UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
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Gloucester, MA 01930

November 10, 2021

Peter R. Blum P.E.
Chief, Planning Division
U.S. Army Corps of Engineers, Philadelphia District
Attn: Environmental Resources Branch CENAP-PL-E
Wanamaker Bldg., 100 Penn Square East
Philadelphia, PA 19107-3390

RE: New Jersey Back Bay Coastal Storm Risk Management Study: Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement

Dear Mr. Blum:

We have reviewed the New Jersey Back Bays (NJBB) Coastal Storm Risk Management (CSRM) Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement (DIFR- EIS) and accompanying Essential Fish Habitat (EFH) Assessment and Biological Assessment (BA) developed by the U.S. Army Corps of Engineers (USACE), Philadelphia District (District), in partnership with the New Jersey Department of Environmental Protection (NJDEP). The report presents preliminary findings of a study to identify CSRM strategies to increase resilience and to reduce risk from future storms and compounding impacts of sea level change for the network of interconnected tidal water bodies located inland of the New Jersey ocean coastline in Monmouth, Ocean, Atlantic, Burlington, and Cape May counties, identified as the back bay area (Study Area). According to the document, the objective of the NJBB CSRM Study (Study) is to investigate CSRM problems and identify solutions to reduce damage from coastal flooding that affect populations, critical infrastructure, property, and ecosystems. We are a cooperating agency in the National Environmental Policy Act (NEPA) process.

We recognize that the Council on Environmental Quality (CEQ) (40 CFR 1508.28) and USACE (33 CFR 230.13) regulations allow NEPA studies for large, complex projects such as this one to be carried out in a multi-stage or "tiered" process and that NEPA documents prepared using this approach to describe the project and its impacts at a broader level while taking into account the full range of potential effects to both the human and natural environment. However, significant deficiencies exist in the document and in the coordination process used in its development. As a result, we cannot support carrying forward the Tentatively Selected Plan (TSP) as it is currently described, which includes storm surge barriers across three coastal inlets (Manasquan, Barnegat, and Great Egg) and two cross bay barriers, into a Final Integrated Feasibility Report-Environmental Impacts Statement and subsequent Chief's Report to Congress. We recommend that the District re-evaluate the actions proposed in the TSP and develop a revised plan that evaluates, avoids, and minimizes effects to NOAA trust resources and coastal ecosystems, prioritizes the use of non-structural and other land use management options and natural and nature-based solutions, and is consistent with the NOAA/USACE Infrastructure Systems

Rebuilding Principles developed in 2013 which include improving coastal resilience by pursuing a systems approach that incorporates natural, social, and built systems as a whole.

As stated in our letter dated September 30, 2021, the DIFR-EIS and associated Biological and EFH Assessments do not contain sufficient information on the proposed action or its effects to allow for the initiation of consultations under Section 7 of the Endangered Species Act (ESA) or under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for EFH. As a result, our comments on the document included in the enclosed attachment represent technical assistance to inform your decisions and project planning as the Study moves forward. We caution, however, that the actions currently included in the TSP (i.e., two cross-bay barriers and storm surge barriers across three coastal inlets) will have significant negative consequences to NOAA trust resources including federally managed species for which EFH has been designated, Habitat Areas of Particular Concern (HAPC) for summer flounder and sandbar shark, and other commercially, recreationally, and ecologically important species. While we recognize that the USACE's SMART (Specific, Measurable, Attainable, Risk Informed, Timely) Planning process and the tiered NEPA approach are intended to allow for an iterative process based upon risk informed decision points, the low level of information available in the DIFR-EIS on the existing conditions and resources within the Study Area, the lack of details on the proposed structural components of the TSP including the materials and methods of construction, and the high degree of uncertainty regarding the adverse ecological effects of the TSP actions prevent a robust evaluation of the direct, indirect, individual, and cumulative impacts on aquatic resources including EFH and ESA-listed species.

We are also concerned that meaningful early interagency coordination to inform the development of the TSP and DIFR-EIS did not occur as described in the *U.S. Army Corps of Engineering SMART Planning Feasibility Studies: A Guide to Coordination and Engagement with the Services* (USACE 2015) developed jointly by USACE, NOAA's National Marine Fisheries Service (NMFS), and the US Fish and Wildlife Service (FWS). In this guidance document, the USACE recognizes the importance of substantive, early engagement and the need to ensure NMFS and FWS (collectively called the "Services") are fully informed, engaged, and able to review and shape project proposals. While we have participated in a number of interagency webinars and public meetings and have provided extensive comments during project scoping and throughout the Study, these efforts did not result in any meaningful discussions of project modifications to avoid or minimize adverse effects to our trust resources or the inclusion of studies or the collection of data to adequately evaluate the effects of the TSP on aquatic resources. In addition, the Services were not included as members of the Project Delivery Team (PDT) as allowed for in the 2015 guidance and have not been fully engaged during the scoping and alternatives evaluation and analysis phase of the Study. For a study of such a large scope and degree of potential effects to fish and wildlife, participation of the Services on the PDT would have greatly benefited the feasibility study process.

Further, pursuant to Section 2(b) of the Fish and Wildlife Coordination Act (FWCA), the USACE is required to consult with the Services on activities that affect, control, or modify waters of any stream or bodies of water. It also requires the USACE to consider the effects that these activities would have on fish and wildlife and must also provide for the improvement of these resources. During the scoping phase of the Study, coordination with the Services should have occurred to develop a scope of work and timelines for completion for either a FWCA 2(b) Report or Planning Aid letter. The purpose of these documents is to identify problems and opportunities related to the conservation and enhancement of all potentially impacted fish and wildlife resources and, according to the SMART Planning Guidance, is critical for the USACE alternatives development. The DIFR-EIS, with the TSP, or initially preferred alternative, was prepared and released for public comment prior to the development of the required FWCA 2(b) Report and the associated coordination with the Services. This is inconsistent with FWCA and the USACE's own policies.

As stated in our July 23, 2021, comments on the preliminary draft of the DIFR-EIS, the document is extremely lengthy and difficult to read. There are numerous inconsistencies and issues including typographical, grammatical, and content errors. As currently written, the effects of the TSP implementation are difficult to find in the document and significant gaps in the information used by the District to develop the TSP appear to exist. Consequently, the technical assistance comments provided in the attached document are grouped into broad general categories and do not generally include specific comments on individual sections of the document.

Although we cannot support the TSP as currently proposed, we are willing to work collaboratively with the USACE, NJDEP, and other federal, state, and local agencies and stakeholders on the development of a plan that identifies practicable solutions to reduce damages from coastal flooding that affect population, critical infrastructure, property, and ecosystems while minimizing adverse impacts to NOAA trust resources and coastal ecosystems. We are also available to discuss data gaps, information needs, and the required consultations with you or your staff if you have any questions about our comments. If you would like to discuss this matter further, please contact Jessie Murray at (978) 675-2175 or jessie.murray@noaa.gov with our Habitat and Ecosystem Services Division and/or Peter Johnsen at (978) 281-9416 or peter.b.johnsen@noaa.gov with our Protected Resources Division.

Sincerely,

Michael Pentony
Regional Administrator

cc:
USACE NAP- S. Allen, M. Brandreth
USACE – NAD – R.Weichenberg
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Attachment
NOAA Fisheries Technical Assistance Comments
US Army Corps of Engineers
New Jersey Back Bays (NJBB) Coastal Storm Risk Management (CSRM) Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement (DIFR-EIS)

Introduction

The New Jersey Back Bays (NJBB) Coastal Storm Risk Management (CSRM) Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement (DIFR-EIS) presents preliminary findings of a Study to identify CSRM strategies to increase resilience and to reduce risk from future storms and compounding impacts of sea level change (SLC) for the New Jersey Back Bays region. The Study was undertaken by the U.S. Army Corps of Engineers (USACE), Philadelphia District (District), in partnership with the New Jersey Department of Environmental Protection (NJDEP). According to the DIFR-EIS, the objective of the NJBB CSRM Study is to investigate CSRM problems and identify solutions to reduce damages from coastal flooding that affect population, critical infrastructure, property, and ecosystems. The report discusses a Tentatively Selected Plan (TSP) for the network of interconnected tidal water bodies located inland of the New Jersey ocean coastline in Monmouth, Ocean, Atlantic, Burlington, and Cape May counties, identified as the back bay area (Study Area). Specifically, the TSP includes:

- Storm surge barriers at Manasquan Inlet, Barnegat Inlet, and Great Egg Harbor Inlet.
- Cross-bay barriers along Absecon Boulevard/Route 30 in Atlantic County and along an extension of 52nd Street (spans across the bay along the old railroad abutment) in Ocean City, Cape May County.
- Perimeter measures including floodwalls, levees and seawalls which tie the storm surge barriers and cross-bay barriers into adjacent higher ground.
- Elevating 18,800 structures (including homes and businesses) in Monmouth, Ocean, Atlantic, and Cape May counties. (Note: there are approximately 182,000 structures in the Study Area.

