) and sea level. Reserves are adding surface elevation tables and monitoring pore water chemistry along vegetation monitoring transects and linking their System-Wide Monitoring Program to a network of specialized spatial infrastructure to allow precise measurement of local sea level and lake level changes and subsequent impacts to key habitats. The Reserve System is working in partnership with NOAA's National Geodetic Survey and the Center for Operational Oceanographic Products and Services to support the development of sentinel sites.

(Mandatory text end)

Research Program Context

A. What is the geographic scope of your program?
B. What information has been gained by the program since the last management plan?
C. Who are the target audiences for the research developed at the reserve?
D. How would the research community surrounding the reserve be characterized?
E. What are the most pressing research issues and questions that the reserve will address and how do they align with the Reserve System Strategic Plan?

Research Program Capacity

A. What staff, facilities, infrastructure, etc. support your research program currently?
B. What partners will you work with to accomplish your research?

Research Program Delivery

A. How will the reserve locally implement the system-wide programs (e.g. SWMP) and national programs (e.g. NSC) and priorities (e.g. NERRS Climate Change Initiative)?
B. How will the reserve implement local and regional monitoring and research?
C. How will the research program support other functions at the reserve?
D. How will the research program support or be influenced by other programs at the reserve?
E. How does the reserve evaluate the research program currently? Will this change in the next five years?
F. What are the major outcomes the research program wants to achieve? What research and/or monitoring contributions will be made to the scientific or management community?

Research Future Needs and Opportunities

A. What are the research needs and priorities identified by local stakeholders?
B. What is the nexus between those needs and projected capacity in the next five years?
C. What are the limitations of the research program? What are the opportunities?

Research Related Objectives and Actions

A. List research objectives from strategic plan
B. List research actions that will advance those objectives from the strategic plan

B. Education Program

(Mandatory text begin)

The National Estuarine Research Reserve System's mission includes an emphasis on education, interpretation, and outreach. Education at each reserve is designed to fulfill the Reserve System goals as defined in the regulations (15 C.F.R Part 921(b)):

- Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;
- Conduct and coordinate estuarine research within the system, gathering and making available information necessary for improved understanding and management of estuarine areas.

To sustain these system goals, the 2011-2016 Reserve System Strategic Plan outlines education objectives that support the focus areas of climate change, habitat protection and water quality:

- Enhance the capacity and skills of teachers and students to understand and use Reserve System data and information for inquiry-based learning; and
- Increase estuary literacy and promote active stewardship among public audiences through the development and delivery of tools and programs addressing climate change, habitat protection, and water quality.

The Reserve System provides a vehicle to increase understanding and awareness of estuarine systems and improve decision-making among key audiences to promote stewardship of the nation's coastal resources. Education and interpretation incorporate science-based content into a range of programs and methodologies that are systematically tailored to key audiences around priority coastal resource issues.

Reserves conduct formal and informal education activities, as well as outreach activities that target culturally diverse audiences of educators and students, environmental professionals, resource users and the general public. Education and public programs, interpretive exhibits and community outreach programs integrate elements of Reserve System science, research and monitoring activities and ensure a systematic, multi-faceted, and locally focused approach to fostering stewardship.

The reserves system is committed to preparing tomorrow's future leaders with the knowledge and understanding of our nation's oceans and coasts to be responsible stewards. To fulfill this commitment, the Reserve System has created the K-12 Estuarine Education Program (KEEP) to increase the estuary literacy of students, teachers and the general public. The KEEP Program helps students and teachers learn about essential coastal and estuarine concepts, develop data literacy skills and strengthen their critical thinking, team building, and problem-solving skills. K-12 and professional development programs for teachers include the use of established coastal and estuarine science curricula aligned with state and national science education standards and frequently involves both on-site and in-school follow-up activity.

Community education is another priority for the Reserve System. Community education programs foster behavioral change to promote resource conservation. These programs work with audiences whose choices directly impact the integrity of our estuaries and their associated watersheds.

(Mandatory text end)

Education Program Context

A. What is the geographic scope of your program?
B. What information has been gained by the program since the last management plan? (e.g., from market analysis and needs assessments or other assessments)
C. Who are the target audiences for reserve education programming, identifying population and reach, and why were they selected? Distinguish audiences among professional development programs, students programs, public outreach programs, and/or community education programs.
D. What are the priority issues for your reserve that your education program can address and how do they align with the Reserve System Strategic Plan?

Education Program Capacity

A. What staff, facilities, infrastructure, etc. support your education program currently?
B. What partners will you work with to accomplish your education program?

Education Program Delivery

A. How will the reserve locally implement and/or align with the system-wide programs (e.g. KEEP, SWMP), national programs (e.g. NSC) and priorities (e.g. NERRS Climate Change Initiative)?
B. What major activities will the education program implement and what methodologies will it employ?
C. How will the education program support or be supported by other programs at the reserve?
D. How will the education program deliver and disseminate results?
E. How does the reserve evaluate the education program currently? Will this change in the next five years?
F. What major impacts or outcomes does the education program want to achieve and what behavior change does the reserve wish to influence?

Education Future Needs and Opportunities

A. What are the education needs identified via assessment or by local stakeholders?
B. What is the nexus between those needs and projected capacity in the next five years?
C. What are the limitations of the education program? What are the opportunities?

Education Related Objectives and Actions

A. List education objectives from strategic plan
B. List education actions that will advance those objectives from the strategic plan

C. Coastal Training Program

(Mandatory text begin)

The National Estuarine Research Reserve System's mission includes an emphasis on education and interpretation. The Reserve System recognizes it has a responsibility to educate coastal decision makers and supports the Reserve System goals, as defined in the regulations (15 C.F.R Part 921(b)), through the Coastal Training Program:

- Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;
- Conduct and coordinate estuarine research within the system, gathering and making available information necessary for improved understanding and management of estuarine areas.

To sustain these system goals, the 2011-2016 Reserve System Strategic Plan outlines coastal training objectives that support the focus areas of climate change, habitat protection and water quality:

- Increase estuary literacy and promote active stewardship among public audiences through the development and delivery of tools and programs addressing climate change, habitat protection, and water quality.
- Improve the capacity and skills of coastal decision makers to use and apply science- based information in decisions that affect estuaries and coastal watersheds.

The Coastal Training Program provides up-to-date scientific information and skill-building opportunities to coastal decision makers responsible for making decisions affecting coastal resources. Through this program, reserves ensure that coastal decision makers have the knowledge and tools they need to address local critical resource management issues.

Coastal decision makers are defined as individuals whose duties include making decisions that affect the coast and its resources. The target decision-maker groups vary according to reserve priorities, but generally include groups such as local elected or appointed officials, managers of both public and private lands, natural resource managers, coastal and community planners, and coastal business owners and operators. They may also include groups such as farmers, watershed councils, professional associations, recreation enthusiasts, researchers, and more.

Reserves are uniquely positioned to deliver of pertinent information to local and regional decision makers given their place-based nature. Coastal Training Program coordinators know the local people, places, and science are able to skillfully convene training participants and experts to address coastal management issues. Coastal training programs are built upon solid and strategic program documents, including an analysis of the training market and assessment of audience needs. Coordinators then work with the results to identify how their program can best address local and Reserve System priority issues.

Partnerships are integral to the success of the program. Reserves work closely with several other NOAA programs, as well as a host of local partners in determining key coastal resource issues, target audiences, and expertise to deliver relevant and accessible programs.

(Mandatory text end)

Coastal Training Program Context

A. What is the geographic scope of your program?
B. What information has been gained by the program since the last management plan? (e.g. from market analysis and needs assessments or other assessments)
C. Who are the target audiences for reserve coastal training opportunities and why? What do you know about the skills, abilities, and current level of knowledge of the target audiences?
D. What are the priority issues for your reserve that your education program can address and how do they align with the Reserve System Strategic Plan?

Coastal Training Program Capacity

A. What staff, facilities, infrastructure, etc. support your training program currently?
B. What partners will you work with to accomplish your training program?

Coastal Training Program Delivery

A. How will the reserve locally implement and/or align with the system-wide programs (e.g. KEEP, SWMP), national programs (e.g. NSC), and priorities (e.g. NERRS Climate Change Initiative)?
B. What major activities will the training program implement and what methodologies will it employ?
C. How will the training program support or be supported by other programs at the reserve?
D. How will the training program deliver and disseminate results?
E. How does the reserve evaluate the training program currently? Will this change in the next five years?
F. What major impacts or outcomes does the training program want to achieve and what behavior change does it wish to influence?

Coastal Training Future Needs and Opportunities

A. What are the training needs identified via assessment or by local stakeholders?
B. What is the nexus between those needs and projected capacity in the next five years?
C. What are the limitations of the training program? What are the opportunities?

Training Related Objectives and Actions

A. List training objectives from strategic plan
B. List training actions that will advance those objectives from the strategic plan

Administrative Plan

About This Section

The administrative plan is a required element of a management plan and should outline staff roles in administration, research, education, and surveillance and enforcement, per the Federal Code of Regulations 15 CFR 921.13 (a)(2). The administrative plan should outline the means and support necessary to implement the goals and objectives of the reserve. It should provide an overview of the organizational and administrative framework that governs management of the reserve, address the roles and responsibilities of staff, as well as identify strategic partnerships and advisory committees. In effect, the administrative plan supports all other components in the reserve management plan; objectives and actions do not need to be integrated into the strategic plan element given this section will support achieving all reserve goals and objectives.

Specifically, the administrative plan should include: an organizational framework; a staffing plan; a description of strategic partnerships and advisory committees; an administrative plan with objectives and actions. Optional elements could include: volunteer plan; vessel and vehicle plan; communications plan, and additional information about administrative initiatives of the state and reserve that impact the future of reserve operations.

Plan Contents

A. Organization Framework and Management Authorities

This section builds on the 'Introduction to the Reserve' component to provide more information about the state agency administrative structure and management authorities. This section should highlight the mission of the agency and why it is an appropriate match to host the reserve. An organizational chart outlining the current location of the reserve within the state agency aligned with NOAA's management structure should be included; see Figure 9. Additionally, an organizational chart of the reserve should be included.

If applicable, this section should capture any changes in the host agency since designation and the reasons for those changes. It should also include all information about state law, codes, or management authorities that impact the administration of the reserve.

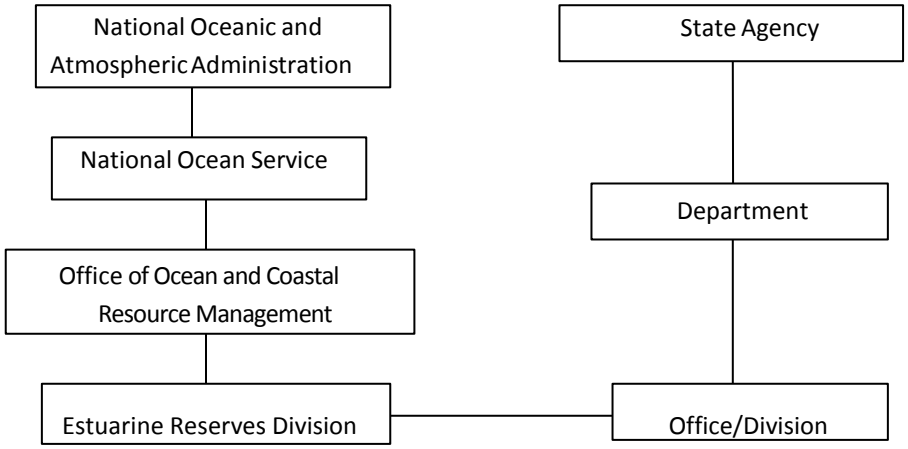
Administrative Plan

__ Organizational framework
__ Organizational charts
__ Current staffing and needs
__ Strategic partnerships
__ Advisory committees
__ Administrative objectives and actions
__ Volunteer plan ♦
__ Vessel and vehicle plan ♦
__ Communications plan ♦

B. Current Staff and Needs

This section should clearly outline the number of staff employed to support reserve programs, as well as their roles and responsibilities. Indicate if employees are full-time, part-time or seasonal and the location of their primary office. Include an administrative chart to visually represent the reserve's staff positions, administrative structure and oversight. If applicable, indicate strategies to secure state funding for core staff positions.

Figure 9. Organizational Relationship



Include detailed information about anticipated staffing needs to better support the mission of the reserve and projected program developments. Outline the roles and responsibilities of these anticipated positions, the goal-based justifications, and reference any supporting documents that recommend these staffing needs (i.e. internal reviews and evaluations findings). If available, include information on how these future positions would be funded.

C. Strategic Partnerships

The administration of a reserve occurs through a collaborative process involving a variety of agencies and organizations at various levels of engagement. Strategic partnerships are those that leverage specific resources to carry out core functions of the reserve and are often associated with facilities, enforcement, or staffing. This section should not be an exhaustive list of all reserve partnerships, but instead briefly describe key partnerships. If applicable, this section could include information about the reserve's Friends group, in particular the role and responsibility of the group in supporting the mission of the reserve.

All Memoranda of Understandings should be included in the appendix of the management plan. If there is a need to compile a complete list of all organizations the reserve current partners with, it should also be included as an appendix.

D. Advisory Committees

Reserve advisory committees are composed of local community stakeholders and assist in guiding the policies and management of the reserve. This section should detail the roles, membership and expectations of the reserve's advisory committee. For example, do committee members provide feedback and recommendations on-site management and implementation strategies; assist in seeking support for Reserve programs; represent the interests of users of the Reserve and its' products, expected to discuss relevant issues with the community and so on. If applicable, provide information about sub-committees or task forces.

Optional additional information about the advisory committees could include:

- How members are appointed and how long they serve
- General meeting structure (i.e. open to the public) and frequency of meetings
- How are decisions made (i.e. consensus)
- Information about the general composition of the committee by
    - A list of the specific organizations/users represented on the advisory committees or
    - A list of members and affiliations from a prior year

E. Objectives and Actions

The objectives and actions developed for the administrative plan should ensure the administrative, operational and financial capacities of the reserve are adequate to effectively implement the goals of the Reserve. Administrative objectives assist in the management of the reserve by addressing the operational needs and plans to maintain and train staff, maintain vessels and facilities, complete administrative processes, as well as work in the community through strategic partnerships and advisory committees. Actions should be designed to effectively and efficiently utilize the existing administrative, infrastructure, fiscal, and human resources.

The objectives and actions developed here likely support and are related to achieving all of the reserve goals and objectives. Hence, they do not need to be integrated into the strategic plan. Reserves should clearly describe why these were crafted and how they move the reserve forward in meeting their goals and objectives. However, reserves may choose to integrate these objectives and actions if administrative issues are a central focus for the next five years. In NOAA's experience, we have found that reserves find it difficult to merge these types of objectives with programmatic objectives because they are central to supporting the entire plan.

North Carolina Reserve: Administrative Goal and Objectives

The North Carolina management plan developed a goal and several objectives that support the administration and operations of the reserve. In their administrative plan chapter they outline strong, relevant activities that will help them achieve their objectives. Reserves may choose to develop an administrative goal or they can simply list objectives within this component that directly support objectives within the strategic plan (*www.nerrs.noaa.gov/Doc/PDF/Reserve/NOC_MgmtPlan.pdf*).

F. Optional Plans That Support Programs and Their Management

1. Volunteer Plan

A volunteer plan can provide guidance for how a volunteer program builds connections with the community and supports reserve programs in meeting their goals and objectives. Volunteers are an invaluable resource to reserves. Considerations for creating a volunteer plan include:

Planning for Volunteers
Prior to starting a volunteer program, it important to assess needs that can be filled by volunteers and determine how the reserve will support the program as it does take a budget and expertise to run an effective program. It will be important to create and market clear position descriptions, including qualifications, purpose, timeframe, expected outcomes and evaluation criteria (if applicable). It will also be important to establish policies and procedures for administration and volunteers so that everyone is clear about what needs to happen before a volunteer can begin and while working.

Recruiting and Organizing Volunteers
Once the reserve establishes why the program should exist and clear functions that can be performed by volunteers, it is time to recruit, screen, interview and place volunteers in appropriate positions aligned with their ability, expertise and interest. It will be important to plan for the number of volunteers that can be adequately monitored and supported. Organizing teams of volunteers for certain areas can be useful to manage volunteers and provides them a network of people with similar interests to maintain engagement and give support to each other. It will be important to consider how the reserve will orient and train volunteers to perform duties and feel safe and productive when doing so. Once trained and performing duties, it will be important to ensure proper supervision, support and evaluation of efforts.

Supervising, Evaluating and Retaining Volunteers
Supervising volunteers takes time and attention to ensure they are effective, safe and happy. It will be important to outline steps for developing an evaluation system to determine whether the complement of volunteers continues to be suited to the reserve. It will also be important to identify ways to recognize the volunteer contributions as this helps to develop a bond with the reserve and ensure continued contribution.

2. Vessel and Vehicle Plan

A fleet of vehicles and vessels can be critical to supporting reserve objectives and activities. A fleet infrastructure plan could help determine when craft need to be repaired and/ or replaced, overseeing maintenance and repair work, procuring new craft and associated equipment, training staff in the proper use and safety protocols for each type of craft and associated equipment, and keeping required records for all fleet craft. If applicable, please identify policies for vehicles, including hybrids and additional energy saving plans.

3. Communication Plan

It is critical to communicate the importance and impacts of reserve efforts, as well as deliver key messages to key audiences regarding protecting and valuing the coastal resources reserves protect. See general areas appropriate for a communications plan below. Considerations for crafting a communications plan include:

Objectives and Target Audiences
Developing clear, measurable objectives is critical to the success of your communication plan. Think about what you want your communications activities to accomplish which directly relates to who you need to be communicating about what – for example, do you want to generate excitement, build awareness, educate on priority issues, maintain positive information flow, secure support for specific initiatives or projects? Identifying who you want to communicate to will help articulate the approach and how they want to receive information. It will be important to prioritize between primary audiences and others to achieve primary objectives.

Approach
It will be important to determine what methods the reserve will employ to reach target audiences. Questions that may help inform approach include: What types of communication media will the reserve use? Will a mix be useful for various objectives? Who will be involved in a successful approach to both internal and external communications? How much time will be focused on various elements?

Key Messages, Tactics, and Costs
Key messages are important to create. Remember to address who, what, when, where, why, and how to convey key information to influential audiences. Messages should be clear, benefit- oriented, and written so that target audiences will understand and relate. It will be important to develop a plan for how to communicate with target audiences and how often. Consider the types of tactics that will be most effective – print, electronic, in-person. It is important to choose substance over flash. Communication messages must be simple, clear, direct and audience-focused—no matter how slickly they are packaged—or they won't be read, heard or understood. It will be wise to set a budget for developing and employing communications strategies and products.

Timeline and Evaluating Success
It will be important to identify key times for targeting messages – are there key times when audiences are more receptive and/or seeking information to make decisions, how long will various efforts be pursued, how will you know when you've reached success? In order to understand the last question, it will be helpful if tangible success measures are identified – are you looking for a percentage change in audience behavior, are you hoping for increased financial support, etc.? Whether successful or not, it will be important to engage audiences and solicit feedback on how to better engage and communicate with them.

Resource Protection Plan

About This Section

The resource protection plan is a required element of a management plan, per the Federal Code of Regulations, 15 CFR 921.13. The general provisions provided by 15 CFR 921.1 state that reserves shall be open to the public to the extent allowed by state and federal law, multiple uses are allowed to the degree compatible with reserve purpose and use levels prescribed in the management plan. Additionally, regulations note that the management plan shall identify uses requiring a state permit, as well as areas where uses are encouraged or prohibited. Protecting the resources of the reserve serves as the foundation for all programmatic efforts and is central to the success of the reserve. It is important for reserves to protect the ecological unit representative of key land and waters within each biogeographic region and maintain it in the face of human and natural stressors that are continually increasing.

This plan should provide a description of the authorities which protect the reserve, allowable and unallowable uses per those authorities, uses requiring a permit, and surveillance and enforcement strategies to ensure appropriate use of the reserve.

Plan Contents

A. State Management and Statutory Authorities

The protection of the reserve relies on state management and regulatory authorities. This section should describe all authorities (federal, state, local and tribal (if applicable)) related to the protection and use of reserve resources. It should include a complete description of rules and regulations that govern access and activities on reserve property. It should also identify key partners in developing and upholding these authorities.

Questions to inform this section include: What are the state, federal, and local regulatory authorities in place to protect the reserve? What rules govern uses and when were these developed? What partners were and/or are involved in maintaining these regulations?

Resource Protection Plan

__ Management Authorities
__ Allowable and unallowable uses
__ Map of allowable uses
__ Surveillance and enforcement capacities
__ Resource protection challenges
__ Resource protection objectives and actions ♦
__ Monitoring and evaluation plan strategies ♦

B. Allowable and Unallowable Uses

This section should describe all allowable and unallowable uses within the reserve, based on the

above authorities, and where they may/may not occur respectively. A map and/or table that provide an overview of these uses are encouraged. Any uses requiring a permit should be identified. A rationale should be provided regarding why there are restrictions in certain areas. Pre-existing uses that occurred prior to designation should be discussed and evaluated if those uses are still occurring to determine compatibility with intent of reserve.

Questions to inform this section include: What are the allowable and unallowable uses in the reserve? Why are these uses allowable and/or unallowable? How were these designations determined? Where do these uses occur? Are there pre-existing uses that are still occurring and are they compatible with the intent of the reserve? If not, how will the reserve resolve these uses? Are there additional policies in development that may limit access in certain areas? When will these be likely to be implemented? Is there a mechanism to communicate allowable uses to users of the reserve?

C. Surveillance and Enforcement

This section should describe the personnel and strategies dedicated to enforcing the management authorities to ensure appropriate uses of the reserve. The plan should clearly outline how violations to specific uses will be addressed via the enforcement network with jurisdiction over these resources. Key partnerships and other land owner protection plans that support the management and protection of the reserve should be described and included within an appendix if directly protecting reserve lands.

Questions to inform this section include: What agencies are responsible for surveillance and enforcement of rules regarding use within the reserve boundary? What is the relationship between the state agency and enforcement officials? Is there a plan in place for surveillance and enforcement? Is there a clear line of communication between applicable reserve staff and enforcement officials? What are the key partnerships important to protecting the reserve? What role do these partners play?

D. Resource Protection Challenges

Maintaining adequate control of reserve resources can be challenging for a variety of reasons. This section should identify uses outside reserve boundaries that potentially impact reserve resources. It should describe how existing authorities and processes protect the reserve and how the reserve interfaces with these uses, e.g., is the reserve involved in reviewing permits for certain activities that may impact the reserve.

Questions to inform this section include: What activities occurring outside or within the reserve boundary impact or may potentially impact reserve resources? How does the reserve ensure these activities are not detrimental to the reserve? How do staff members interface with local entities to monitor and/or approve activities which may impact the reserve? Will reserve staff members be involved in permit review for activities occurring adjacent to the reserve?

E. Objectives and Actions

Like the administrative plan, this plan provides a foundational capacity to support the overarching goals and objectives within the strategic plan and be supported by other program efforts. If applicable, the reserve

can decide to incorporate specific objectives related to resource protection within the strategic plan or they can stand alone as foundational to all other elements within the strategic plan.

F. Monitoring and Evaluation Strategies

In order to effectively monitor whether resources are adequately protected, reserves must consider the following questions: What resource indicators does the reserve use to ensure ecosystem health? How will you monitor allowable and unallowable uses and adjust strategies to ensure protection? What are the frequency, timing and location of those monitoring activities? How does the reserve detect change in both resource and social indicators?

Public Access and Visitor Use Plan

About This Section

The public access plan is a required element of a management plan, per the Federal Code of Regulations 15 CFR 921.13. Public access can be defined as the ability of all members of the community to pass physically and visually to, from, and along the ocean shore, other waterfronts, and over public lands. The ability to enjoy the oceans, bays and rivers is directly related to the ability to reach them. A public access plan must try to allow for the long-term public use and enjoyment of the water and shoreline while minimizing damage to the resources. Depending on the geographic proximity and current access available to visitors, reserves may want to consider topics such as public transit, bike trails, ADA accessibility for all visitor facilities, and signage to ensure visitors can locate accessible areas and follow necessary rules for using resources wisely.

This plan should discuss public uses, opportunities, and challenges within the reserve. Objectives and actions should support public access and positive visitor experiences while maintaining adequate long-term protection of reserve natural and cultural resources.

Plan Contents

The following are key elements to be included within this section of the management plan. Discussion in response to the elements below should be addressed to the best of the reserve's ability given the unique stage and nature of the reserve.

A. Current Public Access

This section should include general information about where and how visitors, researchers, and other interested parties can access the reserve. This section should also include all relevant information and data that supports acceptable limits for public access or carrying capacity. Carrying capacity is the type and level of visitor use that can be accommodated while sustaining the desired resource and visitor experience conditions in the reserve. Visitor experience includes the perceptions, feelings, and reactions a person has while visiting the reserve.

Questions to inform this section include: What are reserve hours of operations and fees? Where are the land and water access points? What is the rationale for current public access structure? What purpose do these access points serve and to whom i.e. target audiences for access? Why are they relevant and important? Which public uses are permitted at these access points? What specific programs support access opportunities? What access is permitted to historical and or cultural areas of significance within the reserve?

Public Access and Visitor Use Plan

__ Current public access
__ Map of public access points
__ Public access challenges
__ Public access and visitor experience opportunities
__ Public access objectives and actions ♦
__ Monitoring and evaluation strategies ♦

If the reserve has conducted carrying capacity studies, the following questions should be addressed: What is the reserve's current carrying capacity? What are the reserve's limits of acceptable change in addressing carrying capacity? Does the reserve have any statistics regarding current attendance records, visitor use impacts and/or results of carrying capacity studies?

B. Public Access Challenges

This section should include an overview of challenges to provide public access and maintain adequate control and protection of natural and cultural resources. Studies on carrying capacity and surveys on visitor use can serve as foundations for future action.

Questions to inform this section include: What and where are the challenges in balancing public access and protection of natural resources? What specific impacts has the reserve seen from these challenges? Does the reserve anticipate exacerbation of these impacts? What changes in demographics do you predict for the future? How do those changes impact planning for the future? Will climate change impacts provide public access challenges? Will these impacts potentially change the nature of access in certain areas? Are there particular species of concern potentially impacted by large groups visiting the reserve at particular times of the year, e.g. breeding season, growing season?

C. Public Access Opportunities and the Visitor Experience

While balancing information from current uses and challenges, this section should describe the future opportunities to increase or decrease access to specific areas of the reserve.

Questions to inform this section include: Who are reserve future target audiences? What has been learned since the last management plan that provides input for this plan? What specific access policies will impact education, stewardship, research, and monitoring programs? Is the reserve trying to increase, reduce, limit public access and visitor use, and why? What are the primary themes that communicate the significance of the reserve to visitors? What strategies does the reserve implement to ensure that those interpretative themes are communicated? How does the reserve connect outdoor visitor use experiences to indoor exhibits?

D. Objectives and Actions

If applicable, this section should provide an overview of the strategic plan objectives and actions that relate to public access and visitor use. It will be important to consider the role of education, interpretation and outreach in managing public access and visitor use.

If applicable, discuss indicators and procedures for monitoring and evaluating these actions to determine if public access should be altered in the future.