The TSP also includes additional options for non-structural measures and perimeter plans as well as some conceptual ideas for natural and nature-based features (NNBF).

The District is using a tiered approach to the NEPA process in evaluating the current risks of coastal flooding and SLC within the Study Area. The Tier 1 level of review is general in nature and scope, and uses available information in assessing the effects of its TSP on the human environment rather than collecting new information. NEPA documents prepared using this approach describe the project and its impacts at a broader level while taking into account the full range of potential effects to both the human and natural environment. Unfortunately, the document does not account for the full range of these potential effects and fails to fully consider a number of significant issues including many of the direct, indirect and cumulative effects of the TSP on NOAA trust resources and other natural and ecosystem functions, as well as the synergistic effects of storm surge, precipitation and other coastal storm induced weather conditions.

The DIFR-EIS states “except for current structural alignments where direct footprint impacts can be assessed on the various habitats affected, indirect impacts such as on water quality and aquatic life can only be assessed at this level with existing physical modeling. Therefore, only general impacts and/or a range of impacts utilizing existing information have been identified at this stage of the NJBB CSRM feasibility study and associated NEPA analysis, which will continue into a Tier 2 level during the Preconstruction, Engineering and Design (PED) phase.” The document further states that in the Tier 2 EIS, “subsequent refinements in structural design features, detailed physical and biological modeling, and the practice of avoiding and minimizing impacts with design refinements and appropriate compensatory mitigation will further inform the environmental risk level with a goal of reducing the environmental risks to a lower level than is currently identified.” Unfortunately, even with the level of detail presented in the DIFR-EIS, it is evident that the significant environmental impacts including substantial adverse effects to aquatic resources of national importance including essential fish habitat (EFH), federally managed species, Special Aquatic Sites and other NOAA trust resources will result from the implementation of the structural elements of the TSP and these adverse effects cannot be rectified with design refinements and compensatory mitigation that would be developed in the PED phase.

The DIFR-EIS identifies numerous impacts to the aquatic environment resulting from the implementation of the TSP, including the filling of over 154 acres of wetlands, mud flats, submerged aquatic vegetation (SAV), and open waters of the Study Area, as well the potential for the TSP to impact water quality, tidal flow and regime, sediment transport, and the early life stages of a variety of aquatic organisms, but these are discussed in general terms. Further, this is an assumed estimated area based on outdated mapping and according to the DIFR-EIS, may be much more significant. Because of the limited analysis in the Tier 1 NEPA document, the report does not quantify the potential numerous indirect, cumulative, and synergist impacts that could occur. Also, while compensatory mitigation is mentioned, the document does not clearly explain how adverse impacts have been avoided or minimized or the amount and type of compensatory mitigation that will be necessary to offset all of the direct and indirect impacts of the implementation of the TSP.

Putting off the full analysis of effects and the avoidance and minimization of adverse effects to the planned Tier 2 NEPA document to be developed during the PED phase of the Study will allow a plan with high risk for significant ecological harm and little understanding of the consequences of this harm to coastal ecosystems, fisheries, and the communities and economies upon which they depend to be submitted to Congress for approval. Studies, data collection, and modelling needed to fully evaluate all of the direct, indirect, individual, and cumulative effects of the TSP elements and a robust analysis of alternatives that avoid and minimize adverse effects to aquatic resources should be undertaken to inform the Final Integrated Feasibility Report and Tier 1 Environmental Impact Statement (FIFR-EIS), not after Congressional approval of the plan.

Project Coordination

The proposed project was first presented to us in 2016, following the outcomes and framework developed in the North Atlantic Coastal Comprehensive Study, which provided Tier 1 (i.e., regional scale) analysis of CSRM studies. In our September 26, 2016, letter, we provided comments on the scoping for this Study outlining important aquatic resources within the Study Area, consultation requirements, and effects that should be considered. We also provided extensive comments on the Study via email on August 5, 2017, outlining a number of significant concerns and issues including:

- The construction of structural measures such as storm surge barriers across inlets would result in a substantial and unacceptable impact to aquatic resources of national importance, including essential fish habitat;
- A great deal of time, effort, and funding would be needed to assess fully all of the ecological consequences of installing structures on inlets and across the back bays;
- The potential controversy over the environmental impacts and costs; and
- Public health and safety issues associated with restricting access for commercial fishermen, recreational boaters and U.S. Coast Guard vessels through the affected inlets.

In our letter dated February 6, 2018, we accepted your invitation to become a cooperating agency in the NEPA process per the requirements of Section 1005 of the Water Resources Reform and Development Act of 2014. We provided additional substantive comments on the *Interim Feasibility Study and Environmental Scoping Documen*t (Interim Report) via email on May 1, 2019, and on the preliminary draft DIFS-EIS on July 23, 2021. Unfortunately, the majority of the concerns and issues expressed in our previous comments remain unaddressed and do not appear to have influenced the outcome of the Study or affected selection of the TSP, nor have you done any of the recommended studies to inform the development of the TSP or to evaluate the environmental consequences the proposed structural measures.

We also participated in a June 6, 2019, workshop to develop a New York/New Jersey Bight Conceptual Ecological Model. The goals of the workshop were to:

- Refine the overarching model development approach;
- Develop conceptual models of the seven ecosystem types and connectivity analyses.
- Develop a preliminary set of hypotheses qualitatively describing the response of each ecosystem to potential flood risk management actions; and
- Collate sources of available data, existing models, and expertise useful for development.

According to the workshop information provided to us, the USACE's modeling objective was "to articulate the mechanisms and magnitude of environmental effects of proposed coastal storm risk management actions in the New York Bight Ecosystem as needed for project decision-making." It was our understanding that this model would be used in the development and analysis of alternatives, project plans, effects evaluation, and TSP selection in several ongoing CSRM within the New York Bight include the NJBB Study, the Nassau County Back Bay Study, and the New York/New Jersey Harbor and Tributaries Study. While this conceptual model is mentioned in the report, it is clear that the model has not been completed and the results and outputs necessary for decision-making have not been incorporated into the Study.

The *U.S. Army Corps of Engineering SMART Planning Feasibility Studies: A Guide to Coordination and Engagement with the Services* (SMART Planning Guidance; USACE 2015), developed jointly by the USACE, NOAA Fisheries and the US Fish and Wildlife Service (FWS) (collectively, the "Services") stresses the inclusion of the resource agencies "to identify the significant resources at risk, to better understand the important questions to ask regarding those resources and risks, and to determine the information needed to answer those questions and reduce risk." While we have responded to numerous requests for comment, and attended many interagency meetings and workshops, based upon the contents of the report, this coordination appears to have had only a superficial effect on the DIFR-EIS and no discernible effect on the development of the TSP. The SMART Planning Guidance emphasizes that, "Substantive, early engagement is needed to successfully deliver projects that could potentially be delayed by lingering conflicts" and that ensuring the Services are "fully informed, engaged, and able to review and shape project proposals is critical given reduced timeframes and budgets." We were not included as members of the Project Delivery Team as allowed for in the guidance and we were not engaged in any meaningful way during the scoping phase of the Study development. As stated in the SMART Planning Guidance, "early involvement provides opportunities to avoid impacts to valued resources and areas with high-conflict potential prior to the commitment of significant planning investments." Despite the emphasis the planning guidance places on early coordination and engagement with the Services, and the extensive comments we have previously provided, the report does not appear to address the many issues raised in these comments.

The SMART Planning Guidance also notes that the scoping phase of a feasibility study also triggers the statutory requirements of the Fish and Wildlife Coordination Act (FWCA). Under the FWCA, the USACE is required to consult with the Services on activities that affect, control or modify waters of any stream or bodies of water. It also requires the USACE to consider the effects that these activities would have on fish and wildlife and must also provide for the improvement of these resources. During the scoping phase, coordination with the Services should have occurred to develop a scope of work for either a FWCA 2(b) Report or Planning Aid Letter and to establish timelines for the completion of the report or letter. The purpose of these reports is to identify problems and opportunities related to the conservation and enhancement of all potentially impacted fish and wildlife resources and, according to the SMART Planning Guidance, is critical for the USACE alternatives development.

The timeline included in the SMART Planning Guidance indicates that the Planning Aid Letter should be prepared and submitted to USACE at the beginning of the Alternatives Evaluation and Analysis Phase of the project with the draft FWCA 2(b) Report completed and submitted before the end of this phase and prior to the USACE TSP decision milestone and release of the DIFR-EIS for public and agency review. Unfortunately, these reports have not yet been completed as required by the FWCA and USACE's own policies and interagency agreements. As a result, the NEPA document provided to the public and the agencies for comment lacks the benefit of the Services' expertise and recommendations relative to fish and wildlife resources, surveys and investigations to determine the possible impacts of the proposed actions to fish and wildlife resources, recommendations for preventing their loss or damage, and measures for developing and improving these resources.

As indicated in our July 23, 2021, email providing you with some high level comments on the preliminary DIFR-EIS, we have significant concerns about the way the tiered NEPA approach has unfolded since it has not allowed any meaningful public or agency input into the development of the TSP. While the DIFR-EIS cites that tiering a NEPA analysis allows for discussions of issues ready for decision, with future additional public participation and consideration of avoidance, minimization, and mitigation planning using more up to date information, we do not agree that an appropriate level of coordination of analysis has occurred which is apparent by the extensive data gaps and uncertainties cited throughout the document. Given the scale and scope of what is proposed, the lack of any detailed ecological effects evaluation, the potential significant ecological consequence to fish and wildlife resources, resource agency input into the alternatives identification and evaluation process should have occurred as discussed above, and as embedded in the joint agency SMART Planning Guidance.

General Comments

The document is quite long and contains a number of inconsistencies and errors. This has complicated our review of the DIFR-EIS. For example, Section 7 - Plan Formulation and Section 8 - Tentatively Selected Plan are both very long and difficult to follow, as a result, the logic behind the decisions made to reach the proposed TSP is unclear. As currently written, the effects of the TSP implementation are difficult to find in the document and significant gaps in the information used by the District to develop the TSP appear to exist.

Another significant concern with this Study is that it does not appear to consider similar studies for other coastal barrier projects. Similar USACE Studies are also ongoing in other areas including Nassau County, New York; Galveston, Texas; Miami-Dade County, Florida, and elsewhere. There is no mention of other similar studies and no inclusion of any lessons learned from these other studies. The results of these studies should be considered to help inform the next steps for the NJBB Study For example, in 2018 the City of Boston conducted an assessment of installing similar barriers across the harbor (see: https://www.umb.edu/editor_uploads/images/centers_institutes/sustainable_solutions_lab/umb_rpt_BosHarbor_5.18_15-optimized.pdf). The overriding recommendation from that study stated "Shore-based solutions would provide flood management more quickly at a lower cost, offer several key advantages over a harbor-wide barrier, and provide more flexibility in adapting and responding to changing conditions, technological innovations, and new information about global sea level rise." We also note that USACE has agreed to re-consider the Miami-Dade County Back Bay Coastal Storm Risk Management Feasibility Study in response to stakeholders input urging the inclusion of more nature-based solutions and less structural solutions into its plan. The TSP for the Nassau County Back Bay Study currently favors non-structural solutions to coastal storm flooding rather than storm surge barriers (SSB) and cross bay barriers (CBB). We recommend that the USACE pursue a more consistent national approach in limiting the use of structural solutions to climate and storm resilience and prioritize NNBF, nonstructural solutions and land use management options such as managed retreat.

Project Description

As indicated in the DIFR-EIS, the objective of the Study is to investigate problems and solutions to reduce damages from coastal storm-related flooding that affects population, critical infrastructure, property, and ecosystems within the NJBB. However, because the document is a Tier 1 NEPA document, the project description provides only a high-level summary that limits appropriate discussions of all the different aspects of the TSP and does not incorporate specific details of the different alternatives considered or that are still under consideration. Considering the size and scope of the TSP and the conceptual ideas presented, it is difficult to determine what the actual plans are, how proposed structures will overlap with existing habitats, how the structural project elements will be constructed and of what materials, what the total temporary and permanent disturbances will be, and how each of the five study regions will be properly evaluated given the site-specific variations of structures. All of this information is paramount to provide enough information to initiate consultations through the MSA and ESA.

SSBs and CBBs are each proposed to include a series of components which may include sector gates, auxiliary flow gates, impermeable barriers, and perimeter barriers which could consist of a combination of levees, seawalls, floodwalls, road closure gates, mitre gates, or sluice gates. Preliminary conceptual plans and cross sections are provided along with the approximate lengths and heights of the different components. However, construction methods are generalized (i.e., installation and removal of temporary cofferdams, temporary excavations, fill and rock placement, concrete work, and pile driving) and do not include specifics on equipment and materials, there is no estimate of the amount of fill that may be required, there is no schedule provided for the different construction components, total temporary and permanent impacts are not quantified, there is no discussion on how the barriers will operate (e.g., storm thresholds and duration to deploy) or how the permanent features will block inlets and affect flow, and the Operation, Maintenance, Repair, Replacement and Rehabilitation (OMRR&R) summarizes general tasks without details on materials, methods, schedules or disturbances.

The preliminary plans in the report do not show how the structural components of the TSP overlap with the existing habitats due to a lack of site specific surveys of wetlands, SAV, and geotechnical and hazardous, toxic, and radioactive wastes (HTRW), which makes it impossible to understand and evaluate the temporary and permanent impacts to these habitats by the construction of these features. Most concerning, as indicated in the EFH assessment, the effects of SSBs are relatively unknown but are expected to be a high risk for significant effects on fisheries. The report mentions that SSBs and CBBs have potentially significant indirect impacts on hydrodynamics and also states "SSBs cause an increase in velocities in the vicinity of the structures." The consequences of this increase in velocities are of particular concern specifically regarding effects to habitats and habitat shifts. The construction work in the inlets (SSBs) and barriers (CBBs) will also modify the grain size of sediments to an extent with the possibility that composition of invertebrate species will change and likely affect fish species. It is unlikely that these impacts can be rectified with design refinements and compensatory mitigation that would be considered in the PED phase after the TSP has been approved by Congress. These issues should be addressed prior to the development of the FIFR-EIS and the TSP should be modified to reduce impacts to fisheries and coastal ecosystems.

Non-structural features of the TSP include elevating and floodproofing approximately 18,800 structures in the Shark River region, Ocean, Atlantic, and Cape May counties with additional considerations to elevate and floodproof 23,152 structures in the North Region and 10,895 structures in the Central Region of the Study Area. Although non-structural features do not have an in-water component, the document does not contain a discussion about how these alternatives were developed or why managed retreat or other land management options were not explored more fully as potential solution or as a component of the TSP. Furthermore, no consideration was offered for the effects this would have on induced housing demand, community perceptions/expectations, and subsequent increases in future risk to existing/planned infrastructure and long-term community resilience to SLR.

The project description also presents the consideration of alternatives with perimeter plans in the Central and South regions. While only floodwalls and levees are discussed briefly in the text, Table 2 presents other perimeter features such as seawalls, road closure gates, mitre gates and sluice gates. Similar to the SSB and CBB discussion, construction methods are generalized due to the nature of the Tier 1 NEPA document; there is no schedule provided, total temporary and permanent impacts are not quantified, and there is no detail on OMRR&R. Additionally, it is unclear where the different structures will be located and how they overlap with existing habitats. It is also unclear if complete and partial operational failure of any of these features was modeled and if varying sizes of the structure footprints were addressed.

Additional complementary measures to the TSP include further consideration of NNBFs. As indicated in the EFH assessment, the NNBFs are highly conceptual and may include marsh augmentations, marsh island creation, island expansion, filling mosquito ditches, thin layer placement, mudflat expansion, SAV bed expansion through “shallowing” and filling-in dredge holes, and horizontal/ecotone levees. As a result, there is insufficient information for an analysis of the effects of these features on fisheries and the existing habitats. It is also not possible to determine where these features would be most effective in providing coastal resilience, erosion control and flood protection services, as well as habitat benefits. Similar to the omission of a number of non-structural measure considerations, it is unclear as to why NNBF appear to be an afterthought instead of a first line of defense prior to structural measures.