E. Monitoring and Evaluation Strategies

In order to effectively monitor and evaluate the success of restoration habitats, consider the following questions: Has habitat function and structure been established to meet targets? Has biodiversity been established to meet targets? What are the long-term monitoring plans? Were methods used appropriate for meeting targets? Were new protocols used and if so, were they effective in meeting targets?

Resources

NOAA's Managing Visitor Use in Coastal and Marine Protected Areas Course: Provides participants with tools to identify and define unacceptable visitor use impacts to natural resources and visitor experiences. Participants of this course will be able to understand the human dimensions of coastal and marine management, apply recreation and visitor use management planning frameworks, identify visitor use issues, including visitor-resource and visitor-visitor impacts, craft a clear problem statement, develop measurable indicators for monitoring impacts and management and set standards for impact acceptability, and implement visitor use monitoring methods and management strategies and tactics.

Managing Visitor Impacts in Parks: a Multi-Method Study of the Effectiveness of Alternative Management Practices: Provides recommendations for outdoor recreation management within protected areas such as parks.

Monitoring and Management of Recreation in Protected Areas: the Contributions and Limitations of Science: Provides examples of significant contributions of science to visitor monitoring and management. It covers the related scientific purposes of explanation, causation, prediction and assessment.

Facility Development and Improvement Plan

About This Section

The facilities plan is a required element of a management plan, per the Federal Code of Regulations 15 CFR 921.13. Reserve facilities provide functional space for reserve work and programming, and serve as the face to the public providing venues for learning and serving as a learning tool themselves. Reserve facilities must face all of the pressures that come with working and building in the coastal zone including withstanding storms, surge, erosion, and elements of wind, salt, sand, humidity among others. Additionally, a changing climate will exacerbate these pressures resulting in increased erosion, frequency and intensity of storm events and associated surge, sea- level rise and associated salt water intrusion. These challenges require reserves to build facilities that will withstand these pressures and serve their intended purpose for the life cycle of the structure. NOAA is encouraging reserves to build new and improve existing facilities so that they are sustainable and resilient.

Facility Development and Improvement Plan

__ Purpose of facilities
__ Current facilities
__ Map of facility locations
__ Facility challenges and gaps
__ Planned facilities, facility upgrades, and exhibits
__ Climate and non-climate stressors
__ Facility descriptions
__ Operations and maintenance manual as appendix ♦
__ Long-term facility plan as appendix ♦

Supporting material is provided in *Appendix 10: Planning for Sustainable Facilities* that expounds on how to assess vulnerability of potential investments, principles for sustainability and resiliency including examples and options, and sustainable building codes and rating systems. Building principles are discussed in detail and considerations, references and resources are provided to help reserves think about how to incorporate sustainable principles into facility planning. Please note that the supporting material for this guidance is more robust than other plan elements because it also supports planning requirements for the NOAA Programmatic Framework for Considering Climate Change Impacts in Coastal Habitat Restoration, Land Acquisition and Facility Development Investments.

This plan should discuss the reserve's philosophy on sustainable building, purpose and description of existing facilities, facility challenges and gaps, and plans for new facilities, facility upgrades, and exhibits. Like the administration plan, facilities support reserve operations and reserve staff ability to meet objectives and actions within the strategic plan. Reserves may either choose to craft specific objectives for this plan that do not need to be incorporated into the strategic plan, or they may simply identify facility priorities. Either approach is acceptable, but there should be a clear link between facility plans and the achievement of reserve goals and objectives.

Plan Contents

A. Purpose of Facilities and Construction Philosophies

This section should describe the overall purpose and vision for what the facilities on the reserve campus will help achieve. Reserves may see themselves as centers for regional excellence in providing services; they may be local experts with a lower profile; and/or they may have facilities that showcase sustainable building approaches and practices. Green or sustainable building is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building's life cycle from siting to design, construction, operation, maintenance, renovation and deconstruction. Building in this way reaps not only environmental, but economic and social benefits.

This section should describe the philosophies that the reserve ascribes to, as well as the state laws, regulations and initiatives that support sustainable building.

Questions to inform this section include: What are the values of reserve facilities to the staff and public? What are the general reserve philosophies around construction, operations and maintenance of reserves facilities? What state laws, regulations, and/or initiatives support sustainable building? What elements of sustainability are most important for the reserve to achieve?

B. Description of Current Facilities

This section should describe each facility on the reserve campus. Descriptions of stationary and traveling exhibits should be included.

Questions to inform this section include: What is the purpose of the facility? Where is it located? When was it constructed? What are the components within the facility (if applicable)? How is the facility used and by whom? Is there visitor use and capacity data to support these facilities? How does the facility employ sustainable building principles? Are there plans to upgrade the facility to improve sustainability and operational efficiency? If so, these should be described generally in this section, but more specifically in the "Planned Facilities and Facility Upgrades" section as appropriate.

A map should be included that identifies the location of all current facilities. Additionally, include photos of major facilities.

C. Facility Challenges and Gaps

This section should describe the projected challenges that facilities will face, whether that is from age, use, natural or anthropogenic stressors, including climate impacts, and provide a rationale and basis for new facility siting and upgrade priorities.

Questions to inform this section include: How old are the current facilities? Which ones are in need of repair? How old are the current systems within the building? What can be done to make them more efficient and supportive? What are the major stressors likely to affect facilities? Will increased precipitation, lake or sea level change, or frequency and intensity of storms be likely scenarios? Are facilities prepared for potential impacts?

This section should also describe the current facility gaps and needs as demonstrated through some form of needs assessment. These needs should be grounded in data – capacity, visitor use, functional needs, etc. – that identify the challenges, that if overcome, support the vision of the program and are consistent with elements of a standard reserve and sustainable reserve guidelines. (Dewberry Design, 2004) Much of this data may come from the needs and gaps information identified in the "Program Foundations" section.

Questions to inform this section include: What are the key programmatic technical and structural needs for reserve operations? What staff, visitor or stakeholder needs are not currently being met? What are the projected needs of those audiences? How can the reserve increase operational efficiency and reduce resources to meet those needs?

D. Planned Facilities

This section should describe the facility and/or facility upgrades that the reserve wants to undertake during the period of the management plan that meets the identified needs stated above. Detailed explanation of these facilities should include considerations for siting (if applicable), sustainable design principles, and climate change impacts. Please refer to information generated from the 'Introduction to the Reserve' component to inform development of this section.

1. Climate and Non-climate Stressors

In order to effectively plan for new facilities and/or the most appropriate facility upgrades, reserves need to consider siting for optimal sustainability, survivability and accessibility while also thinking hard about projected use and utility for staff and partners.

Questions to inform this section include: What are the major stressors likely to affect siting of new facilities? Will increased precipitation, lake or sea level change, or frequency and intensity of storms be likely scenarios? Will temperature ranges be shifting? What type of scenario planning has the reserve done to appropriately site new facilities? What are the results of that work? What are the projected uses and lifespan for the facility?

Hence, part of planning for future facilities, should include the following:

- Identification of the projected climate change impacts that will affect the investment. Stressors and their subsequent impacts that should be addressed include changes in precipitation, air temperature, change in sea level or lake level, and changes in storm frequency and intensity. Please refer to Appendix 6, Summary of Observed and Projected Regional Climate-related Changes, and Appendix 7, Summary of Climate Change Phenomena with Observed and Projected Changes, as well as local information relevant to understanding infrastructure sensitivity, exposure and/or vulnerability. Climate data and scenario tools focusing on sea level change can be found in the "Introduction to the Reserve" resources section as well as in Appendix 10, Planning for Sustainable Facilities.

- Identification of the life span of the project based on these scenarios and projected utility. It is the responsibility of project principals to identify the methods used to determine the life span of the project based on scenarios and expected utility of the structure. However, a 30 year life span is suggested for all major facilities.

- Gauging the extent to which the projected impacts will affect project objectives and benefits over the life span of the project. By reviewing all of the factors above, determine the risk and appropriate investment for long-term facility projects, as well as potentially shorter-term upgrades and improvements in existing facilities.

- Making determinations about the extent of the climate impacts over time based on one or more climate change scenarios. We advise applying a multi-scenario analysis based on recommendations outlined by the National Research Council, the U.S. Global Change Research Program, and the Intergovernmental Panel on Climate Change.

2. Facility Descriptions

Identify each project in order of priority and describe why the project is a priority for the reserve. In order to describe these projects accurately, pre-work and planning will likely be a necessity. If the reserve has already developed a facility master plan, please draw from this document. For each project describe the following:

- Purpose and estimated life of the facility.
- Sustainability goals, targets and evaluation mechanisms.
- Elements of the project that support Reserve System Sustainable Building Principles.

  Cost estimate for each proposed facility which include associated costs for environmental assessment, if applicable. An environmental assessment will need to be prepared if the project occurs on undisturbed land and/or if it is expected to have significant effects on the environment. Each project will be evaluated on a case by case basis.
- Description of associated signage and/or exhibits that describe the sustainable principles and features of the building if open to the public.
- Description of forecasted maintenance costs and state commitment to supporting these costs.

The Reserve System Sustainable Building Principles, adopted from "Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings" set forth in the Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding (2006), are discussed in detail along with examples in *Appendix 10: Planning for Sustainable Facilities*. With regard to addressing bullet three above, please refer to Appendix 10 which contains supporting information corresponding directly with the questions below related to each building principle.

Reserve System Sustainable Building Principles

- Integrated design and sustainable siting
- Water efficiency
- Energy efficiency
- Materials and resource conservation
- Indoor environmental quality
- Operational efficiency

Integrated Design and Sustainable Siting

All projects should employ a collaborative, integrated planning and design process that starts at the earliest stages of the design process, includes a variety of expertise relevant to each stage, and maintains an integrated project team throughout all stages of the project considering the life cycle of the project.

Questions to inform integrated design include: Will a collaborative integrated planning and design process be used? Will performance goals for the green principles be established for the project? What are there constraints to sustainable building? Are there local ordinances that will make this challenging?

The coastal zone presents a harsh environment for facilities and climate change will present new and exacerbate existing stressors. Projects should account for climate change impacts, as well as elements such as natural light, habitat preservation, stormwater, and factors affecting accessibility.

Questions to inform siting include: Are potential sites for future facilities at risk to climate impacts and/or natural hazards? Are potential sites for future facilities confined to the reserve buffer areas? What are the state and local considerations for reserve facility siting? Are you considering the full spectrum of lighting needs and impacts? How do you plan to protect existing native habitat or restore a site with native species? How do you plan to address stormwater discharges on the site? Are you considering implementing Low Impact Development (LID) practices for stormwater? Are you considering proximity to community features and transportation issues?

Mission-Aransas Reserve: Building Sustainably on the Texas Coast

In 2011, the Mission-Aransas Reserve celebrated the opening of its new Estuarine Research Center on the University of Texas Marine Science Institute campus. Several years in the making, the Reserve coordinated a collaborative approach bringing together an interdisciplinary team of engineers, architects and reserve staff to design and construct a headquarters and research facility to withstand harsh coastal conditions (i.e., high winds, salt, torrential rains and storm surges) and meet specific sustainability goals. Their first challenge was working within a culture where facilities development practices and norms did not necessarily incorporate green principles.

To address conditions on the coast, the facility is designed to sacrifice the ground floor housing non-critical building functions, an exterior rated to handle 130mph winds and using concrete additives to prevent chloride penetration to name a few. In addition, the grounds are being irrigated by air conditioning condensate and rainwater captured from the roof to reduce impacts on municipal water systems. During the construction, 83% of the construction waste was recycled and 82% of the materials used originated in Texas. Taken together, the project team incorporated sustainable design and construction practices that qualified for Leadership in Energy and Environmental Design (LEED) Silver certification.

Throughout the project, the reserve found that building sustainability with low carbon footprints is difficult to do on the coast. However, commitment from all the partners to sustainable designs and practices was critical to achieving a facility that is durable, versatile and sustainable. For more information, contact the Mission-Aransas Reserve.

Water Efficiency

Water is a precious commodity and given availability and infrastructure stressors, we must decrease the amount of water used and increase dependence on water that is collected, used, purified, and reused on-site. Try to employ water saving mechanisms as much as feasible.

Questions to inform water efficiency include: How will you incorporate xeriscaping? Are you being strategic in use of turf areas as part of the facility landscaping? How will you incorporate efficient irrigation systems and schedules? What water use reduction practices will you incorporate?

Energy Efficiency

Buildings in this country use a significant amount of energy most of which is produced from nonrenewable, fossil fuel resources which are contributing to greenhouse gas impacts. It is imperative that reserves reduce their energy demands. It is worth re-emphasizing an integrated project team since reducing energy demand requires a team including a variety of building experts to do this effectively.

Questions to inform energy efficiency include: How will you ensure an integrated planning team and process? How will you set energy efficiency targets and measure them? How will you reduce heating, cooling and lighting loads? How will you employ renewable or high–efficiency energy sources? How will you identify efficient HVAC and lighting systems? How will you reduce non-regulated energy consumption? How will you optimize system controls?

Great Bay Reserve: Stepping Out on Geothermal and Solar

The Great Bay Reserve broke new ground for the New Hampshire Public Works Department as the first state facility to install a geothermal system. Due to the department's lack of experience and the fact that they had to go with the lowest bidder who then subcontracted out various parts, the system was delivered with multiple challenges which required time and money to fix. A key lesson here is to do as much homework as possible to make up for the experience your agency may lack. While states must follow certain contracting rules, at a minimum, try to ensure that there is one company, ideally one with local expertise, to manage the entire project to ensure a seamless product and installation. On the flip side, the solar roof was a great success because they hired a local contractor who designed and installed the system. The bid process was a success as well since they bid for solar with a roof component vs. bidding for a building with a geothermal component. The reserve is already seeing about 20% energy saving. The roof is projected to last about 40 years, almost twice that of an asphalt roof. Beyond energy and materials savings, staff and visitors love coming to a green building. For more information, contact the Great Bay Reserve.

Materials and Resource Conservation

Preventing and recycling waste reduces depletion of natural resources, creates less pollution by reducing manufacturing and transportation-related emissions, uses less energy and water compared to many virgin material product manufacturing processes, and reduces greenhouse gasses by using less energy for manufacturing and transportation. It is important to purchase products and employ processes that do not pollute or unnecessarily contribute to the waste stream, do not adversely affect health, and do not deplete limited natural resources.

Questions to inform material and resource conservation include: Do you have a plan for managing construction waste? Have you evaluated environmental trade-offs for materials and resources? Have you considered recycled materials and deconstruction assemblies as much as possible? Have you considered using renewable, locally produced and low energy materials to the full extent possible?

Indoor Environmental Quality

Indoor environmental quality encompasses indoor air and water quality, aesthetics, ergonomics, acoustics, lighting, and electromagnetic frequency levels. It is important to value decisions about these items and engage building occupants in making these decisions, as well as allow for personal control of these items where practicable.

Questions to inform indoor environmental quality include: How will you achieve a comfortable and healthy air and water quality for occupants? How will you reduce pollutants inside the facility? How will you ensure a productive work environment?

Operational Efficiency

Operational Efficiency will be a direct result of taking all other sustainable building principles into account for new buildings. a whole building design approach ultimately yields the best returns in reduced impact to the environment, efficient operation, and effective work environment.

Questions to inform operational efficiency include: Have you identified operational efficiency targets, especially for energy and water efficiency? Have you created a schedule for assessing those targets? Have you developed an operations and procedures manual so that systems can be cared for appropriately? Have you identified personnel to monitor and maintain the facility?

E. Facility Upgrades

All reserves should try to evaluate where sustainability can be improved for each facility on the reserve campus. Where possible, audits to assess water and energy inefficiencies should be performed to understand usage and options for minimizing usage. This information should directly inform efforts to address the Reserve System sustainable building principles.

Questions to inform this section include: What are the most significant energy and water sinks at the reserve? What actions can be implemented to reduce energy and water usage? What actions can be taken to address the other sustainable building principles, including exterior work associated with landscaping/xeriscaping? What are the sustainability goals and targets for these specific upgrades? How will the reserve evaluate the efficacy of the improvements over time? How will the reserve maintain upgrades and ensure systems and improvements remain efficient?

F. Exhibits

Reserve exhibits provide important passive and active learning opportunities for a variety of visitors about the dynamic processes and benefits of estuaries, as well as the pressures they are under and what the public can do to protect these resources. Exhibits should be theme based, address reserve priority issues, and convey the reserve's key messages. Exhibits should be evaluated periodically to determine how to incorporate new information and best engage audiences.

This section should include a general description and cost estimate for new exhibits and/or exhibit upgrades based on some form of needs assessment. When possible, use sustainable materials, and where applicable discuss sustainable building principles.

Additionally, interpretive materials and signage can be found both inside facilities as well as outside within demonstration sites, land trails, water trails, amphitheaters, etc. Consider the range of experiences available to visitors, and provide description of planned outdoor interpretive materials and/or exhibits. Cost estimates should be included and these activities should also be based on projected visitor use needs and impacts.

References

Dewberry Design Group Incorporated (2004) National Estuarine Research Reserve System Standard Reserve

Dewberry Design Group Incorporated (2004) National Estuarine Research Reserve Sustainable Design Guidelines

Note: a full suite of references, tools, and resources can be found in Appendix 10 regarding building codes and standards, climate change tools, and sustainable building principles.

Land Acquisition Plan

About This Section

The land acquisition plan is a required element of a management plan, per the Federal Code of Regulations, 15 CFR 921.13. Estuaries, and their associated habitats, offer numerous and diverse benefits to society and natural systems. Some of these benefits include storm buffers to protect property from hurricanes; nurseries for commercially important marine species; areas for to enjoy for recreation and aesthetics. However, human development has significantly eliminated or degraded the habitats that provide those societal values. to address the conservation of coastal habitats, the U.S. Commission on Ocean Policy in 2004 recommended that each state identify priority coastal habitats and develop plans, in partnership with willing landowners, federal agencies and others, for coastal and estuarine land conservation.

NOAA supports this recommendation through several acquisition investment tools under the Coastal Zone Management Act of 1972, as amended, including the Coastal Resource Improvement Program authorized under Section 306A, the Coastal and Estuarine Land Conservation Program under Section 307A, and the Reserve System Land Acquisition and Construction Program under Section 315. Each of these programs provides an opportunity to conserve coastal habitats.

This plan should identify ecologically key land and water areas for acquisition, prioritize these areas according to their relative importance for specific values, and describe strategies for establishing adequate long-term state control over these areas.

Plan Contents

A. Acquisition Values

This section should describe the reserve's acquisition values. It is helpful to understand these values as they form the basis of an acquisition plan. Essentially, the reserve should identify those ecological, historical, conservation, cultural, recreational, and other values that are important when considering future acquisitions. These values should be connected to the reserve's management plan goals and objectives.

Questions to inform this section include: What broad acquisition values are important to the reserve? Do the acquisition values match the reserves' management goals and objectives? Has the reserve considered non-ecological values?

B. Priority Acquisition Areas

This section should describe priority areas targeted for potential future acquisitions. To support the identification of these priority areas, the reserve must include a description of the criteria used to prioritize areas, the prioritization process used, and any additional factors that influenced the selection of these areas. These areas do not need to be at the parcel level, but at a level appropriate for the reserve.

1. Descriptions of Priority Acquisition Areas

The description of each priority area should include key habitats, existing ecological value, and proposed value to the reserve's ecological unit and/ or programming. A map should be included of all acquisition areas, within the context of the reserve boundary to understand if priorities are contiguous and/or connected to the reserve via water corridor. Each target acquisition area description must be sufficient to reference when developing potential land acquisition grant applications.

Questions to inform this section include: Are the acquisition areas adjacent to existing reserve boundaries (core or buffer)? Is there sufficient existing information available to describe each area? What are the key habitats within each area? How are these areas contributing to protecting and/or enhancing the ecological unit and/or programming at the reserve? Does the reserve have the capability to produce high quality maps of the areas? What key values are supported through the targeted areas?

Optional Elements for Priority Acquisition Areas the reserve could enhance their priority area descriptions by including maps of important non-ecological acquisition values within priority areas. This supporting visualization could identify important cultural resources; access pathways, consumptive and non-consumptive recreation uses, historic structures, education potential, etc.

2. Prioritization Process and Criteria

It is optional for the reserve to describe the prioritization process used to identify and rank the acquisition areas. Key to this process is the identification of ranking criteria. The criteria developed by a reserve should incorporate climate and non-climate factors into the prioritization process. These criteria are typically created by the reserve staff with input from partners and the reserve advisory board and are linked tightly to objectives within the reserve strategic plan. Benefits of creating criteria include:

Land Acquisition Plan

__ Reserve Acquisition Values ♦
__ Priority Acquisition Areas
__ Description of acquisition areas
__ Map of acquisition areas
__ Prioritization process ♦
__ Climate and non-climate stressors
__ Map of non- ecological acquisition values within priority areas ♦
__ Priority Areas Acquisition Strategy
__ Tract acquisition strategy
__ Tract ecological and/or programmatic values
__ Preferred methods for establishing state control
__ Fair market value estimates
__ Potential acquisition partners♦
__ Funding sources ♦
__ Estimated acquisition timeline
__ Map detailing land uses on public and private tracts outside the reserve boundaries ♦
__ Management and/or stewardship considerations for acquisition priorities ♦
__ Description of collaborative process used in joint acquisition projects ♦

- Help reserve managers, staff and partners visualize the conservation priorities
- Provide a strategic approach to conserving ecosystem functions and services
- Improve ecosystem and community resilience to climate and weather impacts
- Leverage partners in support of reserve priorities
- Improve the management of investment risks

Questions that inform this section include: Has the reserve identified a process or strategy for acquiring new areas? What ranking criteria does the reserve use for prioritizing acquisition areas? Is the prioritization process linked to the reserve management plan or other conservation priorities within the state? Has the reserve sought the input of the Reserve Advisory Board or other stakeholders? Has the reserve developed criteria that account for climate and non-climate factors?

3. Factoring Non-Climate and Climate Stressors into Acquisition Planning

Historically, acquisition planning looked at a variety of anthropogenic and natural stressors to support the prioritization process. Given the limited resources of states and land trusts, this process is useful in identifying targets of future land conservation investments. Some of the types of stressors considered in the past include the threat of development, invasive species, land zoning, etc. Climate-related stressors have not been commonly factored into this process.

in 2010, OCRM and the Office of Habitat Conservation jointly developed the NOAA Programmatic Framework for Considering Climate Change Impacts in Coastal Habitat Restoration, Land Acquisition and Facility Development Investments, which identifies a framework for considering climate change impacts in planning and decision-making for coastal investments in restoration, facilities development and land acquisition. This framework provides that new or updated acquisitions plans, that are part of reserve management plans, must integrate climate considerations.

Reserves should create a set of climate considerations or criteria that are reflected in the prioritization of acquisition areas. Climate-related criteria developed by the reserve should be applied equally to the prioritization process rather than outweighing other values or factors. When factoring in climate stressors the reserve should also consider short and long-term impacts. Some examples of climate stressors used to develop criteria might include changes in relative sea or lake levels; changes in storm intensity, and changes in precipitation patterns. (*Coastal and Estuarine Land Conservation Program Guide, 2011*)

Example Climate Stressor-Impact Links for Acquisition

Stressor	Short-term Impact	Long-term Impact
Sea Level Rise	↑ Inundation, ↑coastal erosion, Δ salinity, functional Δ in habitats	disappearance of habitats, Δ species diversity, functional Δ in habitats, habitat migration
Storm Intensity	↑ storm surge, ↑coastal erosion	damage to key habitats, Δ species diversity
Storm Intensity	↑↓drought, Δ salinity, Δ sediment and pollutant loadings, ↑flooding	Δ water quality, Δ species diversity, functional Δ in habitats

In addition to impacts, reserves should value any potential ecological benefits derived from climate stressors. Benefits could include creating habitat migration corridors, creating a refuge for sensitive species, and buffering for storms.

When identifying and describing climate and non-climate stressors, consider the following questions to inform this section: What climate stressors are most relevant to the reserve? What are the potential short and long-term impacts linked to the stressors? How will already identified acquisition priorities be impacted by climate stressors? How can the reserve maintain the ecological unit with key acquisitions? Are there other climate change planning documents applicable to the reserve acquisition plan? What adaptive benefits or values are important to the reserve when addressing climate impacts? What climate criteria are considered in the prioritization of acquisition areas?

Example of Prioritization Criteria for Climate Change Considerations Include:

- Degree of sensitivity of the area to locally relevant climate change impacts
- Impact to area's primary acquisition values
- Resilience of the area to climate impacts that could include:
  - Connectivity of habitats to allow for species migration
  - Protect key ecosystem features that play a significant role in maintaining system functions and natural processes
  - Conserve habitat and species diversity
  - Reduce anthropogenic stressors to existing habitats and conservation values
- Exposure to climate impacts over time. This could mean a 30 year time horizon but ideally a 50 or 100 year time horizon should be considered.
- Elevation, especially important in coastal areas impacted by sea level change

What non-climate stressors are most relevant to the reserve? What are the potential short and long-term impacts linked to the stressors or threats? How will already identified acquisition priorities be impacted by these stressors? What adaptive benefits or values are important to the reserve when addressing non-climate impacts? What non-climate criteria are considered in the prioritization of acquisition areas?

Example of Prioritization Criteria for Non-climate Considerations Include:

- Immediate threats of development
- Impact to area's primary acquisition values
- Resilience of the area to anthropogenic impacts that could include:
    - Connectivity of habitats to allow for species migration
    - Protect key ecosystem features that play a significant role in maintaining system functions and natural processes
    - Conserve habitat and species diversity
- Exposure to invasive species impacts over time
- Existing zoning practices
- Visitor uses impacts

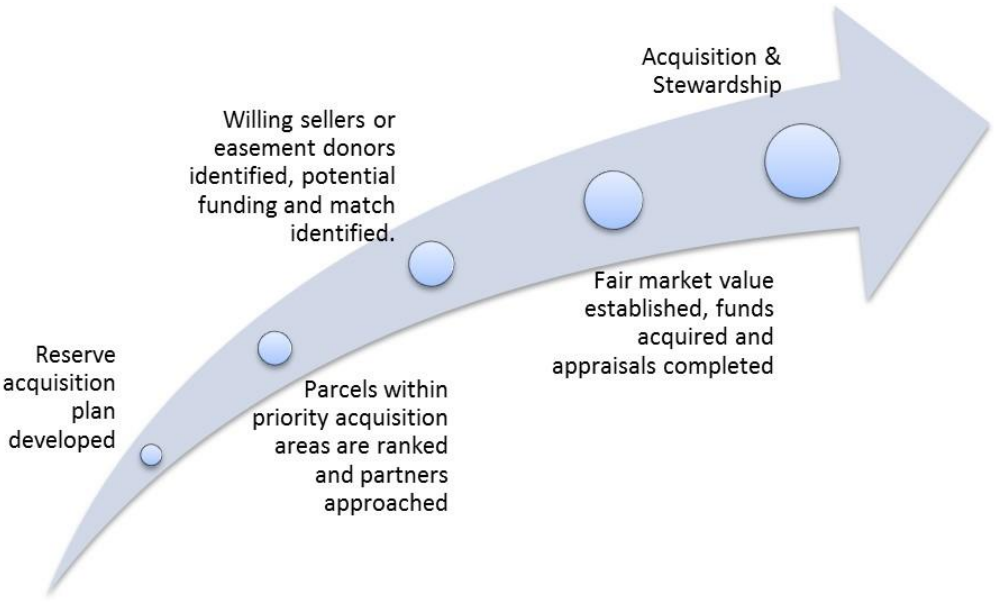
C. Priority Areas Acquisition Strategy

Once priority acquisition areas have been established, the reserve should consider how it will acquire lands and waters within an acquisition area. Tracts within larger areas identified should be identified to the best of the reserve's ability. Ranking priority tracts targeted for acquisition provides reserves the opportunity to efficiently allocate limited acquisition resources to land or waters that best support ecological functions and/or programmatic goals and objectives laid out in the management plan. A table or list of the ranked areas should be included in the plan.

The reserve should describe the strategy or process used for establishing long-term protection to ensure a stable environment for research and education within acquisition areas. These strategies may be stated generally as they may be applied to all acquisition areas; however, if knowledge of a particular strategy is applicable to specific smaller areas or tracts, then that should be identified. If applicable, any required state level acquisition strategies should be described in this section.

It will also be important to understand how these acquisition strategies are consistent with federal and state requirements and processes, as well as if acquisition projects are consistent and complementary to other federal and state acquisition program plans, e.g. Coastal and Estuarine Land Conservation Plans. The coordination with the state Coastal and Estuarine Land Conservation Program plan should be specifically discussed, as well as coordination with other relevant conservation plans linked to reserve land- owning partners.

> *Note: the reserve may choose to not identify specific parcels to target for future acquisition under the plan. These parcels can be grouped together into tracts or subareas for the purpose of creating an acquisition strategy. In most cases, reserves choose not to identify targeted parcels due to local considerations.*



For each ranked priority area, and if possible, the tracts within the larger area, the following should be identified and described:

- Acquisition strategy
- Ecological and/or programmatic values
- Preferred method for establishing state control should
- Fair market values within acquisition areas
- Potential acquisition partners
- Potential funding sources
- Acquisition timeline; and other supporting information, as applicable

Questions to inform this section include: Has the reserve discussed pros and cons of various processes or strategies for acquiring new tracts/areas? Does reserve staff understand different mechanisms for acquisition? Has the reserve considered the subsequent stewardship of areas and parcels targeted for acquisition? What is the reserve's timeline for acquisition of selected priority areas within a 5-year timeframe? How does "core" verse "buffer" impact acquisition planning? Who are the reserve's potential partners or sources of match for acquisition projects?

1. Tract Acquisition Strategy

The reserve should briefly describe the strategy or process used for establishing long-term protection to ensure a stable environment for research and education. Various strategies may be of value; for example, reserves could focus at a landscape scale (i.e. Green Infrastructure) or use a threat-based approach, using reserve stressors like land conversion or development as a key attribute.

2. Tract Ecological or Programmatic Values

The reserve should describe the ecological or programmatic values for the tracts within each prioritized area, or per area as applicable. Identifying these values for individual tracts will help the reserve rank tracts for future acquisition opportunities.

3. Preferred Methods for Establishing State Control

According to Reserve System regulations, a reserve must establish adequate state control over new areas acquired for inclusion into the reserve boundary. Specifically, per 15 CFR 921.13:

> In selecting a preferred method(s) for establishing adequate state control over areas within the proposed boundaries of the reserve, the state shall perform specific steps for each parcel determined to be part of the key land and water areas (control over which is necessary to protect the integrity of the Reserve for research purposes), and for those parcels required for research and interpretive support facilities or buffer purposes.
>
> **(A)** Determine, with appropriate justification, the minimum level of control(s) required [e.g., management agreement, regulation, less-than-fee simple property interest (e.g., conservation easement), fee simple property acquisition, or a combination of these approaches]. This does not preclude the future necessity of increasing the level of state control;
>
> **(B)** Identify the level of existing state control(s);
>
> **(C)** Identify the level of additional state control(s), if any, necessary to meet the minimum requirements identified in paragraph (a)(7)(i)(a) of this section;
>
> **(D)** Examine all reasonable alternatives for attaining the level of control identified in paragraph (a)(7)(i)(C) of this section, and perform a cost analysis of each; and,
>
> **(E)** Rank, in order of cost, the methods (including acquisition) identified in paragraph (a)(7)(i)(D) of this section.(ii) an assessment of the relative cost-effectiveness of control alternatives shall include a reasonable estimate of both short-term costs (e.g., acquisition of property interests, regulatory program development including associated enforcement costs, negotiation, adjudication, etc.) and long-term costs (e.g., monitoring, enforcement, adjudication, management and coordination). In selecting a preferred method(s) for establishing adequate state control over each parcel examined under the process described above, the state shall give priority consideration to the least costly method(s) of attaining the minimum level of long-term control required.

As a result, the reserve will need to identify the method(s) or mechanism(s) of acquisition which the state proposes to use to establish adequate long-term state control over areas targeted for acquisition. Some of the acquisition mechanisms potentially available to reserves include:

- Fee Simple – absolute title to land, free of any conditions, limitations, restrictions, or other claims against the title, which one can sell or pass to another by will or inheritance. A fee simple title has a virtually indefinite duration.

- Conservation Easement – a legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. It allows landowners to continue to own and use their land, and they can also sell it or pass it on to heirs. Examples of acquired easement rights include riparian, subsurface mineral, agricultural, residential development, viewshed, and groundwater.

- Donation – an outright donation of land to a trust or federal, state, or local governments that may provide the donor with a charitable income tax deduction and a reduction in the value of one's taxable estate.

Mission-Aransas Reserve: Stewardship Considerations at Fennessey Ranch

As part of the designation of the Mission-Aransas Reserve in 2006, a conservation easement was acquired on a private working ranch that allows multiple uses including hunting, fishing, nature tours, and cattle ranching, among others. Supporting these diverse business ventures, the ranch includes diverse habitats from freshwater wetlands, riparian corridors and coastal prairie. All these habitats support a wide range of fauna and flora, including over 400 species of birds.

The conservation easement provides the legal foundation for the collaborative management of the property between the reserve and the property owners. a joint management plan was developed that allows for the generation of revenue from compatible uses and ensures that the conservation values of the ranch will continue to support wildlife, biodiversity, as well as, reserve research and education opportunities well into the future. For more information: *www.missionaransas.org*

4. Fair Market Value Estimates

Reserves should look at the fair market value of any property interest within the prioritized acquisition areas. Ownership and fair market values of tracts can be stated in general terms within the plan. It is recommended that individual tract ownership not be identified.

5. Potential Acquisition Partners

If feasible, the reserve can identify potential acquisition partners. These could include a variety of interested local, regional, or national land trusts (e.g., the Conservation Fund, the Nature Conservancy, Weeks Bay Foundation, the Elkhorn Slough Foundation), state land management agencies, municipalities, local governments, and reserve Friends groups. Partners can be valuable assets to a reserve by

providing real estate expertise, conducting property appraisals, contacting willing sellers, offering financial and legal assistance, and monitoring easement properties among others.

Weeks Bay Reserve: Leveraging Partners to Acquire Land

In 2010, a diverse partnership secured the acquisition of 820 contiguous acres of forested wetland habitats adjacent to the Weeks Bay Reserve. A diverse coalition comprised of the Conservation Fund, Weeks Bay Foundation, Baldwin County Commission, Alabama Forever Wild through the Alabama Department of Conservation and Natural Resources (ADCNR), and the National Oceanic and Atmospheric Administration (NOAA) contributed to the success of the project.

To acquire the property for conservation purposes, ADCNR brought together funding from different sources including NOAA, Forever Wild, and Coastal Impact Assistance Program. Working with ADCNR, the local and national land trusts became the contracting entity with the willing seller. In that role, they researched the title and completed an appraisal of the property. Without the contributions of the various partners, the reserve would have not been able to acquire property. The resulting federal, state, local and land trust partnership has made a significant contribution to the conservation of coastal habitats and contributes to improved public access, water quality, and opportunities for research and education. These partnerships led to the largest addition to the reserve since its designation in 1986.

6. Funding Sources

If feasible, the reserve can identify potential sources of acquisition funds. These could include potential sources of matching funds. Funding sources could be federal, state, foundation, or private. Common examples of funding sources are provided in the tools and resources section.

7. Estimated Acquisition Timeline

The plan should include a schedule estimating the time required to complete the process of establishing adequate state control over parcels within priority acquisition areas.

Optional Elements Supporting Priority Area Acquisition Strategy
The Reserve could enhance their priority area descriptions by including optional maps detailing the range of land uses on public and private parcels within the reserve watershed and priority acquisition areas. Looking towards the future, the reserve should detail some of the potential management and stewardship considerations for areas or tracts post-acquisition. These management considerations should link to the reserve's management plan and restoration plan (if applicable). In addition to looking at potential partners, the reserve could also detail the collaborative process it plans to implement with those partners for joint acquisition projects.

References

National Oceanic and Atmospheric Administration (May 2010). Programmatic Framework for Considering Climate Change Impacts in Coastal Habitat Restoration, Land Acquisition, and Facility Development Investments.

U.S. Commission on Ocean Policy (2004) *an Ocean Blueprint for the 21st Century - Final Report*. Washington, DC, 2004. ISBN#0–9759462–0–X

Tools and Resources

NOAA's Habitat Priority Planner: a GIS tool to help identify and prioritize areas for conservation, restoration, and planning.

NOAA's Sea Level Rise and Coastal Flooding Impacts Viewer shows how various levels of sea level rise will impact coastal communities. The current project areas include Mississippi, Alabama, and parts of Texas and Florida, with additional coastal counties to be added in the near future. Visuals and the accompanying data and information cover sea level rise inundation, uncertainty, flood frequency, marsh impacts, and socioeconomics.

Funding Opportunities

U.S. Department of Agriculture - Forest Legacy Program: Grants available to help landowners, state and local governments, and private land trusts identify and protect environmentally important forest lands that are threatened by present and future conversion to non-forest uses. The Forest Legacy Program is designed to assure that both traditional uses of private lands and the public values of America's forest resources are protected.

U.S. Fish and Wildlife Service's North American Wetland Conservation Act Program: Grants are available to fund conservation of wetlands and wetland-dependent fish and wildlife (waterfowl) through acquisition, restoration and/or enhancement. Grants may be provided directly to state, local governments, and non-profit organizations. This program strongly prefers to fund diverse conservation partnerships.

U.S. Fish and Wildlife Service's Coastal Wetland Grant Program: Grants are awarded to Great Lakes and coastal states and trust territories for projects that restore, acquire, manage, or enhance coastal lands and waters. Projects must provide for the long-term conservation of such lands and waters and the fish and wildlife dependent on them. The Coastal Grants Program gives priority to the restoration of barrier islands associated maritime forest, coastal wetlands ecosystems, endangered species, anadromous fish species and to the building of financial and cooperative, private, and governmental partnerships.

U.S. Fish and Wildlife Service's Endangered Species Recovery Lands Program: Grants are provided to states and territories for acquisitions of habitat that support approved recovery plans.

Natural Resources Conservation Service (NRCS) Grant Programs: The NRCS has a number of cost-share/grant programs that involved acquisition of conservation easements including the Conservation Reserve Program, Wetland Reserve Program, and Conservation Reserve Enhancement Program. The Wetland Reserve Program provides technical and financial assistance to eligible landowners to address wetland, wildlife habitat, soil, water, and related natural resources concerns on private lands in an environmentally beneficial and cost-effective manner. The program provides an opportunity for landowners to receive financial incentives to enhance wetlands in exchange for retiring marginal land from agriculture. This program involves the establishment of permanent or 30-year conservation easements or restoration cost-share funds.

NOAA's Coastal and Estuarine Land Conservation Program: Grants to state and local governments to purchase significant coastal and estuarine lands, or conservation easements on such lands, from willing sellers.

NOAA's National Estuarine Research Reserve System PAC (Procurement, Acquisition, and Construction): Grants to state host agencies of reserves to support land acquisition for projects identified in approved reserve management plans.

Resource Manipulation Plan

About This Section

The resource manipulation plan is an optional element of a management plan, per the Federal Code of Regulations, 15 CFR 921.13, and should be included when resource manipulation activities are occurring within the buffer areas of the reserve. Resource manipulation can occur only in the reserve buffer and refers to long-term pre- existing (prior to designation) manipulation for reasons not related to research or restoration. Most often resource manipulation is occurring for the benefit of human communities. Examples of resource manipulation activities include regulation of water flow, sediment management, timbering, or aquaculture. These activities should be reviewed to ensure they are not preventing the reserve from serving its designated purpose.

Resource Manipulation Plan
(Optional)

__ Current and proposed resource manipulation activities
__ Map of manipulation activities
__ Permitting/approval requirements
__ Climate and non-climate stressors
__ Current and potential partners
__ Impacts of activities

This plan should identify and describe priorities for resource manipulation, influence of stressors on these activities, requirements for conducting them, justification for continuing them, and resources and partners devoted to them.

Plan Contents

Current and Proposed Resource Manipulation

This section should describe the reserve's current or planned resource manipulation activities. Each activity, current or planned, should generally support the reserve's management plan goals and objectives and not create any negative impact to resources. In addition, expected outcomes of the resource manipulation activities should be described generally. Outcomes could be ecological, social, or economic in nature and should not be detrimental to the ecology of the reserve. Given that reserves have limited resources, the reserve should prioritize what activities they will implement or continue over the 5-year management planning period.

The reserve should justify why the current and planned resource manipulation activities are useful and/or at minimum, not detrimental to reserve resources. It will be helpful to reference local, state, or federal priorities or plans that support these activities and are important to the reserve. A reserve boundary map should be provided that spatially references the current and planned resource manipulation activities and key resources or habitats important to these manipulations.

Question to inform this section include: What are the reserve's current or proposed resource manipulation activities? How are the activities identified connected the reserve's management

plan goals and objectives? What are the priorities for the reserve and why? What are the potential benefits of conducting resource manipulation activities? At what scale are these manipulations occurring? What local, state, and/or federal authorities or priorities support current and proposed resource manipulation activities?

1. Factoring Non-Climate and Climate Stressors into Resource Manipulation Planning

The reserve should consider stressors that may impact resource manipulation activities, including climate considerations that factor into prioritizing these activities. When available, incorporate downscaled climate model information and other climate trend information to support the prioritization process. Incorporating these considerations into the prioritization process will help the reserve create a matrix of place-based climate-related impacts to reserve resources or habitats associated to resource manipulation activities.

Questions to inform this section include: What climate stressors could impact resource manipulation activities? Are these impacts beneficial or harmful to key reserve resources or habitats? Will resource manipulation activities enhance resilience to climate stressors?

2. Current and Potential Partners

Briefly identify reserve partners that support current or planned resource manipulation activities. Partners may be key players in achieving successful activity outcomes.

3. Permitting or Approval Requirements

The reserve should briefly describe any permits or other regulatory or administrative requirements for resource manipulation activities within reserve boundaries. Permits or regulatory requirements will vary based on each activity. An example of a permit could include an incidental take permit issued by the U.S. Fish and Wildlife Service (USFWS) for certain species.

Questions to inform this section include: Have you contacted regulatory officials within your state or county to inquire about permitting requirements for resource manipulation activities. If the reserve is not the primary party responsible for land stewardship or management, have those entities been included in the development of the proposed activity? What state and federal permitting or regulatory requirements apply to current and proposed manipulation activities?

4. Impacts of Resource Manipulation Activities

When resources are manipulated by human activity, opportunities exist for unintended ecological disturbance. These activities should be closely monitored for intended and unintended consequence to ensure that key reserve resources are protected.

Questions to inform this section include: Do the manipulation activities have the potential to negatively impact key land and water areas or habitats? Are resource manipulation activities occurring in areas considered for core area expansion? How will the reserve monitor these activities and their impacts?

Restoration Plan

About This Section

> **"Here is the means to end the great extinction spasm. The next century will, I believe, be the era of restoration in ecology."**
>
> – E.O. Wilson

The restoration plan is an optional element of a management plan, per the Federal Code of Regulations, 15 CFR 921.13. Most reserves have habitats that are in less than pristine condition due to land use and/or climate-related impacts. Restoration offers the opportunity for reserves to return habitat to its natural functioning, and in doing so, inform the practice of restoration through a hypothesis- driven restoration design. Restoration planning should take advantage of the full suite of reserve programmatic capability to the extent possible and address climate and anthropogenic stressors in considering the resilience, and hence prioritization, of restoration activities. Within the Reserve System, reserves span the spectrum of restoration needs from relative intact systems with no readily apparent need for restoration, to those altered where restoration may be the only way to achieve original function. The level of detail and priorities identified in this plan will depend on where a reserve is along this continuum.

This plan should describe restoration priorities, process for determining those priorities, influence of stressors on the priorities, project details (if available), and a monitoring strategy. Background on restoration ecology and the Reserve System Restoration Science Strategy is provided as context for the plan contents section.

What Is Restoration Ecology?

Restoration ecology is the scientific study and practice of renewing and restoring degraded, damaged, or destroyed ecosystems and habitats in the environment by active human intervention and action, within a short time frame site using targeted actions to achieve relatively self-sustaining ecological conditions. The Society for Ecological Restoration defines ecological restoration as an "intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability." (Society for Ecological Restoration, 2004) the practice of ecological restoration encompasses a wide scope of projects such as restoration of hydrology, regarding, shoreline erosion control, reforestation, local seed sourcing, removal of non-native species, re-vegetation of disturbed areas, stream bank modifications, reintroduction of native species, as well as habitat and range improvements for targeted areas within reserves.

What Is Restoration Science in the Reserve System?

in 2002, a multi-disciplinary group of Reserve System staff and outside restoration experts developed a Restoration Science Strategy that takes advantage of the unique capabilities of the Reserve System within individual reserves and the system. The goal of the strategy is to "provide the scientific bases and technical expertise to restore, enhance, and maintain estuarine ecosystems by developing and transferring effective approaches to identify, prioritize, restore, and monitor degraded or lost coastal habitat."

The strategy identifies a number of overarching restoration-related questions that the Reserve System is poised to address through an inquiry-based approach to restoration. Questions posed by the plan include:

Once habitats and functions of value in estuaries are degraded, is this reversible and how? Can these functions be reversed to a pre-existing condition; are all functions restorable? When is rehabilitation to another type of habitat more appropriate than restoration?

What is the importance of topographical complexity to restoration? What is the relationship between topographical complexity and biodiversity? What is the relationship between habitat structure and function?

What do you monitor at an individual reserve that would help measure the cumulative benefit of many restoration projects? How long should projects be monitored to ensure long-term success? What steps should be involved in restoration projects? What level of effort is appropriate? What are the trade-offs between tremendous effort up front and small efforts over a longer period of time?

Additional considerations include ecosystem services. Considering the value of coastal resources and potential climate impacts and other stressors effects on these values, how can ecosystem services be maintained or enhanced to increase resilience of habitats and communities? What services are most beneficial to the reserve and surrounding natural and human communities? How will climate impacts generally be factored into restoration decisions?

The strategy promotes collaboration among reserves to address many of these questions and hence, contribute to scientific literature and policy development. The Reserve System can play a national role by developing innovative technology and methods of evaluating restoration performance, serving as local reference sites, translating and transferring restoration information, providing scientific and technical advice to support policy and regulatory decisions, and building support for regional science coordination. A reserve's restoration plan should not only focus on restoring habitat in the reserve, but explore what role(s) the reserve's restoration or other on-site capacity can play in promoting the priorities of the Reserve System Restoration Strategy.

Reserves should follow the guiding principles for restoration set forth within the strategy:

- Preservation and conservation of existing habitat must occur along with restoration
- Reserve participation is voluntary and additional funding is required for implementation
- Reserves will not support habitat manipulation that causes adverse impacts
- a partnered approach with science and management organizations or professional
- Integrated application of research, education, and stewardship capacities
- Science activities will be subject to a peer review process

Plan Contents

A. Priority Restoration Areas

1. Description of Restoration Areas

A description of each priority habitat identified for restoration should be included which indicates why the restoration is needed to protect and maintain the ecological unit of the reserve. Additionally, the ultimate ecological condition, or general outcome, of each area should be described. A map should be included of all areas targeted for restoration. Refer to the Reserve System habitat classification system as appropriate to describe current and project future habitat states.

Restoration Plan
(Optional)

__ Priority restoration areas
__ Description of restoration areas/habitats
__ Map of restoration areas
__ Climate and non-climate stressors
__ Prioritization process and criteria
__ Priority restoration projects
__ Acres and outcomes
__ Partners
__ Monitoring and evaluation strategies ♦

Questions to inform this section include: What habitats are most important to restore to ensure the integrity of the reserve's ecological unit? What are regional or national restoration-related science questions that can be informed by an inquiry-approach to restoration projects at the reserve? What restoration projects could inform broader stakeholder and/or partner needs? Is restoration to a pre-existing state obtainable and sustainable, or should manipulation to a new condition more sustainable?

2. Factoring Climate and Non-climate Stressors into Restoration Planning

When prioritizing restoration areas it will be important to develop criteria that help the reserve identify those areas most important to ensuring the integrity of the reserve's ecological unit. As part of this prioritization process, it will be important to factor climate and non-climate stressors into the process to determine timing and challenges for restoration efforts. Reserve understanding of anthropogenic drivers on their reserve habitats and ecosystems varies considerably. In some cases, a reserve may have the ability to control those impacts or stressors. In those instances, the reserve should incorporate controls in project designs. Some potential stressors to consider include land use impacts such as sediment and nutrient loading, as well as physical barriers to habitat migration such as dams, roads, and levees.

Questions to inform this section include: What stressors will impact the success and resilience of reserve habitats identified to be restored? Has the reserve considered climate impacts such as change in local sea level, inundation patterns, temperature changes, soil moisture changes, precipitation patterns, and storm intensity/pattern changes?

3. Determining Restoration Priorities

Given limited resources, it will be important to determine what criteria and process are in place to prioritize restoration activities. It is advised that the plan outline the process the reserve will take to develop and apply identified criteria for determining restoration priorities. Criteria can be ecological and logistical in nature.

For example, the reserve may want to consider ecological criteria that address the following questions: Are there threatened and endangered species that need to be protected? Are there needs to buffer resources from storm surge? Are there rare fauna or flora communities that need to be protected? What areas are important for ensuring habitat resiliency in the face of key climate and anthropogenic stressors? Is there any information lacking that would impede restoration success?

The reserve may also want to factor in logistical criteria that address the following questions: Is there available funding to conduct the project and ensure maintenance and monitoring? Can permits be obtained? Are partnerships required to ensure project success? Are those partners committed to the project? Are volunteers integral to the success of the project?

B. Priority Restoration Project Planning

Where enough detail is available, it is advised that project level information be included to leverage funding opportunities and share ideas with partners. Basic details for each project should include a description of the project, the intended outcome, the affected acreage, partners involved, monitoring strategy, and a site map noting the area to be restored in the context of the reserve boundary. Additionally, please note how local and/or regional policy makers, scientists, and/or restoration practitioners have been or will be involved in the design, and/ or implementation of the project. To the extent possible, restoration projects should include a restoration science element that links to the Reserve System Restoration Science Plan. A restoration science element may include reference site data and/or restoration-specific questions that can be examined within the context of the restoration project.

Please describe how reserve programs and assets will support the project; note how System-Wide Monitoring Program data will be used, and how CTP and education program staff will be involved in project development, communication of results, and/or resulting best management practices.

Reserves may also be engaged in projects by serving as a reference site and not an active area for restoration. Please note where this is occurring and if restoration practitioners in the area are using SWMP data.

C. Monitoring and Evaluation Strategies

In order to effectively monitor and evaluate the success of restoration habitats, consider the following questions: Has habitat function and structure been established to meet targets? Has biodiversity been established to meet targets? What are the long-term monitoring plans? Were methods used appropriate for meeting targets? Were new protocols used and if so were they effective in meeting targets?

South Slough Reserve: Winchester Tidelands Restoration Project (WTRP)

The Winchester Tidelands is an area within the South Slough Reserve representative of converted and degraded tidal wetlands throughout coastal Oregon and northern California. In 1993, South Slough staff assembled an advisory group of specialists from universities, local and federal agencies, NGO's, and consulting firms with expertise in restoration and estuarine ecology, tidal hydrology, fish biology, program development, project engineering, and permitting to help design a multi-phase project to test the effectiveness of a variety of restoration methods. They have published their results, including research on concepts, methods and lessons learned to increase restoration practitioner's knowledge throughout the Pacific Northwest.
(*www.oregon.gov/DSL/SSNERR/CRMSmain.shtml*)

References

Clewell, Andre; Rieger, John; and Munro, John. (2005) Society for Ecological Restoration International: Guidelines for Developing and Managing Ecological Restoration Projects.

Reserve System Restoration Science Plan and Implementation Strategy (2002) available via Reserve System Intranet under Restoration.

National Marine Fisheries Service (2010) *Guidelines for Incorporating Sea Level Rise into Restoration of Tidal Wetlands in the Northeast* Accessed via Reserve System Intranet under Restoration.

Tools and Resources

Planning for Sea Level Rise in the Northeast: Considerations for the Implementation of Tidal Wetland Habitat Restoration Projects Workshop Report (2011) NOAA's Restoration Center, Northeast Region.

NOAA Habitat Blueprint: a framework to improve habitat for fisheries, marine life, and coastal communities (2012) NOAA Office of Habitat Conservation, National Marine Fisheries Service.

NOAA's Habitat Priority Planner: a GIS tool to help identify and prioritize areas for conservation, restoration, and planning.

SUBCHAPTER B—OCEAN AND COASTAL RESOURCE MANAGEMENT

PART 921—NATIONAL ESTUARINE RESEARCH RESERVE SYSTEM REGULATIONS

Subpart A—General

Subpart B—Site Selection, Post Site Selection and Management Plan Development

Subpart C—Acquisition, Development and Preparation of the Final Management Plan

Subpart D—Reserve Designation and Subsequent Operation

Subpart E—Ongoing Oversight, Performance Evaluation and Withdrawal of Designation

Subpart F—Special Research Projects

Subpart G—Special Monitoring Projects

Subpart H—Special Interpretation and Education Projects

Subpart I—General Financial Assistance Provisions

AUTHORITY: Section 315 of the Coastal Zone Management Act, as amended (16 U.S.C. 1461).

SOURCE: 58 FR 38215, July 15, 1993, unless otherwise noted.

Subpart A—General

§ 921.1 Mission, goals and general provisions.

(a) The mission of the National Estuarine Research Reserve Program is the establishment and management, through Federal-state cooperation, of a national system (National Estuarine Research Reserve System or System) of estuarine research reserves (National Estuarine Research Reserves or Reserves) representative of the various regions and estuarine types in the United States. National Estuarine Research Reserves are established to provide opportunities for long-term research, education, and interpretation.

(b) The goals of the Program are to:

(1) Ensure a stable environment for research through long-term protection of National Estuarine Research Reserve resources;

(2) Address coastal management issues identified as significant through coordinated estuarine research within the System;

(3) Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;

(4) Promote Federal, state, public and private use of one or more Reserves within the System when such entities conduct estuarine research; and

(5) Conduct and coordinate estuarine research within the System, gathering and making available information necessary for improved understanding and management of estuarine areas.