In addition, NNBF may also have their own impacts to our resources, particularly where fill may be involved, and will require further analysis. As indicated in the report, NNBF are assumed to require significant amounts of fill material. Besides the nature and location of these features, the sources of fill material and justification for the potential conversion of one aquatic habitat type to another or the loss of aquatic habitat will need to be included in the analysis of impacts. This includes potential borrow areas that may be used, sources of beneficial use of fill material from dredging, or existing dredged material confined disposal facilities. Changes to sediment structure can greatly affect the critical and sensitive structure of the ecosystem. If NNBF features are to be considered for the final plan, these concepts, selection/prioritization criteria, and adaptive management strategies should be discussed through rigorous coordination with the Services and be included in the FIFR-EIS, and should be included in any Chief’s Report submitted to Congress for approval.

Alternatives

As mentioned above, the DIFR-EIS describes an array of alternatives, most focusing around various combinations of structural elements including SSBs, CBBs, perimeter flood walls, and levees. We have consistently cautioned against the use of such measures due to the significant impacts their construction and operation would have on the NOAA trust resources within the Study Area. We recognize that the SMART planning and tiered NEPA processes allows for decisions to be made based upon available data rather than undertaking extensive reconnaissance studies in the early stages of a feasibility study. However, in this instance, due the complex nature of the study and its vast scope, covering five counties, approximately 950 square miles and nearly 3,400 miles of shoreline, a fundamental flaw in the report is the failure to emphasize the high degree of uncertainty associated with the impacts of the structural components of the TSP. This uncertainty does not appear to have factored into the USACE Plan Formulation Process.

Furthermore, even though the report states that equal consideration must be given to structural and non-structural alternatives during the planning processes, this does not appear to be evident in the analysis of alternatives. The document appears to be fundamentally biased towards structural elements. The primary consideration appears to be the effect that the various alternatives would have on water levels from storm surges entering the back bays and coastal lakes from the Atlantic Ocean, rather than a more comprehensive consideration of factors that influence flooding during coastal storms such as increased and often intense or prolonged periods of precipitation, poor drainage, impervious cover, and development within floodplains. The failure to consider these other factors can result in flawed and biased conclusions. For example, it does not appear that high intensity precipitation events were considered in the analysis of alternatives. The U.S. East Coast has seen a 55% increase in the amount of precipitation falling as very heavy events between 1958 and 2016 (Easterling et al. 2017) and under the Representative Concentration Pathway (RCP) 8.5, extreme precipitation in the northeast region is projected to increase by 22% by 2100 (Johnson et al. 2019). When barriers are in a closed position, flood waters from extreme precipitation can be retained within the back bays, and possibly exacerbate the flooding impacts.

Even in the open position, the retention of flood waters from extreme precipitation may result in increased flooding and other unanticipated consequences that would not have otherwise occurred if gates and barriers were not present. In addition to not considering high intensity precipitation events, upstream measures to retain and slow down runoff waters in watersheds emptying into the bay were also not considered as part of the Study. Even "sunny day," nuisance flooding has increased within the Study Area as a result of sea level rise (SLR). It does not appear that the Study considered how the SSB and CCBs will affect the frequency of this type of flooding and if this will result in more frequent gate and barrier closures over time. The failure to consider these compounding factors appears to have resulted in flawed conclusions and a TSP based upon inappropriately constrained assumptions.

Climate

Within the report, the terms "sea level change" (SLC) and "sea level rise" (SLR) are used inconsistently. For example, SLR is first encountered in the heading for Table 31 and the figure content list for Figure 36; it is first used in the document on page 133 and first defined in the text on page 143. SLC is first used in the text in the Abstract. We recommended that this inconsistency be corrected in our July 23, 2021, comments on the preliminary draft document. As stated in those comments, the term sea level rise (SLR) should be used. We understand from District staff that the USACE's guidance is to use sea level change (SLC), not SLR. However, the use of the term SLC is misleading to the public as it implies that sea levels could rise or fall; there is no scenario for the eastern U.S. coast where the trajectory is anything but higher sea levels for the next millennium. In addition, SLR is the term used by the vast majority of other reports and documents including the National Climate Assessment and Intergovernmental Panel on Climate Change, so for clarity to the public, we recommend that any further documents developed for this Study use the term sea level rise or SLR and that it be used consistently.

The USACE's "intermediate" SLR scenario may also be a substantial underestimation for end-of-century projections in New Jersey. The USACE's "intermediate" scenario of 2.54 feet (0.8 meters [m]) would assume substantial reduction in greenhouse gas emissions over the next few decades, and this projection is not likely for 2100. This potential significant underestimation of SLR could have a major bearing on the project lifespan and efficacy. In our *Guidance for Integrating Climate Change Information in Greater Atlantic Region Habitat Conservation Division Consultation Processes*, we recommend that Sweet et al. (2017) global SLR scenarios be used. The intermediate-high (1.5 m), high (2.0 m) are recommended. At the very least, a 1.0 m global mean scenario (intermediate) should be used, which would result in a SLR projection of 1.39 m for Atlantic City, NJ in 2100.

Habitat and Aquatic Resource Issues

As stated in our previous comments, many of the coastal bays, inlets and nearshore areas are characterized by high fish production, high benthic faunal density, and species diversity; dense aggregations of fish are supported by local primary production. Infaunal species provide important trophic linkages coupling benthic-pelagic ecosystems. Many of the organisms using these habitats also provide trophic linkages between inshore and offshore systems. Additionally, many of these areas are important for a number of species that migrate across these areas. Understanding how the coastal bays, inlets and nearshore areas function to provide habitat is the product of a complex mix of connections between biological processes and physical factors. There is potential for significant short-term and long-term physical, biological, and chemical impacts from landscape-scale modifications to the habitat, resulting in a cascade of adverse impacts. Proposed TSP actions may result in cumulative, synergistic, and unanticipated changes in habitat quantity and quality as well as local and regional fisheries production. Furthermore, it is entirely unknown how barrier islands, back bay marshes, and the fish and shellfish that rely on these areas will respond to many of these large-scale structural measures currently proposed.

Our previous technical assistance comments provided extensive information on the importance of special aquatic habitats (i.e., SAV, wetlands), aquatic resources (i.e., shellfish, diadromous fishes), and federally listed species and protected resources within the Study Area that could potentially be affected by the proposed TSP. Some of that same information was repeated in the DIFR-EIS, however no further details or site specific studies have been conducted to help define the baseline condition of the Study Area, which is necessary to understand and evaluate the impacts of the TSP. A thorough baseline of existing habitat conditions, aquatic resources, and listed species present is paramount to understanding the direct, indirect, individual, and cumulative effects of the construction and implementation of the TSP. As stated above, it is essential that this information and analysis be completed to inform the development of the FIFR-EIS, and not during the PED phase as there is a high risk that potential and expected impacts of the TSP are greater than what can be rectified by design modification of the current TSP and viability of being able to offset adverse effects through compensatory mitigation is highly uncertain.

Special Aquatic Site Identification and Mapping

The CWA Section 404(b)(1) Guidelines (Guidelines) defines special aquatic sites as sanctuaries and refugees, mudflats, vegetated shallows, and wetlands which possess special ecological characteristics of productivity, habitat, wildlife protection, or other ecological values that significantly influence or positively contribute to the general overall environmental health or vitality of the entire ecosystem of a region. The DIFR-EIS provides a general overview and maps of the special aquatic sites found within the study area. However, these features have been estimated based on previous studies conducted by multiple different agencies. The mapping itself is outdated, with shellfish maps ranging between 1963 and the 1980s, SAV between 1979 and 2009, and wetlands from 2012. No recent site specific surveys have been conducted that accurately depict the various special aquatic areas within the immediate vicinity of the proposed TSP structural elements, or elsewhere in the study area. The EFH assessment consistently reiterates that additional habitat surveys are needed to not only refine the TSP but to finalize the EFH assessment. Site specific details should include up to date mapping of all special aquatic sites within the inclusion of bathymetry and highlighted mean high water (MHW) and mean low water (MLW) lines. This baseline data should be collected annually, and over multiple years and seasons to gain a full understanding of the aquatic resources and their interannual dynamics within the Study Area and how any of the USACE's proposed actions will affect their long-term productivity and persistence. Additionally, site plans should overlap with the different aquatic habitats to more accurately quantify the direct impacts from the TSP.