(c) National Estuarine Research Reserves shall be open to the public to the extent permitted under state and Federal law. Multiple uses are allowed to the degree compatible with each Reserve's overall purpose as provided in the management plan (see §921.13) and consistent with paragraphs (a) and (b) of this section. Use levels are set by the state where the Reserve is located and analyzed in the management plan. The Reserve management plan shall describe the uses and establish priorities among these uses. The plan shall identify uses requiring a state permit, as well as areas where uses are encouraged or prohibited. Consistent with resource protection and research objectives, public access and use may be restricted to certain areas or components within a Reserve.

(d) Habitat manipulation for research purposes is allowed consistent with the following limitations. Manipulative research activities must be specified in the management plan, be consistent with the mission and goals of the program (see paragraphs (a) and (b) of this section) and the goals and objectives set forth in the Reserve's management plan, and be limited in nature and extent to the minimum manipulative activity necessary to accomplish the stated research objective. Manipulative research activities with a significant or long-term impact on Reserve resources require the prior approval of the state and the National Oceanic and Atmospheric Administration (NOAA). Manipulative research activities which can reasonably be expected to have a significant adverse impact on the estuarine resources and habitat of a Reserve, such that the activities themselves or their resulting short- and long-term consequences compromise the representative character and integrity of a Reserve, are prohibited. Habitat manipulation for resource management purposes is prohibited except as specifically approved by NOAA as: (1) A restoration activity consistent with paragraph (e) of this section; or (2) an activity necessary for the protection of public health or the preservation of other sensitive resources which have been listed or are eligible for protection under relevant Federal or state authority (e.g., threatened/endangered species or significant historical or cultural resources) or if the manipulative activity is a long-term pre-existing use (*i.e.,* has occurred prior to designation) occurring in a buffer area. If habitat manipulation is determined to be necessary for the protection of public health, the preservation of sensitive resources, or if the manipulation is a long-term pre-existing use in a buffer area, then these activities shall be specified in the Reserve management plan in accordance with §921.13(a)(10) and shall be limited to the reasonable alternative which has the least adverse and shortest term impact on the representative and ecological integrity of the Reserve.

(e) Under the Act an area may be designated as an estuarine Reserve only if the area is a representative estuarine ecosystem that is suitable for long-term research. Many estuarine areas have undergone some ecological change as a result of human activities (e.g., hydrological changes, intentional/unintentional species composition changes—introduced and exotic species). In those areas proposed or designated as National Estuarine Research Reserves, such changes may have diminished the representative character and integrity of the site. Although restoration of degraded areas is not a primary purpose of the System, such activities may be permitted to improve the representative character and integrity of a Reserve. Restoration activities must be carefully planned and approved by NOAA through the Reserve management plan. Historical research may be necessary to determine the ''natural'' representative state of an estuarine area (*i.e.,* an estuarine ecosystem minimally affected by

human activity or influence). Frequently, restoration of a degraded estuarine area will provide an excellent opportunity for management oriented research.

(f) NOAA may provide financial assistance to coastal states, not to exceed, per Reserve, 50 percent of all actual costs or $5 million whichever amount is less, to assist in the acquisition of land and waters, or interests therein. NOAA may provide financial assistance to coastal states not to exceed 70 percent of all actual costs for the management and operation of, the development and construction of facilities, and the conduct of educational or interpretive activities concerning Reserves (see subpart I). NOAA may provide financial assistance to any coastal state or public or private person, not to exceed 70 percent of all actual costs, to support research and monitoring within a Reserve. Notwithstanding any financial assistance limits established by this Part, when financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, such assistance may be used to pay 100 percent of all actual costs of activities carrier out with this assistance, as long as such funds are available. Predesignation, acquisition and development, operation and management, special research and monitoring, and special education and interpretation awards are available under the National Estuarine Reserve Program. Predesignation awards are for site selection/feasibility, draft management plan preparation and conduct of basic characterization studies. Acquisition and development awards are intended primarily for acquisition of interests in land, facility construction and to develop and/or upgrade research, monitoring and education programs. Operation and management awards provide funds to assist in implementing, operating and managing the administrative, and basic research, monitoring and education programs, outlined in the Reserve management plan. Special research and monitoring awards provide funds to conduct estuarine research and monitoring projects with the System. Special educational and interpretive awards provide funds to conduct estuarine educational and interpretive projects within the System.

(g) Lands already in protected status managed by other Federal agencies, state or local governments, or private organizations may be included within National Estuarine Research Reserves only if the managing entity commits to long-term management consistent with paragraphs (d) and (e) of this section in the Reserve management plan. Federal lands already in protected status may not comprise a majority of the key land and water areas of a Reserve (see § 921.11(c)(3)).

(h) To assist the states in carrying out the Program's goals in an effective manner, NOAA will coordinate a research and education information exchange throughout the National Estuarine Research Reserve System. As part of this role, NOAA will ensure that information and ideas from one Reserve are made available to others in the System. The network will enable Reserves to exchange information and research data with each other, with universities engaged in estuarine research, and with Federal, state, and local agencies. NOAA's objective is a system-wide program of research and monitoring capable of addressing the management issues that affect long-term productivity of our Nation's estuaries.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12540, Mar. 17, 1997; 63 FR 26717, May 14, 1998]

§ 921.2 Definitions.

(a) *Act* means the Coastal Zone Management Act of 1972, as amended, 16 U.S.C. 1451 *et seq.*

(b) *Assistant Administrator* means the Assistant Administrator for Ocean Services and Coastal Zone Management or delegee.

(c) *Coastal state* means a state of the United States, in or bordering on, the Atlantic, Pacific, or Arctic Ocean, the Gulf of Mexico, Long Island Sound, or one or more of the Great Lakes. For the purposes of these regulations the term also includes Puerto Rico, the Virgin Islands, Guam, the Commonwealth of the Northern Marianas Islands, the Trust Territories of the Pacific Islands, and American Samoa (see 16 U.S.C. 1453(4)).

(d) *State agency* means an instrumentality of a coastal state to whom the coastal state has delegated the authority and responsibility for the creation and/or management/operation of a National Estuarine Research Reserve. Factors indicative of this authority may include the power to receive and expend funds on behalf of the Reserve, acquire and sell or convey real and personal property interests, adopt rules for the protection of the Reserve, enforce rules applicable to the Reserve, or develop and implement research and education programs for the reserve. For the purposes of these regulations, the terms ''coastal state'' and ''State agency'' shall be synonymous.

(e) *Estuary* means that part of a river or stream or other body of water having unimpaired connection with the open sea, where the sea water is measurably diluted with fresh water derived from land drainage. The term also includes estuary-type areas with measurable freshwater influence and having unimpaired connections with the open sea, and estuary-type areas of the Great Lakes and their connecting waters (see 16 U.S.C. 1453(7)).

(f) *National Estuarine Research Reserve* means an area that is a representative estuarine ecosystem suitable for long-term research, which may include all of the key land and water portion of an estuary, and adjacent transitional areas and uplands constituting to the extent feasible a natural unit, and which is set aside as a natural field laboratory to provide long-term opportunities for research, education, and interpretation on the ecological relationships within the area (see 16 U.S.C. 1453(8)) and meets the requirements of 16 U.S.C. 1461(b). This includes those areas designated as National Estuarine Sanctuaries or Reserves under section 315 of the Act prior to enactment of the Coastal Zone Act Reauthorization Amendments of 1990 and each area subsequently designated as a National Estuarine Research Reserve.

§ 921.3 National Estuarine Research Reserve System biogeographic classification scheme and estuarine typologies.

(a) National Estuarine Research Reserves are chosen to reflect regional differences and to include a variety of ecosystem types. A biogeographic classification scheme based on regional variations in the nation's coastal zone has been developed. The biogeographic classification scheme is used to ensure that the National Estuarine Research Reserve System includes at least one site from each region. The estuarine typology system is utilized to ensure that sites in the System reflect the wide range of estuarine types within the United States.

(b) The biogeographic classification scheme, presented in appendix I, contains 29 regions. Figure 1 graphically depicts the biogeographic regions of the United States.

(c) The typology system is presented in appendix II.

§ 921.4 Relationship to other provisions of the Coastal Zone Management Act, and to the Marine Protection, Research and Sanctuaries Act.

(a) The National Estuarine Research Reserve System is intended to provide information to state agencies and other entities involved in addressing coastal management issues. Any coastal state, including those that do not have approved coastal management programs under section 306 of the Act, is eligible for an award under the National Estuarine Research Reserve Program (see § 921.2(c)).

(b) For purposes of consistency review by states with a federally approved coastal management program, the designation of a National Estuarine Research Reserve is deemed to be a Federal activity, which, if directly affecting the state's coastal zone, must be undertaken in a manner consistent to the maximum extent practicable with the approved state coastal management program as provided by section 1456(c)(1) of the Act, and implementing regulations at 15 CFR part 930, subpart C. In accordance with section 1456(c)(1) of the Act and the applicable regulations NOAA will be responsible for certifying that designation of the Reserve is consistent with the state's approved coastal management program. The state must concur with or object to the certification. It is recommended that the lead state agency for Reserve designation consult, at the

earliest practicable time, with the appropriate state officials concerning the consistency of a proposed National Estuarine Research Reserve.

(c) The National Estuarine Research Reserve Program will be administered in close coordination with the National Marine Sanctuary Program (Title III of the Marine Protection, Research and Sanctuaries Act, as amended, 16 U.S.C. 1431–1445), also administered by NOAA. Title III authorizes the Secretary of Commerce to designate discrete areas of the marine environment as National Marine Sanctuaries to protect or restore such areas for their conservation, recreational, ecological, historical, research, educational or esthetic values. National Marine Sanctuaries and Estuarine Research Reserves may not overlap, but may be adjacent.

Subpart B—Site Selection, Post Site Selection and Management Plan Development

§ 921.10 General.

(a) A coastal state may apply for Federal financial assistance for the purpose of site selection, preparation of documents specified in § 921.13 (draft management plan (DMP) and environmental impact statement (EIS)), and the conduct of limited basic characterization studies. The total Federal share of this assistance may not exceed $100,000. Federal financial assistance for preacquisition activities under § 921.11 and § 921.12 is subject to the total $5 million for which each Reserve is eligible for land acquisition. Notwithstanding the above, when financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, such assistance may be used to pay 100 percent of all actual costs of activities carried out with this assistance, as long as such funds are available. In the case of a biogeographic region (see appendix I) shared by two or more coastal states, each state is eligible for Federal financial assistance to establish a separate National Estuarine Research Reserve within their respective portion of the shared biogeographic region. Each separate National Estuarine Research Reserve is eligible for the full complement of funding. Financial assistance application procedures are specified in subpart I.

(b) In developing a Reserve program, a state may choose to develop a multiple-site Reserve reflecting a diversity of habitats in a single biogeographic region. A multiple-site Reserve allows the state to develop complementary research and educational programs within the individual components of its multi-site Reserve. Multiple-site Reserves are treated as one Reserve in terms of financial assistance and development of an overall management framework and plan. Each individual site of a proposed multiple-site Reserve shall be evaluated both separately under § 921.11(c) and collectively as part of the site selection process. A coastal state may propose to establish a multiple-site Reserve at the time of the initial site selection, or at any point in the development or operation of the Reserve. If the state decides to develop a multiple-site National Estuarine Research Reserve after the initial acquisition and development award is made for a single site, the proposal is subject to the requirements set forth in § 921.33(b). However, a state may not propose to add one or more sites to an already designated Reserve if the operation and management of such Reserve has been found deficient and uncorrected or the research conducted is not consistent with the Estuarine Research Guidelines referenced in § 921.51. In addition, Federal funds for the acquisition of a multiple-site Reserve remain limited to $5,000,000 (see § 921.20). The funding for operation of a multiple-site Reserve is limited to the maximum allowed for any one Reserve per year (see § 921.32(c)) and preacquisition funds are limited to $100,000 per Reserve. Notwithstanding the above, when financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, such assistance may be used to pay 100 percent of all actual costs of activities carrier out with this assistance, as long as such funds are available.

[58 FR 38215, July 15, 1993, as amended at 63 FR 26717, May 14, 1998]

§ 921.11 Site selection and feasibility.

(a) A coastal state may use Federal funds to establish and implement a site selection process which is approved by NOAA.

(b) In addition to the requirements set forth in subpart I, a request for Federal funds for site selection must contain the following programmatic information:

(1) A description of the proposed site selection process and how it will be implemented in conformance with the biogeographic classification scheme and typology (§ 921.3);

(2) An identification of the site selection agency and the potential management agency; and

(3) A description of how public participation will be incorporated into the process (see § 921.11(d)).

(c) As part of the site selection process, the state and NOAA shall evaluate and select the final site(s). NOAA has final authority in approving such sites. Site selection shall be guided by the following principles:

(1) The site's contribution to the biogeographical and typological balance of the National Estuarine Research Reserve System. NOAA will give priority consideration to proposals to establish Reserves in biogeographic regions or subregions or incorporating types that are not represented in the system. (see the biogeographic classification scheme and typology set forth in § 921.3 and appendices I and II);

(2) The site's ecological characteristics, including its biological productivity, diversity of flora and fauna, and capacity to attract a broad range of research and educational interests. The proposed site must be a representative estuarine ecosystem and should, to the maximum extent possible, be an estuarine ecosystem minimally affected by human activity or influence (see § 921.1(e)).

(3) Assurance that the site's boundaries encompass an adequate portion of the key land and water areas of the natural system to approximate an ecological unit and to ensure effective conservation. Boundary size will vary greatly depending on the nature of the ecosystem. Reserve boundaries must encompass the area within which adequate control has or will be established by the managing entity over human activities occurring within the Reserve. Generally, Reserve boundaries will encompass two areas: Key land and water areas (or ''core area'') and a buffer zone. Key land and water areas and a buffer zone will likely require significantly different levels of control (see § 921.13(a)(7)). The term ''key land and water areas'' refers to that core area within the Reserve that is so vital to the functioning of the estuarine ecosystem that it must be under a level of control sufficient to ensure the long-term viability of the Reserve for research on natural processes. Key land and water areas, which comprise the core area, are those ecological units of a natural estuarine system which preserve, for research purposes, a full range of significant physical, chemical and biological factors contributing to the diversity of fauna, flora and natural processes occurring within the estuary. The determination of which land and water areas are ''key'' to a particular Reserve must be based on specific scientific knowledge of the area. A basic principle to follow when deciding upon key land and water areas is that they should encompass resources representative of the total ecosystem, and which if compromised could endanger the research objectives of the Reserve. The term *buffer zone* refers to an area adjacent to or surrounding key land and water areas and essential to their integrity. Buffer zones protect the core area and provide additional protection for estuarine-dependent species, including those that are rare or endangered. When determined appropriate by the state and approved by NOAA, the buffer zone may also include an area necessary for facilities required for research and interpretation. Additionally, buffer zones should be established sufficient to accommodate a shift of the core area as a result of biological, ecological or geomorphological change which reasonably could be expected to occur. National Estuarine Research Reserves may include existing Federal or state lands already in a protected status where mutual benefit can be enhanced. However, NOAA will not approve a site

for potential National Estuarine Research Reserve status that is dependent primarily upon the inclusion of currently protected Federal lands in order to meet the requirements for Reserve status (such as key land and water areas). Such lands generally will be included within a Reserve to serve as a buffer or for other ancillary purposes; and may be included, subject to NOAA approval, as a limited portion of the core area;

(4) The site's suitability for long-term estuarine research, including ecological factors and proximity to existing research facilities and educational institutions;

(5) The site's compatibility with existing and potential land and water uses in contiguous areas as well as approved coastal and estuarine management plans; and

(6) The site's importance to education and interpretive efforts, consistent with the need for continued protection of the natural system.

(d) Early in the site selection process the state must seek the views of affected landowners, local governments, other state and Federal agencies and other parties who are interested in the area(s) being considered for selection as a potential National Estuarine Research Reserve. After the local government(s) and affected landowner(s) have been contacted, at least one public meeting shall be held in the vicinity of the proposed site. Notice of such a meeting, including the time, place, and relevant subject matter, shall be announced by the state through the area's principal newspaper at least 15 days prior to the date of the meeting and by NOAA in the FEDERAL REGISTER.

(e) A state request for NOAA approval of a proposed site (or sites in the case of a multi-site Reserve) must contain a description of the proposed site(s) in relationship to each of the site selection principals (§ 921.11(c)) and the following information:

(1) An analysis of the proposed site(s) based on the biogeographical scheme/typology discussed in § 921.3 and set forth in appendices I and II;

(2) A description of the proposed site(s) and its (their) major resources, including location, proposed boundaries, and adjacent land uses. Maps are required;

(3) A description of the public participation process used by the state to solicit the views of interested parties, a summary of comments, and, if interstate issues are involved, documentation that the Governor(s) of the other affected state(s) has been contacted. Copies of all correspondence, including contact letters to all affected landowners must be appended;

(4) A list of all sites considered and a brief statement of the reasons why a site was not preferred; and

(5) A nomination of the proposed site(s) for designation as a National Estuarine Research Reserve by the Governor of the coastal state in which the state is located.

(f) A state proposing to reactivate an inactive site, previously approved by NOAA for development as an Estuarine Sanctuary or Reserve, may apply for those funds remaining, if any, provided for site selection and feasibility (§ 921.11a)) to determine the feasibility of reactivation. This feasibility study must comply with the requirements set forth in § 921.11 (c) through (e).

§ 921.12 Post site selection.

(a) At the time of the coastal state's request for NOAA approval of a proposed site, the state may submit a request for funds to develop the draft management plan and for preparation of the EIS. At this time, the state may also submit a request for the remainder of the predesignation funds to perform a limited basic characterization of the physical, chemical and biological characteristics of the site approved by NOAA necessary for providing EIS information to NOAA. The state's request for these post site selection funds must be accompanied by the information specified in subpart I and, for draft management plan development and EIS information collection, the following programmatic information:

(1) A draft management plan outline (see § 921.13(a) below); and

(2) An outline of a draft memorandum of understanding (MOU) between the state and NOAA detailing the Federal-state role in Reserve management during the initial period of Federal funding and expressing the

state's long-term commitment to operate and manage the Reserve.

(b) The state is eligible to use the funds referenced in § 921.12(a) after the proposed site is approved by NOAA under the terms of § 921.11.

§ 921.13 Management plan and environmental impact statement development.

(a) After NOAA approves the state's proposed site and application for funds submitted pursuant to § 921.12, the state may begin draft management plan development and the collection of information necessary for the preparation by NOAA of an EIS. The state shall develop a draft management plan, including an MOU. The plan shall set out in detail:

(1) Reserve goals and objectives, management issues, and strategies or actions for meeting the goals and objectives;

(2) An administrative plan including staff roles in administration, research, education/interpretation, and surveillance and enforcement;

(3) A research plan, including a monitoring design;

(4) An education/interpretive plan;

(5) A plan for public access to the Reserve;

(6) A construction plan, including a proposed construction schedule, general descriptions of proposed developments and general cost estimates. Information should be provided for proposed minor construction projects in sufficient detail to allow these projects to begin in the initial phase of acquisition and development. A categorical exclusion, environmental assessment, or EIS may be required prior to construction;

(7)(i) An acquisition plan identifying the ecologically key land and water areas of the Reserve, ranking these areas according to their relative importance, and including a strategy for establishing adequate long-term state control over these areas sufficient to provide protection for Reserve resources to ensure a stable environment for research. This plan must include an identification of ownership within the proposed Reserve boundaries, including land already in the public domain; the method(s) of acquisition which the state proposes to use—acquisition (including less-than-fee simple options) to establish adequate long-term state control; an estimate of the fair market value of any property interest—which is proposed for acquisition; a schedule estimating the time required to complete the process of establishing adequate state control of the proposed research reserve; and a discussion of any anticipated problems. In selecting a preferred method(s) for establishing adequate state control over areas within the proposed boundaries of the Reserve, the state shall perform the following steps for each parcel determined to be part of the key land and water areas (control over which is necessary to protect the integrity of the Reserve for research purposes), and for those parcels required for research and interpretive support facilities or buffer purposes:

(A) Determine, with appropriate justification, the minimum level of control(s) required [e.g., management agreement, regulation, less-than-fee simple property interest (e.g., conservation easement), fee simple property acquisition, or a combination of these approaches]. This does not preclude the future necessity of increasing the level of state control;

(B) Identify the level of existing state control(s);

(C) Identify the level of additional state control(s), if any, necessary to meet the minimum requirements identified in paragraph (a)(7)(i)(A) of this section;

(D) Examine all reasonable alternatives for attaining the level of control identified in paragraph (a)(7)(i)(C) of this section, and perform a cost analysis of each; and

(E) Rank, in order of cost, the methods (including acquisition) identified in paragraph (a)(7)(i)(D) of this section.

(ii) An assessment of the relative cost-effectiveness of control alternatives shall include a reasonable estimate of both short-term costs (e.g., acquisition of property interests, regulatory program development including associated enforcement costs, negotiation, adjudication, etc.) and long-term costs (e.g., monitoring, enforcement,

adjudication, management and coordination). In selecting a preferred method(s) for establishing adequate state control over each parcel examined under the process described above, the state shall give priority consideration to the least costly method(s) of attaining the minimum level of long-term control required. Generally, with the possible exception of buffer areas required for support facilities, the level of control(s) required for buffer areas will be considerably less than that required for key land and water areas. This acquisition plan, after receiving the approval of NOAA, shall serve as a guide for negotiations with landowners. A final boundary for the reserve shall be delineated as a part of the final management plan;

(8) A resource protection plan detailing applicable authorities, including allowable uses, uses requiring a permit and permit requirements, any restrictions on use of the research reserve, and a strategy for research reserve surveillance and enforcement of such use restrictions, including appropriate government enforcement agencies;

(9) If applicable, a restoration plan describing those portions of the site that may require habitat modification to restore natural conditions;

(10) If applicable, a resource manipulation plan, describing those portions of the Reserve buffer in which long-term pre-existing (prior to designation) manipulation for reasons not related to research or restoration is occurring. The plan shall explain in detail the nature of such activities, shall justify why such manipulation should be permitted to continue within the reserve buffer; and shall describe possible effects of this manipulation on key land and water areas and their resources;

(11) A proposed memorandum of understanding (MOU) between the state and NOAA regarding the Federal-state relationship during the establishment and development of the National Estuarine Research Reserve, and expressing a long-term commitment by the state to maintain and manage the Reserve in accordance with section 315 of the Act, 16 U.S.C. 1461, and applicable regulations. In conjunction with the MOU, and where possible under state law, the state will consider taking appropriate administrative or legislative action to ensure the long-term protection and operation of the National Estuarine Research Reserve. If other MOUs are necessary (such as with a Federal agency, another state agency or private organization), drafts of such MOUs must be included in the plan. All necessary MOU's shall be signed prior to Reserve designation; and

(12) If the state has a federally approved coastal management program, a certification that the National Estuarine Research Reserve is consistent to the maximum extent practicable with that program. See §§ 921.4(b) and 921.30(b).

(b) Regarding the preparation of an EIS under the National Environmental Policy Act on a National Estuarine Research Reserve proposal, the state and NOAA shall collect all necessary information concerning the socioeconomic and environmental impacts associated with implementing the draft management plan and feasible alternatives to the plan. Based on this information, the state will draft and provide NOAA with a preliminary EIS.

(c) Early in the development of the draft management plan and the draft EIS, the state and NOAA shall hold a scoping meeting (pursuant to NEPA) in the area or areas most affected to solicit public and government comments on the significant issues related to the proposed action. NOAA will publish a notice of the meeting in the FEDERAL REGISTER at least 15 days prior to the meeting. The state shall be responsible for publishing a similar notice in the local media.

(d) NOAA will publish a FEDERAL REGISTER notice of intent to prepare a draft EIS. After the draft EIS is prepared and filed with the Environmental Protection Agency (EPA), a Notice of Availability of the draft EIS will appear in the FEDERAL REGISTER. Not less than 30 days after publication of the notice, NOAA will hold at least one public hearing in the area or areas most affected by the proposed national estuarine research reserve. The hearing will be held no sooner than 15 days after appropriate notice of the meeting has been given in the principal news media by the state and in the FEDERAL REGISTER by NOAA. After a 45-day

comment period, a final EIS will be prepared by the state and NOAA.

Subpart C—Acquisition, Development and Preparation of the Final Management Plan

§ 921.20 General.

The acquisition and development period is separated into two major phases. After NOAA approval of the site, draft management plan and draft MOU, and completion of the final EIS, a coastal state is eligible for an initial acquisition and development award(s). In this initial phase, the state should work to meet the criteria required for formal research reserve designation; e.g., establishing adequate state control over the key land and water areas as specified in the draft management plan and preparing the final management plan. These requirements are specified in § 921.30. Minor construction in accordance with the draft management plan may also be conducted during this initial phase. The initial acquisition and development phase is expected to last no longer than three years. If necessary, a longer time period may be negotiated between the state and NOAA. After Reserve designation, a state is eligible for a supplemental acquisition and development award(s) in accordance with § 921.31. In this post-designation acquisition and development phase, funds may be used in accordance with the final management plan to construct research and educational facilities, complete any remaining land acquisition, for program development, and for restorative activities identified in the final management plan. In any case, the amount of Federal financial assistance provided to a coastal state with respect to the acquisition of lands and waters, or interests therein, for any one National Estuarine Research Reserve may not exceed an amount equal to 50 percent of the costs of the lands, waters, and interests therein or $5,000,000, whichever amount is less, except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of all actual costs of activities carrier out with this assistance, as long as such funds are available.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12540, Mar. 17, 1997; 63 FR 26717, May 14, 1998]

§ 921.21 Initial acquisition and development awards.

(a) Assistance is provided to aid the recipient prior to designation in:

(1) Acquiring a fee simple or less-than-fee simple real property interest in land and water areas to be included in the Reserve boundaries (see § 921.13(a)(7); § 921.30(d));

(2) Minor construction, as provided in paragraphs (b) and (c) of this section;

(3) Preparing the final management plan; and

(4) Initial management costs, e.g., for implementing the NOAA approved draft management plan, hiring a Reserve manager and other staff as necessary and for other management-related activities. Application procedures are specified in subpart I.

(b) The expenditure of Federal and state funds on major construction activities is not allowed during the initial acquisition and development phase. The preparation of architectural and engineering plans, including specifications, for any proposed construction, or for proposed restorative activities, is permitted. In addition, minor construction activities, consistent with paragraph (c) of this section also are allowed. The NOAA-approved draft management plan must, however, include a construction plan and a public access plan before any award funds can be spent on construction activities.

(c) Only minor construction activities that aid in implementing portions of the management plan (such as boat ramps and nature trails) are permitted during the initial acquisition and development phase. No more than five (5) percent of the initial acquisition and development award may be expended on such activities. NOAA must make a specific determination, based on the final EIS, that the construction activity will not be detrimental to the environment.

(d) Except as specifically provided in paragraphs (a) through (c) of this section, construction projects, to be funded in whole or in part under an acquisition and development award(s), may not be initiated until the Reserve receives formal designation (see § 921.30). This requirement has been adopted to ensure that substantial progress in establishing adequate state control over key land and water areas has been made and that a final management plan is completed before major sums are spent on construction. Once substantial progress in establishing adequate state control/acquisition has been made, as defined by the state in the management plan, other activities guided by the final management plan may begin with NOAA's approval.

(e) For any real property acquired in whole or part with Federal funds for the Reserve, the state shall execute suitable title documents to include substantially the following provisions, or otherwise append the following provisions in a manner acceptable under applicable state law to the official land record(s):

(1) Title to the property conveyed by this deed shall vest in the [recipient of the award granted pursuant to section 315 of the Act, 16 U.S.C. 1461 or other NOAA approved state agency] subject to the condition that the designation of the [name of National Estuarine Reserve] is not withdrawn and the property remains part of the federally designated [name of National Estuarine Research Reserve]; and

(2) In the event that the property is no longer included as part of the Reserve, or if the designation of the Reserve of which it is part is withdrawn, then NOAA or its successor agency, after full and reasonable consultation with the State, may exercise the following rights regarding the disposition of the property:

(i) The recipient may retain title after paying the Federal Government an amount computed by applying the Federal percentage of participation in the cost of the original project to the current fair market value of the property;

(ii) If the recipient does not elect to retain title, the Federal Government may either direct the recipient to sell the property and pay the Federal Government an amount computed by applying the Federal percentage of participation in the cost of the original project to the proceeds from the sale (after deducting actual and reasonable selling and repair or renovation expenses, if any, from the sale proceeds), or direct the recipient to transfer title to the Federal Government. If directed to transfer title to the Federal Government, the recipient shall be entitled to compensation computed by applying the recipient's percentage of participation in the cost of the original project to the current fair market value of the property; and

(iii) Fair market value of the property must be determined by an independent appraiser and certified by a responsible official of the state, as provided by Department of Commerce regulations at 15 CFR part 24, and Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally assisted programs at 15 CFR part 11.

(f) Upon instruction by NOAA, provisions analogous to those of § 921.21(e) shall be included in the documentation underlying less-then-fee-simple interests acquired in whole or part with Federal funds.

(g) Federal funds or non-Federal matching share funds shall not be spent to acquire a real property interest in which the state will own the land concurrently with another entity unless the property interest has been identified as a part of an acquisition strategy pursuant to § 921.13(7) which has been approved by NOAA prior to the effective date of these regulations.

(h) Prior to submitting the final management plan to NOAA for review and approval, the state shall hold a public meeting to receive comment on the plan in the area affected by the estuarine research reserve. NOAA will publish a notice of the meeting in the FEDERAL REGISTER at least 15 days prior to the public meeting. The state shall be responsible for having a similar notice published in the local newspaper(s).

Subpart D—Reserve Designation and Subsequent Operation

§ 921.30 Designation of National Estuarine Research Reserves.

(a) The Under Secretary may designate an area proposed for designation by the Governor of the state in which it is located, as a National Esturaine Research Reserve if the Under Secretary finds:

(1) The area is a representative estuarine ecosystem that is suitable for long-term research and contributes to the biogeographical and typological balance of the System;

(2) Key land and water areas of the proposed Reserve, as identified in the management plan, are under adequate state control sufficient to provide long-term protection for reserve resources to ensure a stable environment for research;

(3) Designation of the area as a Reserve will serve to enhance public awareness and understanding of estuarine areas, and provide suitable opportunities for public education and interpretation;

(4) A final management plan has been approved by NOAA;

(5) An MOU has been signed between the state and NOAA ensuring a long-term commitment by the state to the effective operation and implementation of the area as a National Estuarine Research Reserve;

(6) All MOU's necessary for reserve management (*i.e.*, with relevant Federal, state, and local agencies and/or private organizations) have been signed; and

(7) The coastal state in which the area is located has complied with the requirements of subpart B.

(b) NOAA will determine whether the designation of a National Estuarine Research Reserve in a state with a federally approved coastal zone management program directly affects the coastal zone. If the designation is found to directly affect the coastal zone, NOAA will make a consistency determination pursuant to §307(c)(1) of the Act, 16 U.S.C. 1456, and 15 CFR part 930, subpart C. See §921.4(b). The results of this consistency determination will be published in the FEDERAL REGISTER when the notice of designation is published. See §921.30(c).

(c) NOAA will publish the notice of designation of a National Estuarine Research Reserve in the FEDERAL REGISTER. The state shall be responsible for having a similar notice published in the local media.

(d) The term *state control* in §921.30(a)(3) does not necessarily require that key land and water areas be owned by the state in fee simple. Acquisition of less-than-fee simple interests e.g., conservation easements) and utilization of existing state regulatory measures are encouraged where the state can demonstrate that these interests and measures assure adequate long-term state control consistent with the purposes of the research reserve (see also §§921.13(a)(7); 921.21(g)). Should the state later elect to purchase an interest in such lands using NOAA funds, adequate justification as to the need for such acquisition must be provided to NOAA.

§ 921.31 Supplemental acquisition and development awards.

After National Estuarine Research Reserve designation, and as specified in the approved management plan, a coastal state may request a supplemental acquisition and/or development award(s) for acquiring additional property interests identified in the management plan as necessary to strengthen protection of key land and water areas and to enhance long-term protection of the area for research and education, for facility and exhibit construction, for restorative activities identified in the approved management plan, for administrative purposes related to acquisition and/or facility construction and to develop and/or upgrade research, monitoring and education/interpretive programs. Federal financial assistance provided to a National Estuarine Research Reserve for supplemental development costs directly associated with facility construction (*i.e.*, major construction activities) may not exceed 70 percent of the total project cost, except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100

percent of the costs. NOAA must make a specific determination that the construction activity will not be detrimental to the environment. Acquisition awards for the acquisition of lands or waters, or interests therein, for any one reserve may not exceed an amount equal to 50 percent of the costs of the lands, waters, and interests therein of $5,000,000, whichever amount is less, except when the financial assistance is provided from amounts recovered as result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of all actual costs of activities carrier out with this assistance, as long as such funds are available. In the case of a biogeographic region (see appendix I) shared by two or more states, each state is eligible independently for Federal financial assistance to establish a separate National Estuarine Research Reserve within their respective portion of the shared biogeographic region. Application procedures are specified in subpart I. Land acquisition must follow the procedures specified in §§ 921.13(a)(7), 921.21(e) and (f) and 921.81.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12540, Mar. 17, 1997; 63 FR 26717, May 14, 1998]

§ 921.32 Operation and management: Implementation of the management plan.

(a) After the Reserve is formally designated, a coastal state is eligible to receive Federal funds to assist the state in the operation and management of the Reserve including the management of research, monitoring, education, and interpretive programs. The purpose of this Federally funded operation and management phase is to implement the approved final management plan and to take the necessary steps to ensure the continued effective operation of the Reserve.

(b) State operation and management of the Reserves shall be consistent with the mission, and shall further the goals of the National Estuarine Research Reserve program (see § 921.1).

(c) Federal funds are available for the operation and management of the Reserve. Federal funds provided pursuant to this section may not exceed 70 percent of the total cost of operating and managing the Reserve for any one year, except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs. In the case of a biogeographic region (see Appendix I) shared by two or more states, each state is eligible for Federal financial assistance to establish a separate Reserve within their respective portion of the shared biogeographic region (see § 921.10).

(d) Operation and management funds are subject to the following limitations:

(1) Eligible coastal state agencies may apply for up to the maximum share available per Reserve for that fiscal year. Share amounts will be announced annually by letter from the Sanctuary and Reserves Division to all participating states. This letter will be provided as soon as practicable following approval of the Federal budget for that fiscal year.

(2) No more than ten percent of the total amount (state and Federal shares) of each operation and management award may be used for construction-type activities.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

§ 921.33 Boundary changes, amendments to the management plan, and addition of multiple-site components.

(a) Changes in the boundary of a Reserve and major changes to the final management plan, including state laws or regulations promulgated specifically for the Reserve, may be made only after written approval by NOAA. NOAA may require public notice, including notice in the FEDERAL REGISTER and an opportunity for public comment before approving a boundary or management plan change. Changes in the boundary of a Reserve involving the acquisition of properties not listed in the management plan or final EIS require public notice and the opportunity for comment; in certain cases, a categorical exclusion, an environmental assessment and possibly an environmental impact statement may be required.

NOAA will place a notice in the FEDERAL REGISTER of any proposed changes in Reserve boundaries or proposed major changes to the final management plan. The state shall be responsible for publishing an equivalent notice in the local media. See also requirements of §§ 921.4(b) and 921.13(a)(11).

(b) As discussed in § 921.10(b), a state may choose to develop a multiple-site National Estuarine Research Reserve after the initial acquisition and development award for a single site has been made. NOAA will publish notice of the proposed new site including an invitation for comments from the public in the FEDERAL REGISTER. The state shall be responsible for publishing an equivalent notice in the local newspaper(s). An EIS, if required, shall be prepared in accordance with section § 921.13 and shall include an administrative framework for the multiple-site Reserve and a description of the complementary research and educational programs within the Reserve. If NOAA determines, based on the scope of the project and the issues associated with the additional site(s), that an environmental assessment is sufficient to establish a multiple-site Reserve, then the state shall develop a revised management plan which, concerning the additional component, incorporates each of the elements described in § 921.13(a). The revised management plan shall address goals and objectives for all components of the multi-site Reserve and the additional component's relationship to the original site(s).

(c) The state shall revise the management plan for a Reserve at least every five years, or more often if necessary. Management plan revisions are subject to (a) above.

(d) NOAA will approve boundary changes, amendments to management plans, or the addition of multiple-site components, by notice in the FEDERAL REGISTER. If necessary NOAA will revise the designation document (findings) for the site.

Subpart E—Ongoing Oversight, Performance Evaluation and Withdrawal of Designation

§ 921.40 Ongoing oversight and evaluations of designated National Estuarine Research Reserves.

(a) The Sanctuaries and Reserve Division shall conduct, in accordance with section 312 of the Act and procedures set forth in 15 CFR part 928, ongoing oversight and evaluations of Reserves. Interim sanctions may be imposed in accordance with regulations promulgated under 15 CFR part 928.

(b) The Assistant Administrator may consider the following indicators of non-adherence in determining whether to invoke interim sanctions:

(1) Inadequate implementation of required staff roles in administration, research, education/interpretation, and surveillance and enforcement. Indicators of inadequate implementation could include: No Reserve Manager, or no staff or insufficient staff to carry out the required functions.

(2) Inadequate implementation of the required research plan, including the monitoring design. Indicators of inadequate implementation could include: Not carrying out research or monitoring that is required by the plan, or carrying out research or monitoring that is inconsistent with the plan.

(3) Inadequate implementation of the required education/interpretation plan. Indicators of inadequate implementation could include: Not carrying out education or interpretation that is required by the plan, or carrying out education/interpretation that is inconsistent with the plan.

(4) Inadequate implementation of public access to the Reserve. Indicators of inadequate implementation of public access could include: Not providing necessary access, giving full consideration to the need to keep some areas off limits to the public in order to protect fragile resources.

(5) Inadequate implementation of facility development plan. Indicators of inadequate implementation could include: Not taking action to propose and budget for necessary facilities, or not undertaking necessary construction in a timely manner when funds are available.

(6) Inadequate implementation of acquisition plan. Indicators of inadequate implementation could include: Not pursuing an aggressive acquisition program with all available funds for that purpose, not requesting promptly additional funds when necessary, and evidence that adequate long-term state control has not been established over some core or buffer areas, thus jeopardizing the ability to protect the Reserve site and resources from offsite impacts.

(7) Inadequate implementation of Reserve protection plan. Indicators of inadequate implementation could include: Evidence of non-compliance with Reserve restrictions, insufficient surveillance and enforcement to assure that restrictions on use of the Reserve are adhered to, or evidence that Reserve resources are being damaged or destroyed as a result of the above.

(8) Failure to carry out the terms of the signed Memorandum of Understanding (MOU) between the state and NOAA, which establishes a long-term state commitment to maintain and manage the Reserve in accordance with section 315 of the Act. Indicators of failure could include: State action to allow incompatible uses of state-controlled lands or waters in the Reserve, failure of the state to bear its fair share of costs associated with long-term operation and management of the Reserve, or failure to initiate timely updates of the MOU when necessary.

§ 921.41 Withdrawal of designation.

The Assistant Administrator may withdraw designation of an estuarine area as a National Estuarine Research Reserve pursuant to and in accordance with the procedures of section 312 and 315 of the Act and regulations promulgated thereunder.

Subpart F—Special Research Projects

§ 921.50 General.

(a) To stimulate high quality research within designated National Estuarine Research Reserves, NOAA may provide financial support for research projects which are consistent with the Estuarine Research Guidelines referenced in § 921.51. Research awards may be awarded under this subpart to only those designated Reserves with approved final management plans. Although research may be conducted within the immediate watershed of the Reserve, the majority of research activities of any single research project funded under this subpart may be conducted within Reserve boundaries. Funds provided under this subpart are primarily used to support management-related research projects that will enhance scientific understanding of the Reserve ecosystem, provide information needed by Reserve management and coastal management decision-makers, and improve public awareness and understanding of estuarine ecosystems and estuarine management issues. Special research projects may be oriented to specific Reserves; however, research projects that would benefit more than one Reserve in the National Estuarine Reserve Research System are encouraged.

(b) Funds provided under this subpart are available on a competitive basis to any coastal state or qualified public or private person. A notice of available funds will be published in the FEDERAL REGISTER. Special research project funds are provided in addition to any other funds available to a coastal state under the Act. Federal funds provided under this subpart may not exceed 70 percent of the total cost of the project, consistent with § 921.81(e)(4) (''allowable costs''), except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

§ 921.51 Estuarine research guidelines.

(a) Research within the National Estuarine Research Reserve System shall be conducted in a manner consistent with Estuarine Research Guidelines developed by NOAA.

(b) A summary of the Estuarine Research Guidelines is published in the FEDERAL REGISTER as a part of the notice of available funds discussed in § 921.50(c).

(c) The Estuarine Research Guidelines are reviewed annually by NOAA. This review will include an opportunity

for comment by the estuarine research community.

§ 921.52 Promotion and coordination of estuarine research.

(a) NOAA will promote and coordinate the use of the National Estuarine Research Reserve System for research purposes.

(b) NOAA will, in conducting or supporting estuarine research other than that authorized under section 315 of the Act, give priority consideration to research that make use of the National Estuarine Research Reserve System.

(c) NOAA will consult with other Federal and state agencies to promote use of one or more research reserves within the National Estuarine Research Reserve System when such agencies conduct estuarine research.

Subpart G—Special Monitoring Projects

§ 921.60 General.

(a) To provide a systematic basis for developing a high quality estuarine resource and ecosystem information base for National Estuarine Research Reserves and, as a result, for the System, NOAA may provide financial support for basic monitoring programs as part of operations and management under § 921.32. Monitoring funds are used to support three major phases of a monitoring program:

(1) Studies necessary to collect data for a comprehensive site description/characterization;

(2) Development of a site profile; and

(3) Formulation and implementation of a monitoring program.

(b) Additional monitoring funds may be available on a competitive basis to the state agency responsible for Reserve management or a qualified public or private person or entity. However, if the applicant is other than the managing entity of a Reserve that applicant must submit as a part of the application a letter from the Reserve manager indicating formal support of the application by the managing entity of the Reserve. Funds provided under this subpart for special monitoring projects are provided in addition to any other funds available to a coastal state under the Act. Federal funds provided under this subpart may not exceed 70 percent of the total cost of the project, consistent with § 921.81(e)(4) (''allowable costs''), except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs.

(c) Monitoring projects funded under this subpart must focus on the resources within the boundaries of the Reserve and must be consistent with the applicable sections of the Estuarine Research Guidelines referenced in § 921.51. Portions of the project may occur within the immediate watershed of the Reserve beyond the site boundaries. However, the monitoring proposal must demonstrate why this is necessary for the success of the project.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

Subpart H—Special Interpretation and Education Projects

§ 921.70 General.

(a) To stimulate the development of innovative or creative interpretive and educational projects and materials to enhance public awareness and understanding of estuarine areas, NOAA may fund special interpretive and educational projects in addition to those activities provided for in operations and management under § 921.32. Special interpretive and educational awards may be awarded under this subpart to only those designated Reserves with approved final management plans.

(b) Funds provided under this subpart may be available on a competitive basis to any state agency. However, if the applicant is other than the managing entity of a Reserve, that applicant must submit as a part of the application a letter from the Reserve manager indicating formal support of the application by the managing entity of the Reserve. These funds are provided in addition to any other funds available to a coastal state under the Act. Federal funds provided under this subpart may not exceed 70 percent of the total cost of the project, consistent with § 921.81(e)(4) (''allowable costs''),

except when the financial assistance is provided from amounts recovered as a result of damage to natural resources located in the coastal zone, in which case the assistance may be used to pay 100 percent of the costs.

(c) Applicants for education/interpretive projects that NOAA determines benefit the entire National Estuarine Research Reserve System may receive Federal assistance of up to 100% of project costs.

[58 FR 38215, July 15, 1993, as amended at 62 FR 12541, Mar. 17, 1997]

Subpart I—General Financial Assistance Provisions

§ 921.80 Application information.

(a) Only a coastal state may apply for Federal financial assistance awards for preacquisition, acquisition and development, operation and management, and special education and interpretation projects under subpart H. Any coastal state or public or private person may apply for Federal financial assistance awards for special estuarine research or monitoring projects under subpart G. The announcement of opportunities to conduct research in the System appears on an annual basis in the FEDERAL REGISTER. If a state is participating in the national Coastal Zone Management Program, the applicant for an award under section 315 of the Act shall notify the state coastal management agency regarding the application.

(b) An original and two copies of the formal application must be submitted at least 120 working days prior to the proposed beginning of the project to the following address: Sanctuaries and Reserves Division Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, 1825 Connecticut Avenue, NW., suite 714, Washington, DC 20235. Application for Federal Assistance Standard Form 424 (Non-construction Program) constitutes the formal application for site selection, post-site selection, operation and management, research, and education and interpretive awards. The Application for Federal Financial Assistance Standard Form 424 (Construction Program) constitutes the formal application for land acquisition and development awards. The application must be accompanied by the information required in subpart B (predesignation), subpart C and § 921.31 (acquisition and development), and § 921.32 (operation and management) as applicable. Applications for development awards for construction projects, or restorative activities involving construction, must include a preliminary engineering report, a detailed construction plan, a site plan, a budget and categorical exclusion check list or environmental assessment. All applications must contain back up data for budget estimates (Federal and non-Federal shares), and evidence that the application complies with the Executive Order 12372, ''Intergovernmental Review of Federal Programs.'' In addition, applications for acquisition and development awards must contain:

(1) State Historic Preservation Office comments;

(2) Written approval from NOAA of the draft management plan for initial acquisition and development award(s); and

(3) A preliminary engineering report for construction activities.

§ 921.81 Allowable costs.

(a) Allowable costs will be determined in accordance with applicable OMB Circulars and guidance for Federal financial assistance, the financial assistant agreement, these regulations, and other Department of Commerce and NOAA directives. The term ''costs'' applies to both the Federal and non-Federal shares.

(b) Costs claimed as charges to the award must be reasonable, beneficial and necessary for the proper and efficient administration of the financial assistance award and must be incurred during the award period.

(c) Costs must not be allocable to or included as a cost of any other Federally-financed program in either the current or a prior award period.

(d) General guidelines for the non-Federal share are contained in Department of Commerce Regulations at 15 CFR part 24 and OMB Circular A–110.

Copies of Circular A–110 can be obtained from the Sanctuaries and Reserves Division; 1825 Connecticut Avenue, NW., suite 714; Washington, DC 20235. The following may be used in satisfying the matching requirement:

(1) *Site selection and post site selection awards.* Cash and in-kind contributions (value of goods and services directly benefiting and specifically identifiable to this part of the project) are allowable. Land may not be used as match.

(2) *Acquisition and development awards.* Cash and in-kind contributions are allowable. In general, the fair market value of lands to be included within the Reserve boundaries and acquired pursuant to the Act, with other than Federal funds, may be used as match. However, the fair market value of real property allowable as match is limited to the fair market value of a real property interest equivalent to, or required to attain, the level of control over such land(s) identified by the state and approved by the Federal Government as that necessary for the protection and management of the National Estuarine Research Reserve. Appraisals must be performed according to Federal appraisal standards as detailed in Department of Commerce regulations at 15 CFR part 24 and the Uniform Relocation Assistance and Real Property Acquisition for Federal land Federally assisted programs in 15 CFR part 11. The fair market value of privately donated land, at the time of donation, as established by an independent appraiser and certified by a responsible official of the state, pursuant to 15 CFR part 11, may also be used as match. Land, including submerged lands already in the state's possession, may be used as match to establish a National Estuarine Research Reserve. The value of match for these state lands will be calculated by determining the value of the benefits foregone by the state, in the use of the land, as a result of new restrictions that may be imposed by Reserve designation. The appraisal of the benefits foregone must be made by an independent appraiser in accordance with Federal appraisal standards pursuant to 15 CFR part 24 and 15 CFR part 11. A state may initially use as match land valued at greater than the Federal share of the acquisition and development award. The value in excess of the amount required as match for the initial award may be used to match subsequent supplemental acquisition and development awards for the National Estuarine Research Reserve (see also §921.20). Costs related to land acquisition, such as appraisals, legal fees and surveys, may also be used as match.

(3) *Operation and management awards.* Generally, cash and in-kind contributions (directly benefiting and specifically identifiable to operations and management), except land, are allowable.

(4) *Research, monitoring, education and interpretive awards.* Cash and in-kind contributions (directly benefiting and specifically identifiable to the scope of work), except land, are allowable.

§921.82 Amendments to financial assistance awards.

Actions requiring an amendment to the financial assistance award, such as a request for additional Federal funds, revisions of the approved project budget or original scope of work, or extension of the performance period must be submitted to NOAA on Standard Form 424 and approved in writing.

APPENDIX I TO PART 921—BIOGEOGRAPHIC CLASSIFICATION SCHEME

Acadian

1. Northern of Maine (Eastport to the Sheepscot River.)
2. Southern Gulf of Maine (Sheepscot River to Cape Cod.)

Virginian

3. Southern New England (Cape Cod to Sandy Hook.)
4. Middle Atlantic (Sandy Hook to Cape Hatteras.)
5. Chesapeake Bay.

Carolinian

6. North Carolinas (Cape Hatteras to Santee River.)
7. South Atlantic (Santee River to St. John's River.)
8. East Florida (St. John's River to Cape Canaveral.)

West Indian

9. Caribbean (Cape Canaveral to Ft. Jefferson and south.)
10. West Florida (Ft. Jefferson to Cedar Key.)

Louisianian

11. Panhandle Coast (Cedar Key to Mobile Bay.)
12. Mississippi Delta (Mobile Bay to Galveston.)
13. Western Gulf (Galveston to Mexican border.)

Californian

14. Southern California (Mexican border to Point Conception.)
15. Central California (Point Conception to Cape Mendocino.)
16. San Francisco Bay.

Columbian

17. Middle Pacific (Cape Mendocino to the Columbia River.)
18. Washington Coast (Columbia River to Vancouver Island.)
19. Puget Sound.

Great Lakes

20. Lake Superior (including St. Mary's River.)
21. Lakes Michigan and Huron (including Straits of Mackinac, St. Clair River, and Lake St. Clair.)
22. Lake Erie (including Detroit River and Niagara Falls.)
23. Lake Ontario (including St. Lawrence River.)

Fjord

24. Southern Alaska (Prince of Wales Island to Cook Inlet.)
25. Aleutian Island (Cook Inlet Bristol Bay.)

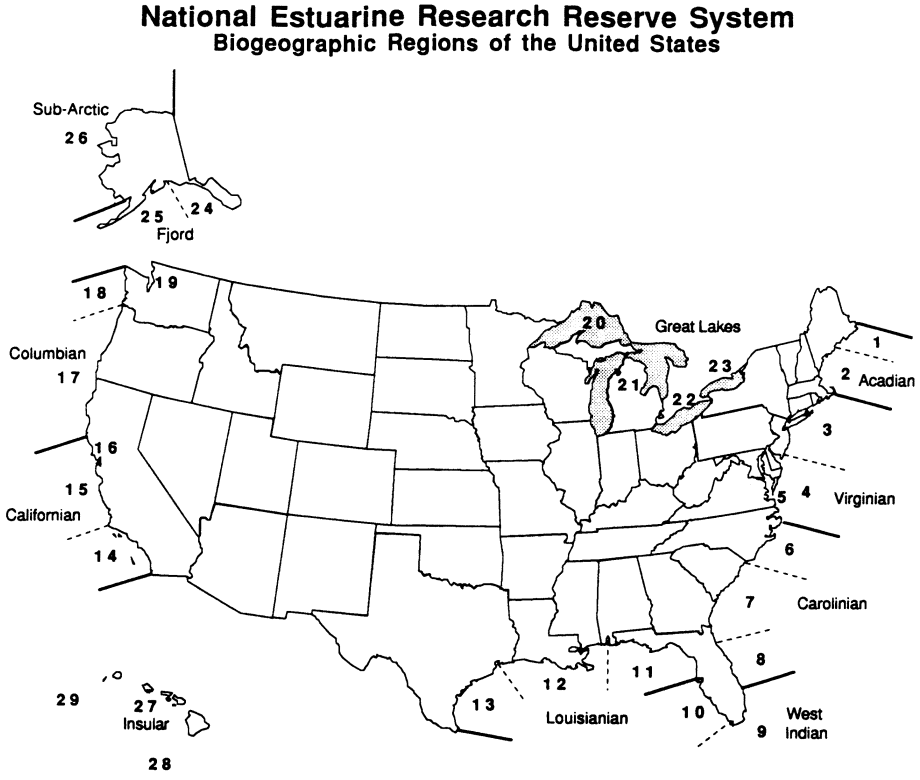
Sub-Arctic

26. Northern Alaska (Bristol Bay to Damarcation Point.)

Insular

27. Hawaiian Islands.
28. Western Pacific Island.
29. Eastern Pacific Island.

FIGURE 1



APPENDIX II TO PART 921—TYPOLOGY OF NATIONAL ESTUARINE RESEARCH RESERVES

This typology system reflects significant differences in estuarine characteristics that are not necessarily related to regional location. The purpose of this type of classification is to maximize ecosystem variety in the selection of national estuarine reserves. Priority will be given to important ecosystem types as yet unrepresented in the reserve system. It should be noted that any one site may represent several ecosystem types or physical characteristics.

Class I—Ecosystem Types

Group I—Shorelands

A. Maritime Forest-Woodland. That have developed under the influence of salt spray. It can be found on coastal uplands or recent features such as barrier islands and beaches, and may be divided into the following biomes:

1. Northern coniferous forest biome: This is an area of predominantly evergreens such as the sitka spruce (Picea), grand fir (Abies), and white cedar (Thuja), with poor development of the shrub and herb leyera, but high annual productivity and pronounced seasonal periodicity.

2. Moist temperate (Mesothermal) coniferous forest biome: Found along the west coast of North America from California to Alaska, this area is dominated by conifers, has relatively small seasonal range, high humidity with rainfall ranging from 30 to 150 inches, and a well-developed understory of vegetation with an abundance of mosses and other moisture-tolerant plants.