Mapping of wetland and water habitats within the DIFR-EIS includes NJDEP land use coverage maps, which omit delineations of mudflats as well as MHW and MLW lines that help to define intertidal and subtidal areas. As discussed in the EFH assessment, no jurisdictional wetland delineations have been conducted within the vicinity of the proposed TSP alignments or elsewhere within the study area. Estimates of wetland habitat impacts were analyzed by grouping wetlands data from different agencies and various classifications into a broader "wetland habitats" category, which grouped estuarine (saline) marshes, scrub shrub marshes, and supratidal marshes. Additionally, the wetland classifications do not match between figures and tables presented. With the older and generalized data, it is also not possible to clearly identify what wetland habitats are being impacted. Additionally, grouping wetland habitats that have different resource use (e.g. grouping low marsh and high marsh areas together) does not accurately portray what aquatic resources and ecosystem services may be impacted by the proposed TSP actions. For example, high marshes and areas above MHW, are used only in a limited way by most NOAA trust resources. While we recognize the important ecosystem services these areas provide, there are distinct differences in resource use. The revised EFH assessment and any future reports should not only include up-to-date mapping of delineated wetlands and water areas, MHW, and MLW, but the classifications should be grouped appropriately and be consistent between tables and figures. We recommend that the aquatic habitat areas be classified using Cowardin (1979) and fully break out the habitats by system, subsystem and class.

SAV mapping within the DIFR-EIS includes data sets from the USFWS National Wetlands

Inventory, the 2009 Rutgers Center for Remote Sensing and Spatial Analysis (CRSSA) Barnegat Bay to Little Egg Harbor, and historic 1979 SAV/macroalgae mapping. Different types of SAV (e.g. eelgrass, macroalgae) are not discernable from the mapping features. Additionally, the EFH assessment appears to assume that without more recent mapping, areas mapped by the 1979 surveys are no longer present. This is based on the omission of direct SAV impacts discussed for the Absecon CBB. Figures depict levees and mitre gates crossing 1979 mapped SAV, but both the direct impacts Table 8 and accompanying text report no direct impacts. The EFH assessment incorrectly assumes that the unavailability of more recent SAV mapping equates to SAV not being present or directly impacted. The DIFR-EIS also states that "it is uncertain that long-term habitat changes to SAV beds would have any indirect effects on species like green sea turtles that venture into the shallow areas to feed on marine algae and eelgrass." However, there is no justification provided for this statement.

Baseline SAV surveys are important both to understanding the current distribution of the threatened North Atlantic Distinct Population Segment (DPS) of green sea turtles as well as to analyze how the construction of the project may affect their distribution and use of the study area in the future. This type of pre-construction SAV survey would be essential as part of the baseline in order to understand the consequences of any project related loss of SAV, especially for green sea turtles and summer flounder. Without this information, we are not able to determine the level of effects to this species. SAV has the tendency to move year to year, so while it is important to provide recent surveys of SAV, it is also important to compare to areas that were previously mapped to determine if an area actually no longer supports SAV and why. The revised EFH assessment and BA should therefore not only provide up-to-date mapping of SAV, but should also compare surveys to historic mapping, water depths, water quality, and bottom sediments to determine if an area is appropriate for growing SAV. Areas that are mapped as SAV or that were previously mapped and still hold the appropriate characteristics to grow SAV are considered SAV habitats. Annual SAV mapping within the entire Study Area should be undertaken, beginning as soon as possible so that current baseline data and trends in SAV presence can be identified. This information is paramount to the evaluation of direct, indirect, individual, and cumulative effects of the TSP and any planned NNBFs.

Habitat Areas of Particular Concern

Several habitat areas of particular concern (HAPCs) have been designated in the Study Area. HAPCs are subsets of EFH that are identified based on one or more of the following considerations: 1) the importance of the ecological function, 2) extent to which the habitat is sensitive to human-induced degradation, 3) whether and to what extent, development activities are stressing the habitat type, or 4) rarity of habitat type (50 CFR 600.815(a)(8)). HAPCs are designated through action by the regional fishery management councils (Councils) or by NOAA Fisheries for highly migratory species. A HAPC designation does not convey additional restrictions or protections on an area; they simply focus increased scrutiny, study, or mitigation planning compared to surrounding areas because they represent high priority areas for conservation, management, or research and are necessary for healthy ecosystems and sustainable fisheries. As the Study moves forward, particular attention should be given to the effects of any proposed actions on HAPCs and efforts to avoid and minimize adverse impacts. The EFH assessment included in the DIFR-EIS, does not adequately evaluate the direct, indirect, individual and cumulative effects of the TSP on HAPCs and the associated species due to the lack of specifics on the proposed SSBs and CBBs, as well as the lack of habitat and species use data. This information and analysis is needed to initiate consultation with us under the MSA and should be collected to inform the FIFR-EIS.

Submerged Aquatic Vegetation

As discussed in our previous comments, NJBBs, especially Barnegat and Manahawkin Bays, support areas of SAV including eelgrass (*Zostera marina*) and widgeon grass (*Ruppia maritima*). SAV habitats are among the most productive ecosystems in the world and perform a number of irreplaceable ecological functions which range from chemical cycling and physical modification of the water column and sediments to providing food and shelter for commercial, recreational, as well as, economically important organisms (Stephan and Bigford 1997). Larvae and juveniles of many important commercial and sport fish such as bluefish summer flounder, spot (*Leiostomus xanthurus*), Atlantic croaker (*Micropogonias undulatus*), herrings (Clupeidae) and many others appear in eelgrass beds in the spring and early summer (Fonseca et al 1992). Heckman and Thoman (1984) concluded that SAV beds are also important nursery habitats for blue crabs. According to Peterson (1982), in Kenworthy (1988) shallow dwelling hard clams may be protected from predation by the rhizome layer of seagrass beds. Rogers and Van Den Avyle (1983) suggest that SAV beds are important to summer flounder, and that any loss of these areas along the Atlantic Seaboard may affect summer flounder stocks.

We are particularly concerned about the potential effects of the SSB proposed at Barnegat Inlet since it appears that the SBB would be in or near some of the most extensive and healthy SAV beds within the Study Area as well as an area of SAV planted as compensatory mitigation for impacts resulting from the New Jersey Department of Transportation's Route 72 Bridge Project.

Sandbar Shark

The back bays from Great Bay south to Lakes Bay, Little Egg Inlet, Absecon Inlet and the adjacent ocean waters have been designated as a HAPC for sandbar shark (*Carcharhinus plumbeus*) due to their importance as nursery and pupping areas. Sandbar shark nursery areas are typically in shallow coastal waters from Cape Canaveral, Florida to Martha's Vineyard, Massachusetts. Studies indicate that juvenile sandbar sharks are generally found in water temperatures ranging from 15 to 30 degrees Celsius, salinities at least from 15 to 35 parts per thousand, and water depth ranging from 0.8 to 23 meters in sand, mud, shell and rocky habitats from Massachusetts to North Carolina (Grubbs and Musick 2007, Grubbs et al. 2007; McCandless et al. 2002, 2007; Merson and Pratt 2007). Pregnant sandbar shark females occur in the area between late spring and early summer, give birth and depart shortly after while neonates (young of the year) and juveniles (ages one and over) occupy the nursery grounds until migration to warmer waters in the fall (Rechisky and Wetherbee 2003; Springer 1960). Neonates return to their natal grounds as juveniles and remain there for the summer.

<u>Winter Flounder</u>

Although not mentioned in our previous technical assistance, EFH for winter flounder has been designated in portions of the Study Area, south to Absecon Inlet (39° 22’ N). Winter flounder ingress into spawning areas within mid-Atlantic estuaries when water temperatures begin to decline in late fall. Tagging studies show that most return repeatedly to the same spawning grounds (Lobell 1939, Saila 1961, Grove 1982 in Collette and Klein-MacPhee 2002). Winter flounder typically spawn in the winter and early spring, although the exact timing is temperature dependent and thus varies with latitude; however, movement into these spawning areas may occur earlier, generally from mid- to late November through December. Winter flounder have demersal eggs that sink and remain on the bottom until they hatch. After hatching, the larvae are initially planktonic, but following metamorphosis they assume an epibenthic existence. Winter flounder larvae are negatively buoyant and are typically more abundant near the bottom. Young-of-the-year flounder tend to burrow in the sand rather than swim away from threats.