3. Temperate deciduous forest biome: This biome is characterized by abundant, evenly distributed rainfall, moderate temperatures which exhibit a distinct seasonal pattern,

well-developed soil biota and herb and shrub layers, and numerous plants which produce pulpy fruits and nuts. A distinct subdivision of this biome is the pine edible forest of the southeastern coastal plain, in which only a small portion of the area is occupied by climax vegetation, although it has large areas covered by edaphic climax pines.

4. Broad-leaved evergreen subtropical forest biome: The main characteristic of this biome is high moisture with less pronounced differences between winter and summer. Examples are the hammocks of Florida and the live oak forests of the Gulf and South Atlantic coasts. Floral dominants include pines, magnolias, bays, hollies, wild tamarine, strangler fig, gumbo limbo, and palms.

B. Coast shrublands. This is a transitional area between the coastal grasslands and woodlands and is characterized by woody species with multiple stems and a few centimeters to several meters above the ground developing under the influence of salt spray and occasional sand burial. This includes thickets, scrub, scrub savanna, heathlands, and coastal chaparral. There is a great variety of shrubland vegetation exhibiting regional specificity:

1. Northern areas: Characterized by Hudsonia, various erinaceous species, and thickets of Myricu, prunus, and Rosa.

2. Southeast areas: Floral dominants include Myrica, Baccharis, and Iles.

3. Western areas: Adenostoma, arcotyphylos, and eucalyptus are the dominant floral species.

C. Coastal grasslands. This area, which possesses sand dunes and coastal flats, has low rainfall (10 to 30 inches per year) and large amounts of humus in the soil. Ecological succession is slow, resulting in the presence of a number of seral stages of community development. Dominant vegetation includes mid-grasses (5 to 8 feet tall), such as Spartina, and trees such as willow (Salix sp.), cherry (Prunus sp.), and cottonwood (Pupulus deltoides.) This area is divided into four regions with the following typical strand vegetation:

1. Arctic/Boreal: Elymus;
2. Northeast/West: Ammophla;
3. Southeast Gulf: Uniola; and
4. Mid-Atlantic/Gulf: Spartina patens.

D. Coastal tundra. This ecosystem, which is found along the Arctic and Boreal coasts of North America, is characterized by low temperatures, a short growing season, and some permafrost, producing a low, treeless mat community made up of mosses, lichens, heath, shrubs, grasses, sedges, rushes, and herbaceous and dwarf woody plants. Common species include arctic/alpine plants such as Empetrum nigrum and Betula nana, the lichens Cetraria and Cladonia, and herbaceous plants such as Potentilla tridentata and Rubus chamaemorus. Common species on the coastal beach ridges of the high arctic desert include Bryas intergrifolia and Saxifrage oppositifolia. This area can be divided into two main subdivisions:

1. Low tundra: Characterized by a thick, spongy mat of living and undecayed vegetation, often with water and dotted with ponds when not frozen; and

2. High Tundra: A bare area except for a scanty growth of lichens and grasses, with underlaying ice wedges forming raised polygonal areas.

E. Coastal cliffs. This ecosystem is an important nesting site for many sea and shore birds. It consists of communities of herbaceous, graminoid, or low woody plants (shrubs, heath, etc.) on the top or along rocky faces exposed to salt spray. There is a diversity of plant species including mosses, lichens, liverworts, and ''higher'' plant representatives.

GROUP II—TRANSITION AREAS

A. Coastal marshes. These are wetland areas dominated by grasses (Poacea), sedges (Cyperaceae), rushes (Juncaceae), cattails (Typhaceae), and other graminoid species and is subject to periodic flooding by either salt or freshwater. This ecosystem may be subdivided into: (a) Tidal, which is periodically flooded by either salt or brackish water; (b) nontidal (freshwater); or (c) tidal freshwater. These are essential habitats for many important estuarine species of fish and invertebrates as well as shorebirds and waterfowl and serve important roles in shore stabilization, flood control, water purification, and nutrient transport and storage.

B. Coastal swamps. These are wet lowland areas that support mosses and shrubs together with large trees such as cypress or gum.

C. Coastal mangroves. This ecosystem experiences regular flooding on either a daily, monthly, or seasonal basis, has low wave action, and is dominated by a variety of salt-tolerant trees, such as the red mangrove (Rhizophora mangle), black mangrove (Avicennia Nitida), and the white mangrove (Laguncularia racemosa.) It is also an important habitat for large populations of fish, invertebrates, and birds. This type of ecosystem can be found from central Florida to extreme south Texas to the islands of the Western Pacific.

D. Intertidal beaches. This ecosystem has a distinct biota of microscopic animals, bacteria, and unicellular algae along with macroscopic crustaceans, mollusks, and worms with a detritus-based nutrient cycle. This area also includes the driftline communities found at high tide levels on the beach. The dominant organisms in this ecosystem include crustaceans such as the mole crab (Emerita), amphipods (Gammeridae), ghost crabs (Ocypode), and bivalve mollusks such

as the coquina (Donax) and surf clams (Spisula and Mactra.)

E. Intertidal mud and sand flats. These areas are composed of unconsolidated, high organic content sediments that function as a short-term storage area for nutrients and organic carbons. Macrophytes are nearly absent in this ecosystem, although it may be heavily colonized by benthic diatoms, dinoflaggellates, filamintous blue-green and green algae, and chaemosynthetic purple sulfur bacteria. This system may support a considerable population of gastropods, bivalves, and polychaetes, and may serve as a feeding area for a variety of fish and wading birds. In sand, the dominant fauna include the wedge shell Donax, the scallop Pecten, tellin shells Tellina, the heart urchin Echinocardium, the lug worm Arenicola, sand dollar Dendraster, and the sea pansy Renilla. In mud, faunal dominants adapted to low oxygen levels include the terebellid Amphitrite, the boring clam Playdon, the deep sea scallop Placopecten, the Quahog Mercenaria, the echiurid worm Urechis, the mud snail Nassarius, and the sea cucumber Thyone.

F. Intertidal algal beds. These are hard substrates along the marine edge that are dominated by macroscopic algae, usually thalloid, but also filamentous or unicellular in growth form. This also includes the rocky coast tidepools that fall within the intertidal zone. Dominant fauna of these areas are barnacles, mussels, periwinkles, anemones, and chitons. Three regions are apparent:

1. Northern latitude rocky shores: It is in this region that the community structure is best developed. The dominant algal species include Chondrus at the low tide level, Fucus and Ascophylium at the mid-tidal level, and Laminaria and other kelplike algae just beyond the intertidal, although they can be exposed at extremely low tides or found in very deep tidepools.

2. Southern latitudes: The communities in this region are reduced in comparison to those of the northern latitudes and possesses algae consisting mostly of single-celled or filamentour green, blue-green, and red algae, and small thalloid brown algae.

3. Tropical and subtropical latitudes: The intertidal in this region is very reduced and contains numerous calcareous algae such as Porolithon and Lithothamnion, as well and green algae with calcareous particles such as Halimeda, and numerous other green, red, and brown algae.

GROUP III—SUBMERGED BOTTOMS

A. Subtidal hardbottoms. This system is characterized by a consolidated layer of solid rock or large pieces of rock (neither of biotic origin) and is found in association with geomorphological features such as submarine canyons and fjords and is usually covered with assemblages of sponges, sea fans, bivalves, hard corals, tunicates, and other attached organisms. A significant feature of estuaries in many parts of the world is the oyster reef, a type of subtidal hardbottom. Composed of assemblages of organisms (usually bivalves), it is usually found near an estuary's mouth in a zone of moderate wave action, salt content, and turbidity. If light levels are sufficient, a covering of microscopic and attached macroscopic algae, such as keep, may also be found.

B. Subtidal softbottoms. Major characteristics of this ecosystem are an unconsolidated layer of fine particles of silt, sand, clay, and gravel, high hydrogen sulfide levels, and anaerobic conditions often existing below the surface. Macrophytes are either sparse or absent, although a layer of benthic microalgae may be present if light levels are sufficient. The faunal community is dominated by a diverse population of deposit feeders including polychaetes, bivalves, and burrowing crustaceans.

C. Subtidal plants. This system is found in relatively shallow water (less than 8 to 10 meters) below mean low tide. It is an area of extremely high primary production that provides food and refuge for a diversity of faunal groups, especially juvenile and adult fish, and in some regions, manatees and sea turtles. Along the North Atlantic and Pacific coasts, the seagrass Zostera marina predominates. In the South Atlantic and Gulf coast areas, Thalassia and Diplanthera predominate. The grasses in both areas support a number of epiphytic organisms.

Class II—Physical Characteristics

GROUP I—GEOLOGIC

A. Basin type. Coastal water basins occur in a variety of shapes, sizes, depths, and appearances. The eight basic types discussed below will cover most of the cases:

1. Exposed coast: Solid rock formations or heavy sand deposits characterize exposed ocean shore fronts, which are subject to the full force of ocean storms. The sand beaches are very resilient, although the dunes lying just behind the beaches are fragile and easily damaged. The dunes serve as a sand storage area making them chief stabilizers of the ocean shorefront.

2. Sheltered coast: Sand or coral barriers, built up by natural forces, provide sheltered areas inside a bar or reef where the ecosystem takes on many characteristics of confined waters-abundant marine grasses, shellfish, and juvenile fish. Water movement is reduced, with the consequent effects pollution being more severe in this area than in exposed coastal areas.

3. Bay: Bays are larger confined bodies of water that are open to the sea and receive strong tidal flow. When stratification is pronounced the flushing action is augmented by

river discharge. Bays vary in size and in type of shorefront.

4. Embayment: A confined coastal water body with narrow, restricted inlets and with a significant freshwater inflow can be classified as an embayment. These areas have more restricted inlets than bays, are usually smaller and shallower, have low tidal action, and are subject to sedimentation.

5. Tidal river: The lower reach of a coastal river is referred to as a tidal river. The coastal water segment extends from the sea or estuary into which the river discharges to a point as far upstream as there is significant salt content in the water, forming a salt front. A combination of tidal action and freshwater outflow makes tidal rivers well-flushed. The tidal river basin may be a simple channel or a complex of tributaries, small associated embayments, marshfronts, tidal flats, and a variety of others.

6. Lagoon: Lagoons are confined coastal bodies of water with restricted inlets to the sea and without significant freshwater inflow. Water circulation is limited, resulting in a poorly flushed, relatively stagnant body of water. Sedimentation is rapid with a great potential for basin shoaling. Shores are often gently sloping and marshy.

7. Perched coastal wetlands: Unique to Pacific islands, this wetland type found above sea level in volcanic crater remnants forms as a result of poor drainage characteristics of the crater rather than from sedimentation. Floral assemblages exhibit distinct zonation while the faunal constituents may include freshwater, brackish, and/or marine species. EXAMPLE: Aunu's Island, American Samoa.

8. Anchialine systems: These small coastal exposures of brackish water form in lava depressions or elevated fossil reefs have only a subsurface connection in the ocean, but show tidal fluctuations. Differing from true estuaries in having no surface continuity with streams or ocean, this system is characterized by a distinct biotic community dominated by benthis algae such as Rhizoclonium, the mineral encrusting Schiuzothrix, and the vascular plant Ruppia maritima. Characteristic fauna which exhibit a high degree of endemicity, include the mollusks Theosoxus neglectus and Tcariosus. Although found throughout the world, the high islands of the Pacific are the only areas within the U.S. where this system can be found.

B. Basin structure. Estuary basins may result from the drowning of a river valley (coastal plains estuary), the drowning of a glacial valley (fjord), the occurrence of an offshore barrier (bar-bounded estuary), some tectonic process (tectonic estuary), or volcanic activity (volcanic estuary).

1. Coastal plains estuary: Where a drowned valley consists mainly of a single channel, the form of the basin is fairly regular forming a simple coastal plains estuary. When a channel is flooded with numerous tributaries an irregular estuary results. Many estuaries of the eastern United States are of this type.

2. Fjord: Estuaries that form in elongated steep headlands that alternate with deep U-shaped valleys resulting from glacial scouring are called fjords. They generally possess rocky floors or very thin veneers of sediment, with deposition generally being restricted to the head where the main river enters. Compared to total fjord volume river discharge is small. But many fjords have restricted tidal ranges at their mouths due to sills, or upreaching sections of the bottom which limit free movement of water, often making river flow large with respect to the tidal prism. The deepest portions are in the upstream reaches, where maximum depths can range from 800m to 1200m while sill depths usually range from 40m to 150m.

3. Bar-bounded estuary: These result from the development of an offshore barrier such as a beach strand, a line of barrier islands, reef formations a line of moraine debris, or the subsiding remnants of a deltaic lobe. The basin is often partially exposed at low tide and is enclosed by a chain of offshore bars of barrier islands broken at intervals by inlets. These bars may be either deposited offshore or may be coastal dunes that have become isolated by recent seal level rises.

4. Tectonic estuary: These are coastal indentures that have formed through tectonic processes such as slippage along a fault line (San Francisco Bay), folding or movement of the earth's bedrock often with a large inflow of freshwater.

5. Volcanic estuary: These coastal bodies of open water, a result of volcanic processes are depressions or craters that have direct and/or subsurface connections with the ocean and may or may not have surface continuity with streams. These formations are unique to island areas of volcanic orgin.

C. Inlet type. Inlets in various forms are an integral part of the estuarine environment as they regulate to a certain extent, the velocity and magnitude of tidal exchange, the degree of mixing, and volume of discharge to the sea.

1. Unrestricted: An estuary with a wide unrestricted inlet typically has slow currents, no significant turbulence, and receives the full effect of ocean waves and local disturbances which serve to modify the shoreline. These estuaries are partially mixed, as the open mouth permits the incursion of marine waters to considerable distances upstream, depending on the tidal amplitude and stream gradient.

2. Restricted: Restrictions of estuaries can exist in many forms: Bars, barrier islands, spits, sills, and more. Restricted inlets result in decreased circulation, more pronounced longitudinal and vertical salinity gradients, and more rapid sedimentation. However, if

the estuary mouth is restricted by depositional features or land closures, the incoming tide may be held back until it suddenly breaks forth into the basin as a tidal wave, or bore. Such currents exert profound effects on the nature of the subtrate, turbidity, and biota of the estuary.

3. Permanent: Permanent inlets are usually opposite the mouths of major rivers and permit river water to flow into the sea.

4. Temporary (Intermittent): Temporary inlets are formed by storms and frequently shift position, depending on tidal flow, the depth of the sea, and sound waters, the frequency of storms, and the amount of littoral transport.

D. Bottom composition. The bottom composition of estuaries attests to the vigorous, rapid, and complex sedimentation processes characteristic of most coastal regions with low relief. Sediments are derived through the hydrologic processes of erosion, transport, and deposition carried on by the sea and the stream.

1. Sand: Near estuary mouths, where the predominating forces of the sea build spits or other depositional features, the shore and substrates of the estuary are sandy. The bottom sediments in this area are usually coarse, with a graduation toward finer particles in the head region and other zones of reduced flow, fine silty sands are deposited. Sand deposition occurs only in wider or deeper regions where velocity is reduced.

2. Mud: At the base level of a stream near its mouth, the bottom is typically composed of loose muds, silts, and organic detritus as a result of erosion and transport from the upper stream reaches and organic decomposition. Just inside the estuary entrance, the bottom contains considerable quantities of sand and mud, which support a rich fauna. Mud flats, commonly built up in estuarine basins, are composed of loose, coarse, and fine mud and sand, often dividing the original channel.

3. Rock: Rocks usually occur in areas where the stream runs rapidly over a steep gradient with its coarse materials being derived from the higher elevations where the stream slope is greater. The larger fragments are usually found in shallow areas near the stream mouth.

4. Oyster shell: Throughout a major portion of the world, the oyster reef is one of the most significant features of estuaries, usually being found near the mouth of the estuary in a zone of moderate wave action, salt content, and turbidity. It is often a major factor in modifying estuarine current systems and sedimentation, and may occur as an elongated island or peninsula oriented across the main current, or may develop parallel to the direction of the current.

GROUP II—HYDROGRAPHIC

A. Circulation. Circulation patterns are the result of combined influences of freshwater inflow, tidal action, wind and oceanic forces, and serve many functions: Nutrient transport, plankton dispersal, ecosystem flushing, salinity control, water mixing, and more.

1. Stratified: This is typical of estuaries with a strong freshwater influx and is commonly found in bays formed from ''drowned'' river valleys, fjords, and other deep basins. There is a net movement of freshwater outward at the top layer and saltwater at the bottom layer, resulting in a net outward transport of surface organisms and net inward transport of bottom organisms.

2. Non-stratified: Estuaries of this type are found where water movement is sluggish and flushing rate is low, although there may be sufficient circulation to provide the basis for a high carrying capacity. This is common to shallow embayments and bays lacking a good supply of freshwater from land drainage.

3. Lagoonal: An estuary of this type is characterized by low rates of water movement resulting from a lack of significant freshwater influx and a lack of strong tidal exchange because of the typically narrow inlet connecting the lagoon to the sea. Circulation whose major driving force is wind, is the major limiting factor in biological productivity within lagoons.

B. Tides. This is the most important ecological factor in an estuary as it affects water exchange and its vertical range determines the extent of tidal flats which may be exposed and submerged with each tidal cycle. Tidal action against the volume of river water discharged into an estuary results in a complex system whose properties vary according to estuary structure as well as the magnitude of river flow and tidal range. Tides are usually described in terms of the cycle and their relative heights. In the United States, tide height is reckoned on the basis of average low tide, which is referred to as datum. The tides, although complex, fall into three main categories:

1. Diurnal: This refers to a daily change in water level that can be observed along the shoreline. There is one high tide and one low tide per day.

2. Semidiurnal: This refers to a twice daily rise and fall in water that can be observed along the shoreline.

3. Wind/Storm tides: This refers to fluctuations in water elevation to wind and storm events, where influence of lunar tides is less.

C. Freshwater. According to nearly all the definitions advanced, it is inherent that all estuaries need freshwater, which is drained from the land and measurably dilutes seawater to create a brackish condition. Freshwater enters an estuary as runoff from the

land either from a surface and/or subsurface source.

1. Surface water: This is water flowing over the ground in the form of streams. Local variation in runoff is dependent upon the nature of the soil (porosity and solubility), degree of surface slope, vegetational type and development, local climatic conditions, and volume and intensity of precipitation.

2. Subsurface water: This refers to the precipitation that has been absorbed by the soil and stored below the surface. The distribution of subsurface water depends on local climate, topography, and the porosity and permeability of the underlying soils and rocks. There are two main subtypes of surface water:

a. Vadose water: This is water in the soil above the water table. Its volume with respect to the soil is subject to considerable fluctuation.

b. Groundwater: This is water contained in the rocks below the water table, is usually of more uniform volume than vadose water, and generally follows the topographic relief of the land being high hills and sloping into valleys.

GROUP III—CHEMICAL

A. Salinity. This reflects a complex mixture of salts, the most abundant being sodium chloride, and is a very critical factor in the distribution and maintenance of many estuarine organisms. Based on salinity, there are two basic estuarine types and eight different salinity zones (expressed in parts per thousand-ppt.)

1. Positive estuary: This is an estuary in which the freshwater influx is sufficient to maintain mixing, resulting in a pattern of increasing salinity toward the estuary mouth. It is characterized by low oxygen concentration in the deeper waters and considerable organic content in bottom sediments.

2. Negative estuary: This is found in particularly arid regions, where estuary evaporation may exceed freshwater inflow, resulting in increased salinity in the upper part of the basin, especially if the estuary mouth is restricted so that tidal flow is inhibited. These are typically very salty (hyperhaline), moderately oxygenated at depth, and possess bottom sediments that are poor in organic content.

3. Salinity zones (expressed in ppt):

a. Hyperhaline—greater than 40 ppt.

b. Euhaline—40 ppt to 30 ppt.

c. Mixhaline—30 ppt to 0.5 ppt.

(1) Mixoeuhaline—greater than 30 ppt but less than the adjacent euhaline sea.

(2) Polyhaline—30 ppt to 18 ppt.

(3) Mesohaline—18 ppt to 5 ppt.

(4) Oligohaline—5 ppt to 0.5 ppt.

d. Limnetic: Less than 0.5 ppt.

B. pH Regime: This is indicative of the mineral richness of estuarine waters and falls into three main categories:

1. Acid: Waters with a pH of less than 5.5.

2. Circumneutral: A condition where the pH ranges from 5.5 to 7.4.

3. Alkaline: Waters with a pH greater than 7.4.

PART 922—NATIONAL MARINE SANCTUARY PROGRAM REGULATIONS

Subpart A—General

Subpart B—Site Evaluation List (SEL)

Subpart C—Designation of National Marine Sanctuaries

Subpart D—Management Plan Development and Implementation

Subpart E—Regulations of General Applicability

Coastal Management
ENVIRONMENTAL QUALITY

PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

BRAXTON DAVIS
Director

November 30, 2015

Mr. Mike Murphy, Director
N.C. Division of Parks and Recreation
121 W. Jones Street
Mail Service Center 1615
Raleigh, N.C. 27603

Dear Mr. Murphy,

The purpose of this letter is to inform you that the North Carolina Department of Environmental Quality intends to study the removal of the southern component of the "New Inlet Dam" along the western boundary of the Zeke's Island component of the N.C. National Estuarine Research Reserve in accordance with Section 14.6.(h) of the 2015 Appropriations Act (NC Session Law 2015-241), entitled "Cape Fear Estuarine Resource Restoration" (for full text of the Act, please see http://www.ncleg.net/Sessions/2015/Bills/House/PDF/H97v9.pdf).

In summary, Section 14.6.(h) instructs the Department of Environmental Quality to conduct the following (paraphrased):

(1) Notify the U.S. Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam;
(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removing the Southern Component of the Dam, including necessary permits and approvals;
(3) Request approval from the National Oceanic and Atmospheric Administration (NOAA) to adjust the boundary for the Zeke's Island component of the N.C. National Estuarine Research Reserve by moving the western boundary of the Zeke's Island Reserve 200 feet seaward and removing the area that lies between the current and new boundary from the Reserve, and adding equivalent acreage to the northern boundary of the Reserve from adjacent acreage at the Fort Fisher State Recreation Area; and
(4) If NOAA approves the boundary adjustment described above, the NC Coastal Resources Commission is then required to amend the Reserve Components Rule (15A NCAC 070 .0105) as further described in the Act.

The Division of Coastal Management is responsible for carrying out the steps outlined above. As you are likely aware, the Zeke's Island Reserve shares a boundary with the Fort Fisher State Recreation Area. Any proposed boundary change to the Zeke's Island Reserve will be developed in consultation with you and your staff to ensure that both agencies' needs are met. At this time, the Division has requested information from NOAA regarding the process and information needs for considering a boundary change. My staff work regularly with Jeff Owen, Superintendent of the Fort Fisher State Recreation Area, and will continue to work with Mr. Owen on this unless you recommend an alternative point of contact. A report on the implementation of this Section is due to the General Assembly by April 1, 2016. Therefore, I would appreciate any initial comments that you may have concerning this study prior to January 15, 2016.

Please contact me at 252.808.2808 x202 or Braxton.Davis@ncdenr.gov if you would like to discuss further.

Sincerely,

Braxton Davis

Attachment

cc: Tom Reeder, Assistant Secretary, Department of Environmental Quality
Rebecca Ellin, Coastal Reserve Program Manager, Division of Coastal Management
Brian Strong, Chief of Planning and Natural Resources, Division of Parks and Recreation
Jeff Owen, Superintendent, Fort Fisher State Recreation Area, Division of Parks and Recreation

(22) The Secretary of Environment and Natural Resources for the waiver or modification of non-State cost-share requirements under G.S. 143-215.73G."

CAPE FEAR ESTUARINE RESOURCE RESTORATION

SECTION 14.6.(h) The General Assembly finds that the New Inlet Dam or "The Rocks" was constructed by the United States Army Corps of Engineers in the late 19th century. The New Inlet Dam is composed of two components, a Northern Component that extends from Federal Point to Zeke's Island and a Southern Component that extends southwestward from Zeke's Island and separates the New Inlet from the main channel of the Cape Fear River. The General Assembly further finds that the Southern Component of the New Inlet Dam impedes the natural flow of water between the Cape Fear River and the Atlantic Ocean that occurred prior to emplacement of the dam. The General Assembly further finds that it is necessary to consider removal of the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean. To this end, the Department of Environment and Natural Resources shall do all of the following:

(1) Notify the United States Army Corps of Engineers of the State's intent to study the removal of the Southern Component of the New Inlet Dam.

(2) Issue a Request for Information for a firm capable of conducting an analysis of the costs and benefits of removal of the Southern Component of the New Inlet Dam, including an inventory of all necessary State and federal permits and approvals needed to develop and implement a removal plan. Identification of a capable firm pursuant to this section shall be done in accordance with Article 8 of Chapter 143 of the General Statutes.

(3) Request approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island for both of the following changes:

a. Moving the current western boundary 200 feet seaward and removing the area that lies between the current boundary and the new boundary from the North Carolina National Estuarine Research Reserve.

b. Compensating for any loss of acreage pursuant to sub-subdivision a. of this subdivision by adding a corresponding amount of acreage to the northern boundary of Zeke's Island from adjacent acreage at Fort Fisher State Recreation Area.

(4) If the Department obtains approval from the National Oceanic and Atmospheric Administration to adjust the boundary established for Zeke's Island as described in subdivision (3) of this subsection, the Coastal Resources Commission shall amend 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) as follows:

a. Definitions. – "Reserve Components Rule" means 15A NCAC 070 .0105 (North Carolina Coastal Reserve: Reserve Components) for purposes of this section and its implementation.

b. Reserve Components Rule. – Until the effective date of the revised permanent rule that the Coastal Resources Commission is required to adopt pursuant to sub-subdivision d. of this subdivision, the Commission and the Department of Environment and Natural Resources shall implement the Reserve Components Rule, as provided in sub-subdivision c. of this subdivision.

c. Implementation. – Notwithstanding the Reserve Components Rule, the Commission shall adjust the boundary established for Zeke's Island in conformance with any boundary change that is approved by the National Oceanic and Atmospheric Administration pursuant to subdivision (3) of this subsection.

d. Additional rule-making authority. – The Commission shall adopt a rule to replace the Reserve Components Rule. Notwithstanding G.S. 150B-19(4), the rule adopted by the Commission pursuant to this subdivision shall be substantively identical to the provisions of sub-subdivision c. of this subdivision. Rules adopted pursuant to this subdivision are not subject to Part 3 of Article 2A of Chapter 150B

of the General Statutes. Rules adopted pursuant to this subdivision shall become effective as provided in G.S. 150B-21.3(b1) as though 10 or more written objections had been received as provided by G.S. 150B-21.3(b2).

e. Effective date. – Sub-subdivision c. of this subdivision expires when permanent rules to replace sub-subdivision c. of this subdivision have become effective, as provided by sub-subdivision d. of this subdivision.