Changes in water velocities, increased turbidity, and the subsequent deposition of suspended sediments near the SSBs and CBBs could smother the winter flounder eggs and would adversely affect their EFH. Specific data on the current velocities within any of the inlets was not included in the EFH assessment of the DIFR-EIS. As a result, it is not possible to determine the suitability of any inlet as a spawning location. However, winter flounder do migrate through the inlet in the fall and winter to spawn in the back bays.

<u>Prey Resources</u>

The indirect effects of this project are concerning as they are not well defined in the Tier 1 NEPA document. In particular, we have concerns with changes in benthic habitat and the potential effects on prey species. These effects could lead to a more limited use of the area by federally managed species, listed sea turtles, and Atlantic sturgeon, and should be analyzed.

The EFH final rule published in the Federal Register on January 17, 2002 defines an adverse effect as: "any impact which reduces the quality and/or quantity of EFH." The rule further states that:

> An adverse effect may include direct or indirect physical, chemical or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat and other ecosystems components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from action occurring within EFH or outside EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

The rule further states that:

> Loss of prey may be an adverse effect on EFH and managed species because the presence of prey makes waters and substrate function as feeding habitat, and the definition of EFH includes waters and substrate necessary to fish for feeding. Therefore, actions that reduce the availability of a major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH. As a result, actions that reduce the availability of prey species, either through direct harm or capture, or through adverse impacts to the prey species'

habitat may also be considered adverse effects on EFH.

The DIFR-EIS and EFH assessment briefly mention some potential prey items, including killifish, mummichogs, and silversides. However, other prey such as benthic invertebrates, macroinvertebrates, and anadromous fish species such as alewife, blueback herring (collectively river herring) and striped bass, are omitted from this list. Additionally, while some of the prey items are introduced, there is no further discussion on how prey would be impacted directly, indirectly or cumulatively by the TSP.

Steimle et al. (2000) has documented that juvenile blue crabs are a food source for several state and federally managed fish species including winter flounder, little skate (*Leucoraja erinacea*), winter skate (*Leucoraja ocellata*), scup, and summer flounder. Adult female blue crabs overwinter at the mouths of New Jersey inlets, generally November through April so they are in position to release their eggs in spring in a location that will allow their eggs to be carried into the ocean. The crabs burrow into surficial sediments as water temperature declines and overwinter in a dormant, immobile state until water temperatures rise above approximately 10 degrees Celsius in the spring. Site specific sampling to determine if blue crabs overwinter within any of the inlets for the proposed SSBs is needed prior to the PED phase.

Buckel and Conover (1997) and Juanes et al. (1993) in Fahay et al. (1999) report that diet items of juvenile bluefish include juvenile anadromous fish including alewife, blueback herring and striped bass. Anadromous fish such as striped bass, alewife and blueback herring enter the back bays in the late winter and spring as they migrate to their freshwater spawning areas. The bay, lakes and rivers in the Study Area provide spawning and nursery habitat for these species. Activities that adversely affect the spawning success and the quality for the nursery habitat of these anadromous fishes, such as the construction and operation of the SSBs and CCBs and their associated direct and indirect effects on hydrodynamics and water quality, can adversely affect the EFH for juvenile bluefish by reducing the availability of prey items.

Impacts to the various prey items may adversely impact EFH and our managed species. A revised EFH assessment should thoroughly include a discussion of the different prey items available within the study area and include the impacts to prey in the impacts analyses. For an appropriate analysis, additional studies including multi-year, multi-season benthic and fisheries surveys are needed to better define the prey resources within the study area.

ESA-Listed Species

The Protected Resources Division has specific requirements and standards that allow us to adequately assess the impacts to ESA-listed species under Section 7 of the ESA including regulatory requirements to determine the adequacy of Biological Assessments at 50 CFR 402.14(c)(1). Basic biology and distribution of listed species is readily available through our website; however, your DIFR-EIS and BA does not provide a proper and thorough analysis of ESA-listed species distribution and presence within the entire action area, study region, and associated project sites. This information is necessary and required for a complete assessment of impacts.

While there is limited information on the presence of ESA-listed species within the Study Area, there is still information about their presence in the larger back bays and inlet areas (e.g., sea turtle entrainment on trash racks at Oyster Creek Generating Station; many published studies on Atlantic sturgeon coastal, spatial, and temporal distribution, etc.) that have not been incorporated into your analysis. At a minimum, you should use our Section 7 Mapper on our website[1] to evaluate distribution and presence of ESA-listed species and their various life stages. Based on our review, it is not evident that the mapper has been used to obtain this information. Instead the DIFR-EIS provides a short, generalized description of species distribution and biology within their overall range.

Understanding the presence and distribution of listed species and their habitat is the first and most essential step in order to understand the potential for exposure of ESA listed species to effects of your project. In our July 23, 2021, comments to you, we suggested that you perform an expanded search for information about species presence to inform your analysis in your specific study area. Although we recognize that the SMART planning and tiered NEPA processes allows for decisions to be made based upon available data in the early stages of a feasibility study, we suggest that you gather further details and site specific information to help define the species baseline conditions within the study area. As such, we suggest that you use habitat information to identify areas where habitat would support listed species including data from interviews or surveys or other means to collect observations of listed species.

In our July 23, 2021, letter we also commented that Atlantic sturgeon aggregate in near shore areas in the vicinity of inlets, and that these aggregations may be a response to the flow of nutrient-rich water from the back bays. We suggested that you consider analyzing the effects of SSBs on the ocean side of the inlets, but the DIFR-EIS does not consider SSB off-shore effects on nutrient-loading or forage for listed species.

In summary, knowing the potential routes of exposure to stressors caused by the action is necessary to understand the effects of proposed activities and of any operation of associated facilities. Given the lack of analysis of species presence and distribution within the back bays as well as in near shore coastal areas, the effects and impact analyses provided does not sufficiently provide a basis for reviewing impacts to listed species.

Hydrodynamic Analyses and Associated Issues

Appropriate environmental analyses related to hydrodynamics are necessary in determining the direct, temporary, indirect, and cumulative impacts the implementation of the TSP may have. These analyses should be completed prior to the FIFR-EIS to allow for decisions on the TSP to be based upon a clear understanding of the consequences of the construction and operation of SSBs, CCBs and other structural elements on coastal ecosystems and fisheries. While the DIFR-EIS included some discussion on hydrodynamic analyses and water surface elevations as they relate to existing storm risk, historical flooding, storm surge modeling, water level and crest elevations, and high-frequency flooding events, topics related to water quality, sediment transport, larval transport, and fish migration were either lacking or omitted from these analyses

[1] https://www.fisheries.noaa.gov/resource/map/greater-atlantic-region-esa-section-7-mapper

and therefore not appropriately vetted for impacts. The report notes that hydrodynamic changes could affect resident time within the affected estuaries and indirectly affect water quality and egg and larval transport for fisheries and EFH, but the impacts are not quantified or clearly described and potential mitigative measures are not discussed. Similarly, the report states that "the effects of the implementation and operation of SSBs and CBBs could result in changes to hydrodynamics and water quality, thereby potentially affecting benthic community composition due to changes in substrate and salinity" without a full analysis of the ecological implications of such changes. Furthermore, recent hydrodynamic modelling by the US Geological Survey (Defne and Ganju, 2014) has documented that most of the tidal flow into Barnegat Bay enters through Little Egg Inlet. It is not clear if water flow through Little Egg Inlet was taken into account during the current analysis. This is a particularly important consideration since the TSP currently includes the installation of SSBs on the inlets to the north and south of the Little Egg Inlet.

Water Quality

Under the TSP in a gate open scenario, there is a projected net reduction (i.e., 22% to 46%) in channel cross-sectional areas that would constrict flood and ebb tidal currents through the inlets. Water velocities through these reduced channels are expected to increase near the SSBs and CBBs and decrease in other parts of the bays, thus altering flow patterns, water circulation, and residence times. Poorly flushed regions within the study area are likely to increase with the construction of the TSP. As discussed in the EFH assessment, "restrictions in tidal flows and increases in residence times could affect salinity levels, nutrients, chlorophyll a and dissolved oxygen concentrations." These effects could be exacerbated at times when the gates are closed during a significant storm event when increased freshwater inputs, nutrients, bacteria and other pollutants discharged from tributaries and point and nonpoint sources are held in the bays for a longer period." While the EFH assessment recognizes the myriad of potential impacts, there are currently no water quality analyses that discuss such impacts and their effects on the system.

The DIFR-EIS also includes information about the high nutrient loads New Jersey coastal waters have been experiencing, which negatively impact water quality causing harmful algal blooms (HABs) and nuisance nettles, elevated dissolved oxygen, and increased turbidity. The negative impacts on water quality have directly influenced the loss of SAV and other aquatic resources. Changes in hydrodynamics stemming from structures indicated in the TSP that would further reduce tidal flushing and stress the system could inherently trigger additional losses to habitats and resources. In addition to high nutrient loads, flooding due to extreme precipitation events could exacerbate tidal flooding, particularly when the barriers are fully or partially closed. The DIFR-EIS does not appear to contain an assessment of the effects of the proposed SSBs and CBBs from flooding due to increased extreme precipitation. As we indicated in our July 23, 2021 comments, this is a serious deficiency of the Study. While additional hydrodynamic and water quality modeling that considers different design configurations and sea level rise projections is said to be ongoing, additional modeling for closed gate conditions which incorporates both precipitation and sea level rise is of the utmost concern and necessary in capturing the magnitude of effects prior to finalizing a recommended plan.

In the report under the Gate-closure scenario, it states "Closures during the growing season may have greater adverse effects on promoting algal blooms and associated dissolved oxygen depressions, while closures during the winter months may have a lesser effect. Additionally, gate closures would affect the distribution of salinity particularly at a time of a storm event where huge amounts of freshwater from precipitation may be entering the bay systems from the rivers and tributaries that discharge into these bays." We agree with this statement, but additional study and analysis is needed to evaluate the scope and ecological consequences of these effects, particularly since research shows many aquatic species to be sensitive to changes in temperature and salinity, especially during embryonic development. Again, this analysis is necessary in capturing the magnitude of effects prior to finalizing a recommended plan.

Sediment Transport

Due to the general nature of the Tier 1 NEPA document, the DIFR-EIS does not adequately evaluate the changes in sediment transport and sediment dynamics within the Study Area that may occur with construction of the SSBs and CBBs. Anthropogenic-induced elevated levels of turbidity and sedimentation above background (e.g., natural) levels can lead to various adverse impacts on fish and their habitats. These increased levels can be caused by construction activities such as dredging, pile driving, structure installation, and fill of open water and wetlands proposed by the TSP. The operation of the SSBs and CBBs can also change system hydrodynamics and shoreline alignment due to location of the final structures in the inlets and bays. For example, increased residence time and reduced circulation, combined with potentially increased run-off and erosion from streams and creeks in the future as a result of climate change, could increase sedimentation in the Intercoastal Waterway, other navigation channels, and marinas and private mooring maintained by dredging.

Increases in turbidity due to the suspension or resuspension of sediments into the water column during activities such as dredging can degrade water quality, lower dissolved oxygen levels, and potentially release chemical contaminants bound to the fine- grained sediments (Johnson et al. 2008). Suspended sediment can also mask pheromones used by migratory fishes to reach their spawning grounds and impede their migration and can smother immobile benthic organisms and demersal newly-settled juvenile fish (Auld and Schubel 1978; Breitburg 1988; Newcombe and MacDonald 1991; Burton 1993; Nelson and Wheeler 1997). Additionally, other effects from suspended sediments may include (a) lethal and non-lethal damage to body tissues, (b) physiological effects including changes in stress hormones or respiration, or (c) changes in behavior, reduced predator avoidance, and others (Wilber and Clarke 2001; Kjelland et al. 2015). Increases in turbidity will also adversely affect the ability of some species, such as larval striped bass, to locate and capture prey and evade predation, leading to decreased survivorship (Fay et al. 1983 in Able and Fahay 1998). Species with low foraging plasticity have been shown to experience high mortality compared with other species during acute elevated turbidity conditions (Sullivan and Watzin 2010). Turbidity can also decrease photosynthesis and primary production, resulting in reduced oxygen levels.

Elevated rates of sedimentation due to increased runoff can lead to numerous negative effects to aquatic systems. Changes in sediment deposition could also affect the distribution of SAV within the Bays. Additional effects can include loss of habitat heterogeneity and reduction in organic matter retention and stable substrate (Allan 2004). Furthermore, the sedimentation (burying/covering) of individual organisms and habitats and changes in benthic environments via alteration to sediment quality, quantity, and grain size can reduce species diversity and decrease overall ecosystem function (Thrush and Dayton 2002). The smothering of benthic prey organisms and chronic elevated sedimentation can prevent recolonization, which reduces the quality of the habitat by making it unsuitable for foraging (Wilber and Clarke 2001). Additionally, particle size is one of the main drivers of benthic faunal biodiversity and community composition; therefore, changes to sediment composition from sedimentation will affect the benthic prey resources of various species, including NOAA-trust resources (Wood and Armitage 1997; Wilber and Clarke 2001). Increased sedimentation could also increase dredging frequency and/or volumes dredged and negative interactions with fish. Increasing the frequency of dredging prevents the re-establishment of a mature, diverse benthic community post-dredging, leaving a recurring population of mostly small, opportunistic colonizer species that are often a poor quality forage base

The report also indicates that the operation of SSB or CBBs could potentially affect intertidal habitats by altering sediment scour and deposition which could lead to changes in the dimensions of the existing habitats. These changes may also affect wetlands throughout the Study Area. Higher sediment flows during storm events may benefit marshes by adding sediment and in turn elevation helping to counter some of the effects of SLR. Of particular concern is that reductions in tidal magnitude due to constrictions caused by the SSBs and CCBs may result in less sediment delivery to the marsh platform and less resilience to SLR. In addition, changes in the sediment dynamics within the Study area may also adversely affect the health of SAV and shellfish beds as these changes may affect water clarity.

Because of the potential significant adverse effects of turbidity, sedimentation, and changes to sediment transport and sediment dynamics within the Study Area, it is important to understand direct and secondary impacts during closure events and how the change in flow velocities may affect these important resources before seeking Congressional approval of the TSP.

Larval Transport

Hydrodynamic changes caused by SSBs and CBBs will likely affect residence times within the affected estuaries and affect egg and larval transport. Summer flounder larvae and post larvae migrate inshore, entering coastal and estuarine nursery areas to complete their life cycle transformation. The movement of these individuals through inlets in New Jersey occurs primarily between October through December, but larvae have been collected as late as March in the Manasquan River Inlet and March and April in Absecon Inlet (Able et al. 1990.) Movement into the estuary may involve intermittent settling to take advantage of tidal stream transport before permanent settlement once metamorphosis is complete (Able and Fahay 1998). Residual bottom inflow, a result of denser oceanic water intruding beneath more buoyant outflow, provides some fishes with a mechanism of ingress (Weinstein et al., 1980 in Rhodes 2008) into estuaries. Species such as summer flounder remain near the bottom as they enter inlets (Miller et al. 1984).

As indicated in the EFH assessment, higher velocities near the proposed SSBs and CBBs and closures from the gate structures are anticipated to affect fish larval transport by inhibiting larvae from entering or exiting the system. Additionally, residence time could increase or decrease, which could have an effect on fish egg and larval transport. The potential impacts on recruitment due to inhibited larval transport would be detrimental to federally managed species such as summer flounder and EFH. Because these effects of SSBs and CBBs are relatively unknown, there is a potential risk for significant effects on fisheries. Additional hydrodynamic modeling and fish census studies are necessary to better understand these effects before proceeding with implementation.

Diadromous Fish Migration

Alewife and blueback herring, collectively known as river herring, spend most of their adult life at sea, but return to freshwater areas to spawn in the spring. Both species demonstrate some degree of repeat spawning behavior, generally returning to their natal rivers (Collette and Klein-MacPhee 2002). Following spawning, some proportion of adults out-migrate to the ocean while their offspring rear in freshwater areas. During the out-migration of young-of-the-year alosines, which is typically protracted over the summer and early fall (Yako et al. 2000), juveniles can spend considerable time in large tidal inlets, moving in and out of the estuarine system repeatedly throughout their first fall and winter (Pacheco and Grant 1973; Stevens et al. 2021). Furthermore, connectivity between estuarine areas and nearshore juvenile wintering grounds off southern New Jersey provides the required range of suitable habitat for early life stages (Milstein, 1981).