Notwithstanding any other provision of law, the Department of Environment and Natural Resources may use funds from the Deep Draft Navigation Channel Dredging and Maintenance Fund, established pursuant to G.S. 143-215.73G, as enacted by subsection (c) of this section, to implement this subsection. No later than April 1, 2016, the Department shall report to the Environmental Review Commission, the chairs of the Senate Appropriations Committee on Natural and Economic Resources and the House Appropriations Committee on Agriculture and Natural and Economic Resources, and the Fiscal Research Division regarding its implementation of this subsection, including a copy of the Request for Information required by subdivision (2) of this subsection and any responses received to the Request. Neither the Department nor any State agency may proceed with the removal of the New Inlet Dam until (i) the Environmental Review Commission has reviewed the report required by this section and (ii) a bill expressly providing authorization for the removal becomes law.

CLARIFY COASTAL COUNTY AUTHORITY OVER ABANDONED VESSELS

SECTION 14.6.(n) Section 1 of S.L. 2013-182 is repealed.

SECTION 14.6.(o) G.S. 153A-132(i), as rewritten by S.L. 2013-182, reads as rewritten:

"(i) A county may by ordinance prohibit the abandonment of vessels in navigable waters within the county's ordinance-making jurisdiction, subject to the provisions of this subsection. The provisions of this section shall apply to abandoned vessels in the same manner that they apply to abandoned or junked motor vehicles to the extent that the provisions may apply to abandoned vessels. For purposes of this subsection, an "abandoned vessel" is one that meets any of the following:

(1) A vessel that is moored, anchored, or otherwise located for more than 30 consecutive days in any 180 consecutive-day period without permission of the dock owner.

(2) A vessel that is in danger of sinking, has sunk, is resting on the bottom, or is located such that it is a hazard to navigation or is an immediate danger to other vessels.

Shipwrecks, vessels, cargoes, tackle, and other underwater archeological remains that have been in place for more than 10 years shall not be considered abandoned vessels and shall not be removed under the provisions of this section without the approval of the Department of Cultural Resources, which is the legal custodian of these properties pursuant to G.S. 121-22 and G.S. 121-23. This subsection applies only to the counties set out in G.S. 113A-103(2)."

EROSION CONTROL STRUCTURES

SECTION 14.6.(p) The Coastal Resources Commission shall amend its rules for the use of temporary erosion control structures to provide for all of the following:

(1) Allow the placement of temporary erosion control structures on a property that is experiencing coastal erosion even if there are no imminently threatened structures on the property if the property is adjacent to a property where temporary erosion control structures have been placed.

(2) Allow the placement of contiguous temporary erosion control structures from one shoreline boundary of a property to the other shoreline boundary, regardless of proximity to an imminently threatened structure.

(3) The termination date of all permits for contiguous temporary erosion control structures on the same property shall be the same and shall be the latest termination date for any of the permits.

(4) The replacement, repair, or modification of damaged temporary erosion control structures that are either legally placed with a current permit or

North Carolina Department of Natural and Cultural Resources

Pat McCrory
Governor

Susan Kluttz
Secretary

January 25, 2016

Mr. Braxton Davis, Director
NC Division of Coastal Management
400 Commerce Avenue
Morehead City, NC 28577

Dear Mr. Davis:

The North Carolina Division of Parks and Recreation appreciates the opportunity to comment on the study for the removal of the southern component of the "New Inlet Dam" along the western boundary of the Zeke's Island component of the N.C. National Estuarine Research Reserve. The Division would like further information on how the project could affect Fort Fisher State Recreation Area and Baldhead Island State Natural Area. Our questions are related to potential water quality impacts; the possibility of extensive erosion of the shoreline associated with Fort Fisher State Recreation Area and Bald Head Island State Natural Area; and potential impacts to rare, threatened and endangered species.

The New Inlet was opened in 1781 during a storm event at a site associated with the traditional location where fisherman had hauled boats over the Barrier Island between the Cape Fear River and the ocean. In the 1870's Congress authorized the closure of the New Inlet and the inlet was physically closed in 1879. Additional structures were added to ensure the permanent closure of the New Inlet. This closure allowed for dredging of the current channel with increased tidal flow due to continued deepening and widening by the USACE.

The Division has several questions related to the proposal to reopen the New Inlet. The reopened inlet would allow the influx of ocean water with a greater salinity as compared to water that currently occurs in the area around Fort Fisher State Recreation Area. These water quality changes should be studied to determine the potential biological impact on the surrounding region.

Secondly, creation of a tidal inlet could have significant impacts on the shoreline adjacent to the proposed inlet location. Opening the New Inlet could impact littoral transport rates and could result in large scale erosion and recession of the adjacent shoreline. These impacts could have a significant effect on both the recreation and natural resource values of Fort Fisher State Recreation Area and Baldhead Island State Natural Area.

Michael A. Murphy, Director
NC Division of Parks and Recreation
1615 Mail Service Center, Raleigh, NC 27699-1615
919-707-9300 / ncparks.gov

The final concern is associated with potential impacts to rare, threatened and endangered species. Fort Fisher is home to a number of species rare to the state. Federally endangered species recorded from this location include Leatherback Sea Turtle and West Indian Manatee. Federally threatened species include Seabeach Amaranth, Loggerhead Sea Turtle, Piping Plover and Green Sea Turtle. Federal Species of Concern include Painted Bunting, Dune Bluecurls and Diamondback Terrapin. The proposed reopening of the New Inlet has the potential to significantly impact habitat which supports these federally listed species. Additional research is needed to determine how these species could be impacted by the proposed reopening of the inlet.

The Division appreciates the opportunity to provide our comments to the Division of Coastal Management regarding this important issue. If you have any further questions regarding this matter please contact Brian Strong at (919) 707-9323.

Sincerely,

Michael A. Murphy

Cc: Brian Strong, Chief of Planning and Natural Resources
Jeff Owen, Superintendent, Fort Fisher State Recreation Area

Resolution # 2015-07

A RESOLUTION EXPRESSING THE CITY OF BOILING SPRING LAKES BOARD OF COMMISSIONERS OPPOSITION TO THE NORTH CAROLINA GENERAL ASSEMBLY'S PROPOSAL IN HOUSE BILL 97 TO REMOVE THE HISTORICAL 1879 NEW INLET DAM

WHEREAS, the City of Boiling Spring Lakes Board of Commissioners ("City") is committed to working with our sister coastal municipalities in being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, the City recognizes that the City and other coastal municipalities' economic survival depends on the sustainability of the existing environment and this proposed legislation necessitates a strong response by all Brunswick communities, environmental conservation organizations, and all interested persons and businesses to oppose this serious economic and environmental threat; and

WHEREAS, the City understand that, based on the analysis of Erik Olsen, P.E., if the Southern half of New Inlet Dam is removed, serious negative consequences will occur. Mr.Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue.

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems-with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport at Oak Island, Bald Head Island and at Fort Fisher, jeopardizing barrier island protection; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AIWW and the vicinity of Southport, creating associated water quality changes because reductions in water exchange in particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear with the Atlantic Ocean, would allow increased flooding due to storm surges associated with major storm events;

NOW, THEREFORE, BE IT RESOLVED, the City of Boiling Spring Lakes Board of Commissioners are opposed to SECTION 24.6(h) of the current version of HOUSE BILL 97

which proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and

BE IT FURTHER RESOLVED, the City of Boiling Spring Lakes Board of Commissioners stand in solidarity with our regional coastal communities who may suffer long-term social, economic and environmental impacts of removing the New Inlet Dam.

BE IT FURTHER RESOLVED, the City of Boiling Spring Lakes Board of Commissioners call upon all North Carolina municipal and county governing bodies of North Carolina to pass resolutions similar to this one and that the League of Municipalities join in this effort.

BE IT FURTHER RESOLVED, the City of Boiling Spring Lakes urge Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism-driven economy.

This the 14th **of July, 2015**

Craig Caster

Craig Caster, Mayor

ATTEST:

Jane McMinn

Jane McMinn, City Clerk

July 14, 2015

Date

CITY OF BOILING SPRING LAKES OFFICIAL SEAL NC

Resolution 15-2097

Town of Carolina Beach
Town Council

A Resolution Opposing the General Assembly's proposed House Bill 97 to remove the Historical 1879 New Inlet Dam

WHEREAS, Carolina Beach is a municipality in New Hanover County where a major economic force is tourism related to the coastal environment; and

WHEREAS, the Town of Carolina Beach endeavors to be a good steward of the coastal environment and its resources; and

WHEREAS, the Carolina Beach Town Council understands that, according to the analysis of Erik Olsen, P.E., if the southern half of the New Inlet Dam is removed, numerous negative consequences will occur;

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems with the introduction of a second inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport to Oak Island, Bald Head Island and Fort Fisher, jeopardizing barrier island protection; and

NOW, THEREFORE, BE IT RESOLVED, the Carolina Beach Town Council is opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and

BE IT FURTHER RESOLVED, the Town Council of Carolina Beach Council Members urge Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism driven economy.

Approved this 14th day of July, 2015.

Dan Wilcox, Mayor

TOWN OF CAROLINA BEACH OFFICIAL SEAL NORTH CAROLINA

Kimberlee Ward

Attest: Kimberlee Ward, Town Clerk

7 14 2015

Date Signed

Town of Caswell Beach
1100 Caswell Beach Road • Caswell Beach, NC 28465
(910) 278-5471 • Fax: 1-866-271-3641 • Website: www.caswellbeach.org

RESOLUTION #2015-009

RESOLUTION EXPRESSING OPPOSITION TO HOUSE BILL 97 AS PROPOSED BY THE NORTH CAROLINA GENERAL ASSEMBLY TO REMOVE THE HISTORIC 1879 NEW INLET DAM

WHEREAS, the Town of Caswell Beach is committed to being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, the Town of Caswell Beach Board of Commissioners recognize that the Town of Caswell Beach and other coastal municipalities' economic survival depends on the sustainability of the existing environment; and this proposed legislation necessitates a strong response by coastal communities, environmental conservation organizations, and all interested persons and businesses to completely understand this potential economic and environmental threat; and

WHEREAS, the Town of Caswell Beach Board of Commissioners understand that the Southern half of New Inlet Dam is being considered for removal; and

WHEREAS, the Town of Caswell Beach Board of Commissioners and members of the public have many questions that have yet to be answered as to the potential impacts the proposed removal of the New Inlet Dam may have on the coastal geography and ecosystem.

NOW, THEREFORE, BE IT RESOLVED, that the Town of Caswell Beach Board of Commissioners are opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which proposes to remove the historic New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879, until the U.S. Army Corps of Engineers completes a detailed engineering study to determine the effects that removal of the New Inlet Dam will have on the Cape Fear area, and a proper amount of time is given for the public and interested parties to comment on said study.

Adopted this 9th day of July, 2015.

Deborah G. Ahlers, Mayor *Pro Tempore*

ATTEST:

Linda C. Bethune, NCCMC, Town Clerk

(SEAL)

Senator Bill Rabon
N.C. Senate
300 N. Salisbury Street, Room 311
Raleigh, NC 27603-5925

24 July 2015

Representative Frank Iler
N.C. House of Representatives
300 N. Salisbury Street, Room 639
Raleigh, NC 27603-5925

Dear Senator Rabon and Representative Iler;

The Town of Holden Beach wishes to expresses its support for the Village of Bald Head Island's opposition to Part V of Senate Bill 160 entitled "Removal of Navigational Obstructions for Ecosystem Restoration and Protection of Navigational Safety" as engrossed; then subsequently appended to House Bill 97 "2015 Appropriations Act" as Section 14.6 (h), "remove the Southern Component of the New Inlet Dam" and yield to their local knowledge and understanding of what's in the best interest for their community.

Thank You,

J. Alan Holden
Mayor
Town of Holden Beach

Cc: VBHI

A RESOLUTION EXPRESSING THE OAK ISLAND TOWN COUNCIL'S OPPOSITION TO THE NORTH CAROLINA GENERAL ASSEMBLY'S PROPOSAL IN HOUSE BILL 97 TO REMOVE THE HISTORICAL 1879 NEW INLET DAM

WHEREAS, the Town of Oak Island is committed to being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, the Oak Island Town Council Members recognize that the Town of Oak Island and other coastal municipalities' economic survival depends on the sustainability of the existing environment and this proposed legislation necessitates a strong response by coastal communities, environmental conservation organizations, and all interested persons and businesses to oppose this serious economic and environmental threat; and

WHEREAS, the Oak Island Town Council Members understand that, based on the analysis (included in this document) of Erik Olsen, P.E., if the Southern half of New Inlet Dam is removed, serious negative consequences will occur. Mr. Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue.

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems-with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport at Oak Island, Bald Head Island and at Fort Fisher, jeopardizing barrier island protection; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AIWW and in the vicinity of Southport, creating associated water quality changes because of reductions in water exchange and in particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear River with the Atlantic Ocean, would allow increased flooding due to storm surges associated with major storm events;

NOW, THEREFORE, BE IT RESOLVED, the Oak Island Town Council Members are opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and

BE IT FURTHER RESOLVED, the Oak Island Town Council Members stand in solidarity with our regional coastal communities who may suffer long-term social, economic and environmental impacts of removing the New Inlet Dam.

BE IT FURTHER RESOLVED, the Oak Island Town Council Members urge Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism-driven economy.

This the 14th day of July, 2015.

Betty W. Wallace

Mayor Betty W. Wallace

ATTEST: Lisa P. Stites

Lisa P. Stites, CMC
Town Clerk

TOWN OF OAK ISLAND
CHARTERED
1999
NORTH CAROLINA

Town of Ocean Isle Beach

Resolution No. 2015 - 13
Date Adopted: July 14, 2015

RESOLUTION IN OPPOSITION TO THE NORTH CAROLINA GENERAL ASSEMBLY'S PROPOSAL IN HOUSE BILL 97 TO REMOVE THE HISTORICAL 1879 NEW INLET DAM

WHEREAS, the Town of Ocean Isle Beach is committed to being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, the Board of Commissioners recognize the Town of Ocean Isle Beach and other coastal municipalities' economic survival depends on the sustainability of the existing environment and this proposed legislation necessitates a strong response by coastal communities, environmental conservation organizations, and all interested persons and businesses to oppose this serious economic and environmental threat; and

WHEREAS, the Board of Commissioners of the Town of Ocean Isle Beach understand that, based on the analysis (included in this document) of Erik Olsen, P.E., if the Southern half of New Inlet Dam is removed, serious negative consequences will occur. Mr. Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue.

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems-with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport at Oak Island, Bald Head Island and at Fort Fisher, jeopardizing barrier island protection; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AIWW and in the vicinity of Southport, creating associated water quality changes because of reductions in water exchange and in particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear River with the Atlantic Ocean, would allow increased flooding due to storm surges associated with major storm events;

NOW, THEREFORE, BE IT RESOLVED, the Board of Commissioners of the Town of Ocean Isle Beach are opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which

proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and

BE IT FURTHER RESOLVED, the Board of Commissioners of the Town of Ocean Isle Beach stand in solidarity with our regional coastal communities who may suffer long-term social, economic and environmental impacts of removing the New Inlet Dam.

BE IT FURTHER RESOLVED, the Board of Commissioners of the Town of Ocean Isle Beach call upon all North Carolina municipal and county governing bodies of North Carolina to pass resolutions similar to this one and that the League of Municipalities join in this effort.

BE IT FURTHER RESOLVED, the Board of Commissioners of the Town of Ocean Isle Beach urge Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism-driven economy.

This the 14th day of July, 2015.

TOWN OF OCEAN ISLE BEACH SEAL NORTH CAROLINA

ATTEST: Sue Stuhr
Sue Stuhr, Town Clerk

Debbie S. Smith
Debbie S. Smith, Mayor

WHITE PAPER

NEW INLET DAM REMOVAL

The following facts or coastal engineering opinions relate to a recent N.C. Legislative proposal (SB160) to remove the historical New Inlet Dam so as to allow for or encourage the reopening of New Inlet which has been closed since 1879. A potential purpose of the reestablishment of New Inlet is to foster a new major navigational channel between the Ocean and various locations within the Cape Fear River.

BACKGROUND

- In 1857, federal nautical charts clearly indicate that New Inlet was a relatively robust tidal inlet having a major influence on the environs of the lower Cape Fear River (see **Figure 1**). At the time, sailing lines existed through *both* New Inlet and the natural primary entrance to the Cape Fear River which is located to the south between Oak Island and Smith Island (known today as Bald Head Island). As an unstabilized inlet, New Inlet's mapped location has varied significantly throughout the years.

- Anecdotally, New Inlet opened in about 1761 during a storm event at a "haulover" location across the barrier island that had been physically lowered by fishermen dragging their boats over the narrow beach which lay between the river and the ocean. It is reported that the haulover was utilized by small craft desiring to avoid transit around or across Frying Pan Shoals located seaward of Cape Fear.

- Various levels of attempted engineered improvements by State interests intended to foster a reliable navigation channel between New Inlet and the City of Wilmington met with little success. Accordingly, portions of the Cape Fear River in the vicinity of the inlet suffered extensive problematic shoaling throughout the 19th Century. In the 1820's, the

State of N.C. formally requested the assistance of the U.S. Army Corps of Engineers via the newly established Rivers and Harbors Act.

- Before 1853, no work had been performed with the goal of improving navigation at the southerly natural entrance to the Cape Fear River. At or about that time however, the historical premise of needing to improve navigation between New Inlet and Wilmington was eventually abandoned. For example, a Commission appointed by the then Secretary of War, Jefferson Davis concluded that prior engineering improvements "attempted" at New Inlet had *not* been sound and had actually impacted or reduced navigability to the City of Wilmington. Not unexpectedly, the Commission similarly deduced that as depths throughout New Inlet increased over time, corresponding depths at the Cape Fear River mouth had decreased. As a result, the Commission subsequently recommended that New Inlet be *closed* in order to attempt to restore naturally occurring navigable depths over the ocean bar at the River entrance back to their pre-1761 conditions. No major navigation works on the Cape Fear were accomplished however until after the Civil War.

- Records show that the Corps of Engineers resumed work on the lower Cape Fear River in 1870. Although New Inlet had been invaluable to the City of Wilmington during the Civil War, it was recognized to be a "liability" after the war due to its propensity for shoaling and lack of reliable depth over its ocean bar. Accordingly, in 1869, Congress authorized a reexamination of the river's navigation system. In 1870, work on the Cape Fear River proceeded in three phrases with the first point of order being the *closure of New Inlet and nearby swashes to the south.* On 14 June 1879, after several years of implementation of various levels of engineered works, New Inlet was physically closed – via the "New Inlet Dam". However, the initial closure of the inlet increased tidal flows through various swashes through the island requiring an extensive second structure extending to the south entitled the "Swash Defense Dam". With the entire tidal prism of the Cape Fear River finally confined to the River mouth, the Wilmington District, USACOE was ultimately able to successfully dredge, expand and maintain a federally

authorized navigation project channel from the Atlantic Ocean to the Port of Wilmington over the subsequent decades.

- In 1913, the Ocean Entrance Channel was dredged to a depth of -26 feet. Since 2000, it has been authorized at a depth of -44 ft. (MLW). As a direct result of channel improvements to the Cape Fear River's hydraulic efficiency, the tidal range at the Port of Wilmington has increased from 2.7 ft. in 1911 to over 4.15 ft. today – due to continuing deepening and widening of the federally authorized navigation channel. Corresponding increases in tidal flow, as well as riverine salinity have likewise occurred.

PREDICTIONS

Based upon historical data, recent numerical DELFT3D modeling (using software licensed from Delft University of Technology in the Netherlands) of the Cape Fear River Entrance by the Village of Bald Head Island and fundamental coastal engineering principles associated with tidal inlet hydromechanics, the following opinions or predictions are rendered for consideration regarding any proposal intended to reopen New Inlet:

- The New Inlet and Swash Dam structures were both authorized by Congress and constructed by the U.S. Army Corps of Engineers. Their removal would therefore necessitate deauthorization by Congress. Such actions would be subject to NEPA and would necessitate appropriate physical and fiscal justification, an Environmental Impact Study and significant federal, state and public coordination. The physical and environmental consequences of reintroducing a second tidal inlet to the Cape Fear River would be significant.

- Similarly, both the nature and the age of the subject dam structures constitute "engineered features" that would qualify for their inclusion in the National Register of Historic Places. Hence, considerations regarding cultural resource impact because of structure removal or modification would be significant. Any associated change in channel alignment could likewise impact the documented site of the CSS Raleigh sunk immediately west of the

inlet dam "Rocks". Any inlet related erosion – after inlet opening – could likewise threaten certain portions of the historical Ft. Fisher complex.

- The entire geomorphology of the entrance to the Cape Fear River as it currently exists – with its Congressionally authorized and routinely maintained federal navigation channel, is dependent upon a *no-flow* condition at New Inlet. Prior to its closure, New Inlet was a relatively robust flowing tidal inlet. With dam removal, the driving forces which influence tidal inlet creation and stability would be expected again to foster a large flowing inlet at its historical location near Fort Fisher. Major alterations to the Cape Fear River's salinity regime, essential fish habitat and entire eco-system – as they exist today – would be *inevitable* with the introduction of a second tidal inlet.

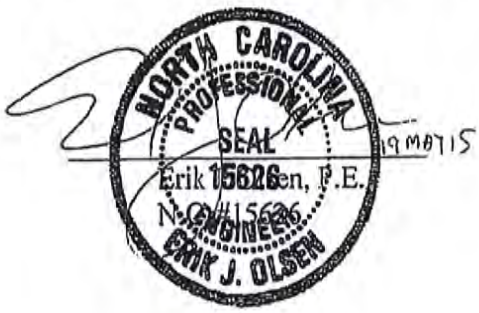
- Moreover, reopening of New Inlet would immediately serve to decrease tidal flow through the Cape Fear River mouth. Subsequently, shoal configurations conducive to today's hydraulic conditions at that location would be subject to significant change. The latter would substantially, influence littoral processes and sediment transport on both Oak Island and Bald Head Island. Federal navigation channel shoaling would be expected to increase significantly thereby requiring more frequent and larger contract dredging operations. Without same, commercial traffic to the Port of Wilmington would be impeded or reduced. To the West of New Inlet in the River, significant transport of sediment from the reopened inlet would result in major maintenance requirements because of shoaling at a location where large scale sediment deposition does not presently occur. Any effort to fix New Inlet at one location in order to meet modern day navigational depth requirements would in all probability necessitate the construction of jetties on the inlet's seaward side.

- The creation (or reintroduction) of *any* tidal inlet along *any* oceanfront shoreline immediately disrupts existing littoral transport rates. As a result, a newly formed tidal inlet becomes an immediate and significant sediment "sink" as ebb and flood tidal shoals at the inlet are formed over time. The net result is large scale erosion and recession of the

adjacent barrier island shorelines which suffer the consequences of the newly established sediment budget. At Bald Head Island, the downdrift shoreline of East Beach (facing Onslow Bay) would suffer long-term and large scale accelerated erosion and shoreline recession due to a highly predictable sediment deficit caused by the reopened (and structurally stabilized) inlet to the north. East Beach presently is relatively stable and is among the most picturesque shorelines in North Carolina, with wide beaches, dune complexes and stately homes. A weakened barrier island upland would again be subject to frequent swash formation during storm events – further exacerbating beach erosion and sediment deficits southward thereof.

- A reduction in tidal flows through the mouth of the Cape Fear River would affect Caswell Beach, Fort Caswell and the two inlet/ocean facing shorelines at Bald Head Island. Changes in tidal flows within the AIWW and in the vicinity of Southport could occur. Associated water quality changes would be expected because of reductions in water exchange at these locations and in particular within the canalized (manmade) segment of the Intracoastal Waterway.

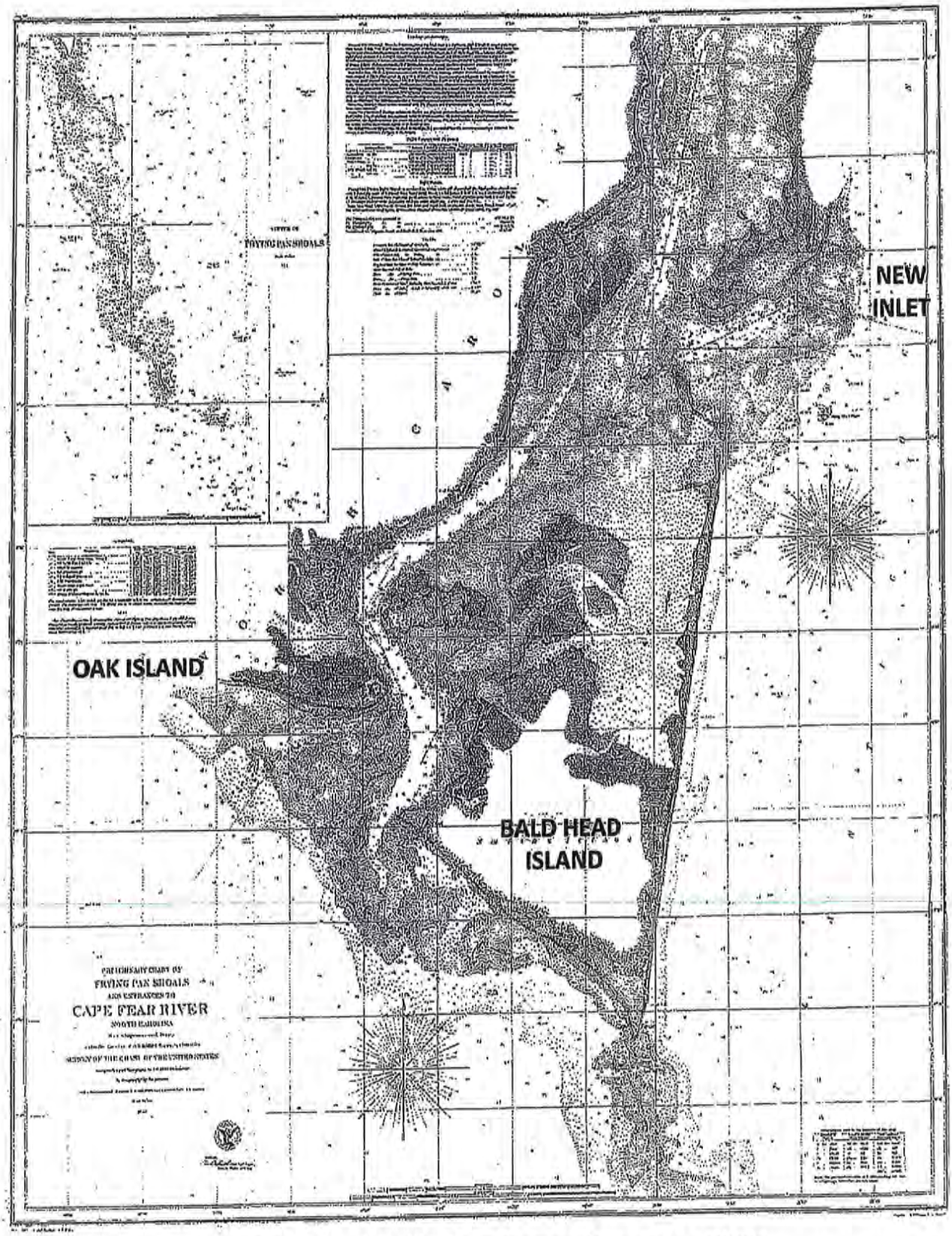
- The reintroduction of a new major inlet connecting the Cape Fear River with the Atlantic Ocean, and in particular one maintained for navigation, would allow for an increase in flooding due to storm surges associated with major storm events. As a result, flood insurance elevations at Southport and other locales within the influence of New Inlet may increase. Existing habitable structures built to today's 100-year storm elevations as established by FEMA, may be deemed non-compliant and subject to higher flooding risks and insurance rates. Increases in tidal range throughout the upper reaches of the Cape Fear River could be realized. If such occurred, corresponding vulnerability to flooding would increase proportionally.



19 MAY 15

Erik J. Olsen, P.E.
N.C. #15626

ATTACH – Figure 1



1857 Navigation Chart – Lower Cape Fear River

Figure 1

BOARD OF ALDERMEN **REGULAR SESSION MINUTES**

COMMUNITY BUILDING **JULY 9, 2015**

223 E. BAY STREET **SOUTHPORT, N.C.**

PRESENT: Mayor Robert D. Howard
Aldermen Mary Ellen Poole, Buddy Barnes,
Todd Coring, Emily Humphreys

ABSENT: Aldermen Jim Powell, Nelson Adams

STAFF PRESENT: Kerry McDuffie, City Manager
Michele Windham, City Clerk
Mike Isenberg, City Attorney
Jerry Dove, Police Chief
Charles Drew, Fire Chief
Melanie Trexler, Finance Director
Cindy Brochure, Tourism Director
Heather Hemphill, Parks & Recreation Director
B. Wayne Strickland, Building Inspector
John Allen, Community Development Specialist

A) Call to Order - 6:00 p.m.

Mayor Howard called the meeting to order at 6:00 p.m.

AGENDA

11. Consideration of Resolution in Opposition to Removal of New Inlet Dam

Alderman Poole motioned, second by Alderman Barnes to adopt the Resolution opposing the removal of New Inlet Dam. **Unanimous vote; motion carried.**

A RESOLUTION EXPRESSING THE SOUTHPORT BOARD OF ALDERMENS' OPPOSITION OF THE NORTH CAROLINA GENERAL ASSEMBLY'S PROPOSAL TO REMOVE THE HISTORICAL NEW INLET DAM SO AS TO ALLOW FOR OR ENCOURAGE THE REOPENING OF NEW INLET WHICH HAS BEEN CLOSED SINCE 1879

WHEREAS, the City of Southport is committed to recognizing and being a sound steward of the unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches on and around Southport; and

WHEREAS, the City of Southport Aldermen recognize that the City of Southport and her sister coastal municipalities' economic survival solely depends on the sustainability of the existing environment and

this proposed legislation calls for a strong response by Southport and surrounding coastal communities, environmental conservation organizations, and all interested persons and businesses to stand firmly in opposition to this serious economic and environmental threat; and

WHEREAS, the City of Southport Aldermen understands that, based on the analysis (included in this document) of Erik Olsen, P.E., if the Southern half of New Inlet Dam is removed, serious negative consequences will occur. Mr. Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue.

WHEREAS, the negative effects may include but are not limited to major alterations to the Cape Fear River's salinity regime, essential fish habitat and entire eco-system-as they exist today- would be inevitable with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport on both Oak Island and Bald Head Island jeopardizing the barrier island protection they provide Southport; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AIWW and in the vicinity of Southport, creating associated water quality changes because of reductions in water exchange and in particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear River with the Atlantic Ocean, would allow increased flooding due to storm surges associated with major storm events and result in possible flood insurance elevations at Southport and other adjacent communities causing higher flooding risks and insurance rates for existing habitable structures built to today's 100-year storm elevations, as established by FEMA; and

NOW, THEREFORE, BE IT RESOLVED, the City of Southport Aldermen are opposed to SECTION 14.6(h) OF THE CURRENT VERSION OF HOUSE BILL 97 which proposes to remove the historical New Inlet Dam so as to allow for or encourage the reopening of new inlet which has been closed since 1879; and

BE IT FURTHER RESOLVED the City of Southport Aldermen stand in solidarity with our regional coastal communities who may suffer long-term social, economic and environmental impacts of removing the New Inlet Dam.

BE IT FURTHER RESOLVED the City of Southport Aldermen calls upon all North Carolina municipal and county governing bodies of North Carolina to pass similar resolutions to this one and that the League of Municipalities join in this effort.

BE IT FURTHER RESOLVED the City of Southport Aldermen urge Governor McCrory and the entire North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline whose natural beauty attracts a proven tourism-driven economy.

On Behalf of the City of Southport Aldermen: July 9, 2015

/s/ Robert D. Howard, Mayor

Attest: /s/ Michele Windham, Clerk

A Resolution Expressing the Sunset Beach Town Council Opposition to the North Carolina General Assembly's Proposal in House Bill 97 to Remove the Historical 1879 New Inlet Dam

WHEREAS, the Town Council for the Town of Sunset Beach is committed to being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, the Town Council for the Town of Sunset Beach recognizes that the Town of Sunset Beach and other coastal municipalities' economic survival depends on the sustainability of the existing environment and this proposed legislation necessitates a strong response by coastal communities, environmental conservation organizations, and all interested persons and businesses to oppose this serious economic and environmental threat; and

WHEREAS, the Town Council for the Town of Sunset Beach understand that, based on the analysis (included in this document) of Erik Olsen, P. E., if the Southern half of the New Inlet Dam is removed, serious negative consequences will occur. Mr. Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue; and

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems-with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport at Oak Island, Bald Head Island and at Fort Fisher, jeopardizing barrier island protection; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AICW and in the vicinity of Southport, creating associated water quality changes because of reductions in water exchange and in particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear River with the Atlantic Ocean would allow increased flooding due to storm surges associated with major storm events.

NOW, THEREFORE, BE IT RESOLVED, that the **Town Council for the Town of Sunset Beach** is opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and,

BE IT FURTHER RESOLVED, that the **Town Council for the Town of Sunset Beach** stands in solidarity with our regional coastal communities who may suffer long-term social, economic and environmental impacts of removing the New Inlet Dam.

BE IT FURTHER RESOLVED, that the **Town Council for the Town of Sunset Beach** calls upon all North Carolina municipal and county governing bodies of North Carolina to pass resolutions similar to this one and that the League of Municipalities join in this effort.

BE IT FURTHER RESOLVED, that the **Town Council for the Town of Sunset Beach** urges Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism-driven economy.

Adopted this the 21st day of July, 2015

TOWN OF SUNSET BEACH

R Watts

Ronald Watts, Mayor

ATTEST:

Lisa H. Anglin

Lisa H. Anglin, Town Clerk

TOWN OF SUNSET BEACH
OFFICIAL SEAL
NC

2015-0601

A RESOLUTION EXPRESSING THE VILLAGE OF BALD HEAD ISLAND VILLAGE COUNCIL'S OPPOSITION TO THE NORTH CAROLINA GENERAL ASSEMBLY'S PROPOSAL IN HOUSE BILL 97 TO REMOVE THE HISTORICAL 1879 NEW INLET DAM

WHEREAS, the Village of Bald Head Island is committed to being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, the Village of Bald Head Island Council Members recognize that the Village of Bald Head Island and other coastal municipalities' economic survival depends on the sustainability of the existing environment and this proposed legislation necessitates a strong response by coastal communities, environmental conservation organizations, and all interested persons and businesses to oppose this serious economic and environmental threat; and

WHEREAS, the Village of Bald Head Island Council Members understand that, based on the analysis (included in this document) of Erik Olsen, P.E., if the Southern half of New Inlet Dam is removed, serious negative consequences will occur. Mr. Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue.

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems-with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport at Oak Island, Bald Head Island and at Fort Fisher, jeopardizing barrier island protection; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AIWW and in the vicinity of Southport, creating associated water quality changes because of reductions in water exchange and in particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear River with the Atlantic Ocean, would allow increased flooding due to storm surges associated with major storm events;

NOW, THEREFORE, BE IT RESOLVED, the Village of Bald Head Island Council Members are opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and

BE IT FURTHER RESOLVED, the Village of Bald Head Island Council Members stand in solidarity with our regional coastal communities who may suffer long-term social, economic and environmental impacts of removing the New Inlet Dam.

BE IT FURTHER RESOLVED, the Village of Bald Head Island Council Members call upon all North Carolina municipal and county governing bodies of North Carolina to pass resolutions similar to this one and that the League of Municipalities join in this effort.

BE IT FURTHER RESOLVED, the Village of Bald Head Island Council Members urge Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism-driven economy.

This the 19th day of June, 2015.

A. Eugene Douglas

Mayor Pro Tem, A. Eugene Douglas

VILLAGE OF BALD HEAD ISLAND
SEAL
NORTH CAROLINA

ATTEST:

Daralyn M. Spivey

Daralyn M. Spivey

Village Clerk

The Village of Bald Head Island

May 19, 2015

Senator Bill Rabon *(via e-mail)*
N.C. Senate 8th District
State Legislative Office Building
300 N. Salisbury Street, Room 311
Raleigh, NC 27603-5925

Representative Frank Iler *(via e-mail)*
N.C. House of Representatives 17th District
State Legislative Office Building
300 N. Salisbury Street, Room 639
Raleigh, NC 27603-5925

Subject: Village of Bald Head Island Concerns Related to SB 160, Part V., Removal of Navigational Obstructions for Eco-System Restoration and Protection of Navigational Safety

Dear Senator Rabon and Representative Iler:

First, let me thank you for your time and efforts over the past several years in working with the Village of Bald Head Island to assist in our efforts to mitigate the erosion along the "Point" adjacent to the Wilmington Harbor Federal Navigation Channel. Specifically, with your assistance in getting the necessary legislation passed, the Village's ability to permit and construct a terminal groin structure has come to fruition. Construction of this much needed improvement is underway.

We must be vigilant, however, in our efforts to protect Brunswick County's pristine beaches and maritime forest. Of significant concern is the proposed SB 160 legislation, specifically Part V., Section 5.1 (a-e), for the purported necessity to remove the Southern Component of the New Inlet Dam in order to reestablish the natural hydrodynamic flow between the Cape Fear River and the Atlantic Ocean.

If this proposed bill is passed and the Southern half of New Inlet Dam is removed, this would have serious negative consequences, the likes of which the Village has been dealing with at the "Point" for many years. The issues would be expanded to occur also at Fort Fisher and in the area of East Beach, which is directly to the South of Zeke's Island and of the portion of the inlet that would be reopened. Increased shoaling and maintenance dredging expense also would occur to the Wilmington Harbor Federal

Navigation Channel. Increased salt water intrusion also may adversely affect Bald Head's Maritime Forest, a substantial and unique State-owned resource.

For your consideration is the attached White Paper of recognized coastal engineer Erik Olsen, P.E. Mr. Olsen, who has decades of experience with Coastal NC and these issues, offers his professional opinion of the likely adverse results of the proposed action. His opinions are shared by other coastal engineers who have reviewed the matter.

I would ask that you forward this information to your colleagues for their consideration. I am glad to discuss this or to provide any additional information that may be helpful.

Sincerely,

Andy Sayre, Mayor
Village of Bald Head Island

pc: U.S. Congressman David Rouzer, North Carolina 7th District
Senator Michael Lee, New Hanover County 9th District
Colonel Kevin P. Landers, Commander USCOE Wilmington District
Donald R. van der Vaart, DENR Secretary
Braxton Davis, DCM Director
Susan W. Kluttz, Cultural Resources Secretary
Laura Blair, Senior Director, External Affairs NCSPA
Jeff Warren, Senior Policy Advisor, Environment, Office of President Pro Tem

WHITE PAPER

NEW INLET DAM REMOVAL

The following facts or coastal engineering opinions relate to a recent N.C. Legislative proposal (SB160) to remove the historical New Inlet Dam so as to allow for or encourage the reopening of New Inlet which has been closed since 1879. A potential purpose of the reestablishment of New Inlet is to foster a new major navigational channel between the Ocean and various locations within the Cape Fear River.

BACKGROUND

- In 1857, federal nautical charts clearly indicate that New Inlet was a relatively robust tidal inlet having a major influence on the environs of the lower Cape Fear River (see **Figure 1**). At the time, sailing lines existed through *both* New Inlet and the natural primary entrance to the Cape Fear River which is located to the south between Oak Island and Smith Island (known today as Bald Head Island). As an unstabilized inlet, New Inlet's mapped location has varied significantly throughout the years.

- Anecdotally, New Inlet opened in about 1761 during a storm event at a "haulover" location across the barrier island that had been physically lowered by fishermen dragging their boats over the narrow beach which lay between the river and the ocean. It is reported that the haulover was utilized by small craft desiring to avoid transit around or across Frying Pan Shoals located seaward of Cape Fear.

- Various levels of attempted engineered improvements by State interests intended to foster a reliable navigation channel between New Inlet and the City of Wilmington met with little success. Accordingly, portions of the Cape Fear River in the vicinity of the inlet suffered extensive problematic shoaling throughout the 19th Century. In the 1820's, the

State of N.C. formally requested the assistance of the U.S. Army Corps of Engineers via the newly established Rivers and Harbors Act.

- Before 1853, no work had been performed with the goal of improving navigation at the southerly natural entrance to the Cape Fear River. At or about that time however, the historical premise of needing to improve navigation between New Inlet and Wilmington was eventually abandoned. For example, a Commission appointed by the then Secretary of War, Jefferson Davis concluded that prior engineering improvements "attempted" at New Inlet had *not* been sound and had actually impacted or reduced navigability to the City of Wilmington. Not unexpectedly, the Commission similarly deduced that as depths throughout New Inlet increased over time, corresponding depths at the Cape Fear River mouth had decreased. As a result, the Commission subsequently recommended that New Inlet be *closed* in order to attempt to restore naturally occurring navigable depths over the ocean bar at the River entrance back to their pre-1761 conditions. No major navigation works on the Cape Fear were accomplished however until after the Civil War.

- Records show that the Corps of Engineers resumed work on the lower Cape Fear River in 1870. Although New Inlet had been invaluable to the City of Wilmington during the Civil War, it was recognized to be a "liability" after the war due to its propensity for shoaling and lack of reliable depth over its ocean bar. Accordingly, in 1869, Congress authorized a reexamination of the river's navigation system. In 1870, work on the Cape Fear River proceeded in three phrases with the first point of order being the *closure of New Inlet and nearby swashes to the south.* On 14 June 1879, after several years of implementation of various levels of engineered works, New Inlet was physically closed – via the "New Inlet Dam". However, the initial closure of the inlet increased tidal flows through various swashes through the island requiring an extensive second structure extending to the south entitled the "Swash Defense Dam". With the entire tidal prism of the Cape Fear River finally confined to the River mouth, the Wilmington District, USACOE was ultimately able to successfully dredge, expand and maintain a federally

authorized navigation project channel from the Atlantic Ocean to the Port of Wilmington over the subsequent decades.

- In 1913, the Ocean Entrance Channel was dredged to a depth of -26 feet. Since 2000, it has been authorized at a depth of -44 ft. (MLW). As a direct result of channel improvements to the Cape Fear River's hydraulic efficiency, the tidal range at the Port of Wilmington has increased from 2.7 ft. in 1911 to over 4.15 ft. today – due to continuing deepening and widening of the federally authorized navigation channel. Corresponding increases in tidal flow, as well as riverine salinity have likewise occurred.

PREDICTIONS

Based upon historical data, recent numerical DELFT3D modeling (using software licensed from Delft University of Technology in the Netherlands) of the Cape Fear River Entrance by the Village of Bald Head Island and fundamental coastal engineering principles associated with tidal inlet hydromechanics, the following opinions or predictions are rendered for consideration regarding any proposal intended to reopen New Inlet:

- The New Inlet and Swash Dam structures were both authorized by Congress and constructed by the U.S. Army Corps of Engineers. Their removal would therefore necessitate deauthorization by Congress. Such actions would be subject to NEPA and would necessitate appropriate physical and fiscal justification, an Environmental Impact Study and significant federal, state and public coordination. The physical and environmental consequences of reintroducing a second tidal inlet to the Cape Fear River would be significant.

- Similarly, both the nature and the age of the subject dam structures constitute "engineered features" that would qualify for their inclusion in the National Register of Historic Places. Hence, considerations regarding cultural resource impact because of structure removal or modification would be significant. Any associated change in channel alignment could likewise impact the documented site of the CSS Raleigh sunk immediately west of the

inlet dam "Rocks". Any inlet related erosion – after inlet opening – could likewise threaten certain portions of the historical Ft. Fisher complex.

- The entire geomorphology of the entrance to the Cape Fear River as it currently exists – with its Congressionally authorized and routinely maintained federal navigation channel, is dependent upon a *no-flow* condition at New Inlet. Prior to its closure, New Inlet was a relatively robust flowing tidal inlet. With dam removal, the driving forces which influence tidal inlet creation and stability would be expected again to foster a large flowing inlet at its historical location near Fort Fisher. Major alterations to the Cape Fear River's salinity regime, essential fish habitat and entire eco-system – as they exist today – would be *inevitable* with the introduction of a second tidal inlet.

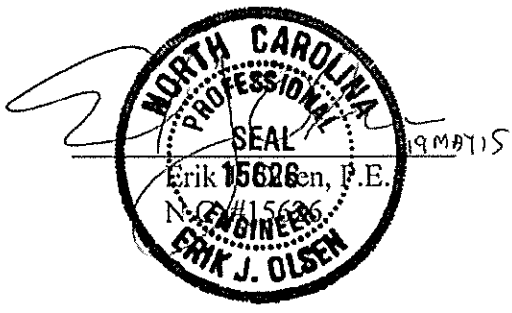
- Moreover, reopening of New Inlet would immediately serve to decrease tidal flow through the Cape Fear River mouth. Subsequently, shoal configurations conducive to today's hydraulic conditions at that location would be subject to significant change. The latter would substantially, influence littoral processes and sediment transport on both Oak Island and Bald Head Island. Federal navigation channel shoaling would be expected to increase significantly thereby requiring more frequent and larger contract dredging operations. Without same, commercial traffic to the Port of Wilmington would be impeded or reduced. To the West of New Inlet in the River, significant transport of sediment from the reopened inlet would result in major maintenance requirements because of shoaling at a location where large scale sediment deposition does not presently occur. Any effort to fix New Inlet at one location in order to meet modern day navigational depth requirements would in all probability necessitate the construction of jetties on the inlet's seaward side.

- The creation (or reintroduction) of *any* tidal inlet along *any* oceanfront shoreline immediately disrupts existing littoral transport rates. As a result, a newly formed tidal inlet becomes an immediate and significant sediment "sink" as ebb and flood tidal shoals at the inlet are formed over time. The net result is large scale erosion and recession of the

adjacent barrier island shorelines which suffer the consequences of the newly established sediment budget. At Bald Head Island, the downdrift shoreline of East Beach (facing Onslow Bay) would suffer long-term and large scale accelerated erosion and shoreline recession due to a highly predictable sediment deficit caused by the reopened (and structurally stabilized) inlet to the north. East Beach presently is relatively stable and is among the most picturesque shorelines in North Carolina, with wide beaches, dune complexes and stately homes. A weakened barrier island upland would again be subject to frequent swash formation during storm events – further exacerbating beach erosion and sediment deficits southward thereof.

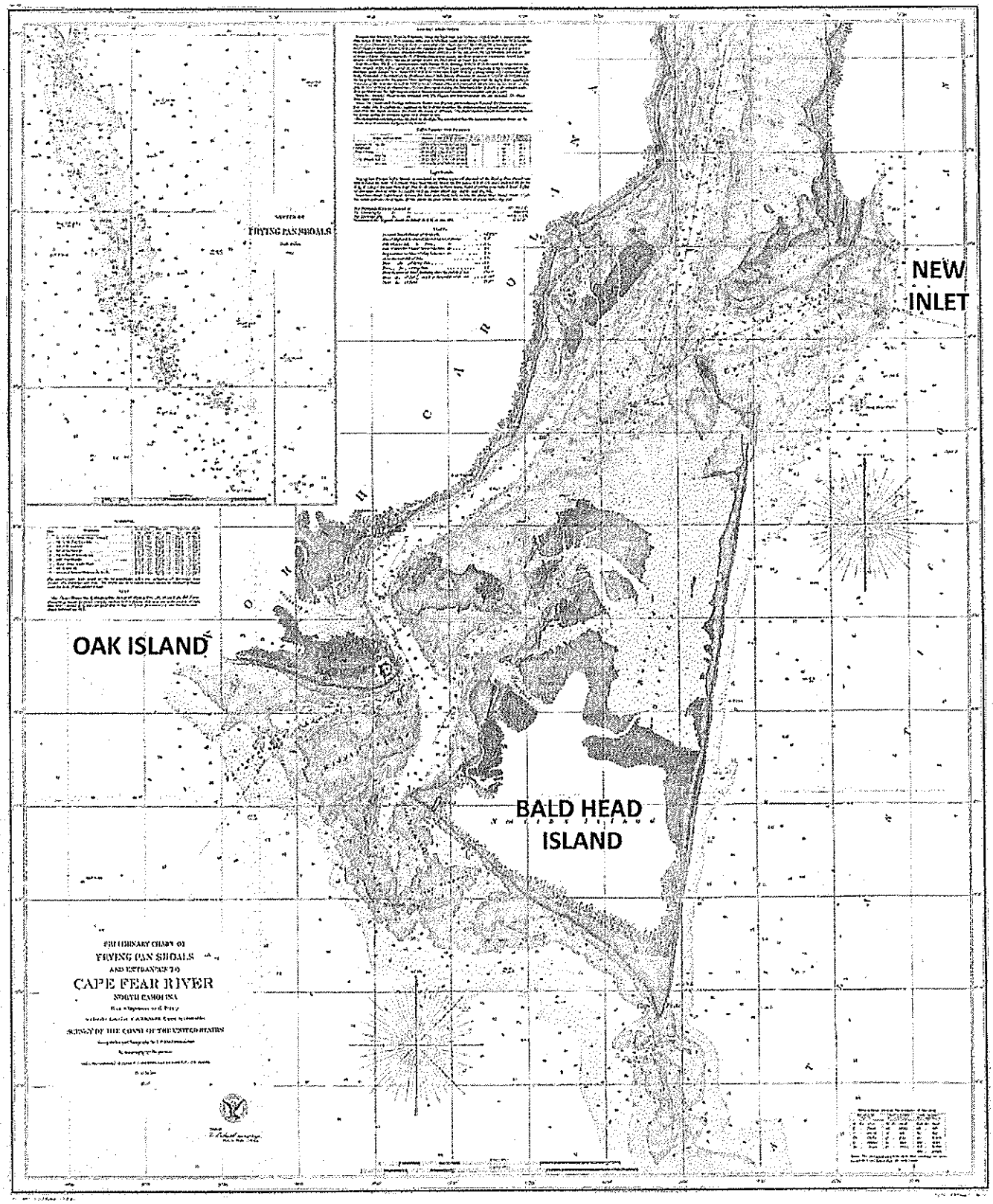
- A reduction in tidal flows through the mouth of the Cape Fear River would affect Caswell Beach, Fort Caswell and the two inlet/ocean facing shorelines at Bald Head Island. Changes in tidal flows within the AIWW and in the vicinity of Southport could occur. Associated water quality changes would be expected because of reductions in water exchange at these locations and in particular within the canalized (manmade) segment of the Intracoastal Waterway.

- The reintroduction of a new major inlet connecting the Cape Fear River with the Atlantic Ocean, and in particular one maintained for navigation, would allow for an increase in flooding due to storm surges associated with major storm events. As a result, flood insurance elevations at Southport and other locales within the influence of New Inlet may increase. Existing habitable structures built to today's 100-year storm elevations as established by FEMA, may be deemed non-compliant and subject to higher flooding risks and insurance rates. Increases in tidal range throughout the upper reaches of the Cape Fear River could be realized. If such occurred, corresponding vulnerability to flooding would increase proportionally.



Erik [illegible]sen, P.E.
N.C. #15626

ATTACH – Figure 1



1857 Navigation Chart – Lower Cape Fear River

Figure 1

North Carolina Beach,
Inlet & Waterway Association

Post Office Box 440
Wrightsville Beach, NC 28480

A RESOLUTION EXPRESSING NCBIWA'S OPPOSITION TO THE NORTH CAROLINA GENERAL ASSEMBLY'S PROPOSAL IN HOUSE BILL 97 TO REMOVE THE HISTORICAL 1897 NEW INLET DAM

WHEREAS, NCBIWA is committed to being a steward of the Region's unique coastal environment, including estuaries, marshes, barrier islands and pristine beaches; and

WHEREAS, NCBIWA Board Members recognize that coastal communities' economic survival depends on the sustainability of the existing environment and this proposed legislation necessitates a strong response by the coastal communities, environmental conservation organizations, and all interested persons and businesses to oppose this serious economic and environmental threat; and

WHEREAS, NCBIWA Board Members understand that, based on the analysis (included in this document) of Erik Olsen, P.E., if the Southern half of New Inlet Dam is removed, serious negative consequences will occur. Mr. Olsen has decades of experience with coastal North Carolina and these issues and his opinions are shared by other coastal engineers that have reviewed this issue.

WHEREAS, the negative effects may include but are not limited to alterations to the Cape Fear River's salinity regime, essential fish habitat and eco-systems with the introduction of a second tidal inlet. Additionally, hydraulic condition changes would substantially influence littoral processes and sediment transport at Oak Island, Bald Head Island and at Fort Fisher, jeopardizing barrier island protection; and

WHEREAS, changes in tidal flows through the mouth of the Cape Fear River could create alterations within the AIWW and in the vicinity of Southport, creating associated water quality changes because of reductions in water exchange and in

particular within the canalized (manmade) segment of the Intracoastal Waterway; and

WHEREAS, the reintroduction of a major inlet connecting the Cape Fear River with the Atlantic Ocean, would allow increased flooding due to storm surges associated with major storm events;

NOW, THEREFORE, BE IT RESOLVED, the NCBIWA Board Members are unanimously opposed to SECTION 14.6(h) of the current version of HOUSE BILL 97 which proposes to remove the historical New Inlet Dam to allow the reopening of New Inlet, which has been closed since 1879; and

BE IT FURTHER RESOLVED, NCBIWA urges all North Carolina municipal and county governing bodies of North Carolina to pass resolutions similar to this one and they urge Governor McCrory and the North Carolina General Assembly to oppose policies that risk the health, safety and sound environmental stewardship of North Carolina's coastline, whose natural beauty attracts a proven tourism-driven economy.

This 13th day of July, 2015

James R. Leutze, Ph.d., Chair
(Chancellor Emeritus, UNC-Wilmington)

Attacment A
NC DEQ RFI

Figure 2. Photograph taken 12.11.2015 on the New Inlet Dam approximately 0.25 miles south of Zeke's Island looking north along the dam at low tide. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Figure 3. Photograph taken 12.11.2015 on the New Inlet Dam at low tide depicting a more intact portion of the dam surface. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Figure 4. Photograph taken 12.11.2015 on the New Inlet Dam at low tide depicting a less intact portion of the dam surface. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.

Figure 5. Photograph taken 12.11.2015 on the New Inlet Dam at low tide depicting a concrete cap on a portion of the dam surface. Photograph is for informational purposes only to support the Request for Information per 2015 Appropriations Act Section 14.6.(h) and does not necessarily represent conditions along the entire length of the New Inlet Dam.