River herring formerly supported the largest and most important commercial and recreational fisheries throughout their range and commercial landings for these species have declined dramatically over the last several decades from historic levels (ASMFC 2018). The 2012 river herring benchmark stock assessment found that of the 52 stocks of alewife and blueback herring assessed, 23 were depleted relative to historic levels, one was increasing, and the status of 28 stocks could not be determined because the time-series of available data was too short (ASMFC 2012a). The 2017 stock assessment update indicates that river herring remains depleted at near historic lows on a coast wide basis. Because landing statistics and the number of fish observed on annual spawning runs indicate a drastic decline in alewife and blueback herring populations throughout much of their range since the mid-1960s, river herring have been designated as Species of Concern by NOAA. Species of Concern are those species about which we have some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. We wish to draw proactive attention and conservation action to these species.

Catadromous American eel (*Anguilla rostrata*) spawn in the Sargasso Sea. Their offspring return to coastal inlets as juvenile elvers and swim upstream to the freshwater habitats in tributaries to the bay. They inhabit these freshwater areas until they return to the sea through the inlets within the Study Area. According to the 2012 benchmark stock assessment, the American eel population is depleted in U.S. waters. The stock is at or near historically low levels due to a combination of historical overfishing, habitat loss, food web alterations, predation, turbine mortality, environmental changes, toxins and contaminants, and disease (ASMFC 2012b).

Uninhibited aquatic connectivity is essential for the completion of the complex life histories exhibited by diadromous Atlantic coast species. Because most of these populations are currently at historical lows, reductions in connectivity between freshwater and marine habitats could lead to the further irreversible diminishment of their population size and genetic diversity. Because hydrodynamic modeling of the proposed SSBs has not been completed, it is not possible to determine the extent to which flow barriers would impede the migration of these species or increase their energetic demand to reach suitable spawning habitat. However, some studies have been completed which provide an indication of the potential effects. In their evaluation of river herring movements at a large tide gate on the Herring River, Massachusetts, Alcott et al. (2021) documented migratory delay and reduced fish passage rates, especially later in the spawning season. While information has not been provided to determine the effects of proposed structures and associated velocity changes considered in this case, available studies elsewhere indicate that impacts to migratory fish movements and subsequent spawning success would likely be substantial. Due to the depressed populations of these species, it is particularly important to understand how changing velocities and reduced cross sections of the inlets caused by the SSBs will change migratory pathways in and out of their natal streams and estuaries, the energetic demand to complete these migrations, juvenile overwintering ground connectivity, and ultimately the persistence of these species.

Cost Benefit Analysis and the Value of Ecological Services

Another significant concern with the level of detail and analysis in the tier 1 NEPA document is the apparent failure to identify and recognize the costs and benefits of the ecosystem services provided by the natural resources in the Study Area. For example, Kaufman and Cruz-Ortiz (2012), estimate that the Barnegat Bay watershed contributes more than $2.3 billion in goods and ecosystem services to the regional economy. Many of these ecosystem services will be diminished by the implementation of the TSP. The DIFR-EIS also does not appear to consider the potential environmental and economic savings (e.g., flood and storm-surge protection, primary production of the aquatic environment, habitats for trust resources) that non-structural elements and NNBFs could provide.

Economists from NOAA's National Ocean Service's National Centers for Coastal Ocean Science have reviewed the DIFR-EIS and have offered a number of comments and questions regarding the Study and the District's analyses of ecosystem services and the cost-benefit analysis (CBA). Some deficiencies noted include:

- Changes to cultural values were not described.
- Benefits for alternatives that allow for maintenance of recreational activities were not quantified.
- Benefits that avoid alternatives harming managed areas were not quantified. Will the change in benefits to these areas be quantified? Will harm to non-managed ecosystems be quantified? If not, why not?
- Net benefits to various categories of individuals (by age, race, income, etc.) were not described.
- Table 3 Critical Assumptions (pages 22-23) - Although it is hard to tell, it seems that benefits may be limited to damages avoided. Will ecosystem service benefits such as protected habitat for various species, increase in fish populations, increased recreational

opportunities, wetlands protection and damages avoided associated with water filtration, among others, be explored? If so, what methods will be used to do this? Will they be included in the CBA?
- For 4.8.18.5 - Other Social Effects, it is unclear how these social effects will be included in the final BCA.
- The document mentions that the CBA "does not account for additional benefit categories such as Infrastructure damages, vehicles damages, emergency costs, or transportation delays." Why not, or rather, is this typical to include and lump into a residual risk category?
- "Risk to life safety" is mentioned several times. How is this quantified/monetized?

Mitigation

As mentioned earlier, the report indicates over 154 acres of wetlands, mud flats, submerged aquatic vegetation, and open waters of the Study Area may be filled as a result of the implementation of the, as well the potential for the TSP to impact water quality, tidal flow and regime, sediment transport, and the early life stages of a variety of aquatic organisms. This is an assumed estimated area based on outdated mapping and according to the DIFR-EIS, may be much more significant. Additionally, the report does not quantify the potential numerous indirect impacts that could occur.

Before mitigation can be fully developed, all potential impacts (i.e., direct, indirect, cumulative, temporary) must be fully disclosed. The DIFR-EIS/EFH assessment consistently references requiring more information to fully understand project impacts and specifically states that indirect and cumulative impacts "are still being evaluated and will be available at a future time." Direct impacts presented are based on missing baseline information, generalized construction details, and incomplete models, while temporary impacts remain unclear. It is also concerning that two separate models (with one that is still under development and not yet peer reviewed), are being used to determine direct effects on saltmarsh, intertidal, and subtidal habitats without complete baseline information and full disclosures on how the models work (e.g. inputs, assumptions). All adverse impacts and losses are necessary to understand the need for compensatory mitigation and to be properly designed. Additionally, all functions of baseline habitats need to be fully evaluated in order to determine appropriate type, level and location of compensatory mitigation to ensure the continued ecological function of these estuaries.

The fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable adverse impacts to waters of the United States after all appropriate and practicable avoidance and minimization has been achieved. NOAA has developed a draft Mitigation Policy for Trust Resources that outlines the principles that we use when considering mitigation for the adverse effects of an action on our resources. This includes avoidance and minimization of adverse effects prior to the consideration of any compensation or offset for the unavoidable adverse effects. The DIFR-EIS does not include a clear discussion of the alternatives and reasoning behind how the TSP was selected. Given the potential magnitude of impacts, a FIFR-EIS should include all alternatives considered and why a plan that is less environmentally damaging than the TSP is not practical. While economic considerations are sure to be considered in the analysis, weight must also be given to the ecosystem analysis, related to both the back bay ecosystem and fishing industry, which was notably absent from the DIFR-EIS.

The Final Rule on Compensatory Mitigation for the Losses of Aquatic Resources (33 CFR 325 and 332 and 40 CFR 230) published in the Federal Register on April 10, 2008, does not limit compensatory mitigation only to impacts to wetlands and special aquatic sites. The rule refers to "waters of the United States." As stated in Part 332.1 (a)(1) of the rule, "the purpose of this part is to establish standards and criteria for the use of all types of compensatory mitigation, including on-site and off-site permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation to offset unavoidable impacts to waters of the United States authorized through the issuance of permits pursuant to section 404 of the Clean Water Act (33 U.S.C. 1344) and/or sections 9 or 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 401, 403)." These standards do not only apply to wetlands and special aquatic sites. They apply to all regulated waters of the U.S., which includes the back bays. We recognize that this study represents a USACE planning and civil works action and not a regulatory one, but the principles of the final rule should be incorporated into any compensatory mitigation plan that is ultimately developed.

The compensatory mitigation ratios presented in Tables 99 and 100 do not reflect the generally accepted mitigation ratios used in NJ and there is no supporting information provided to demonstrate their suitability for offsetting the functional and ecological losses, which have also not yet been clearly defined. Appropriate mitigation ratios must reflect accepted practices in New Jersey, which do not include ratios less than 1:1. Moreover, compensatory mitigation ratios can vary based upon the functions being lost or degraded at the impact site, the functional uplift that may occur at the mitigation site, the temporal loss of functions, the difficulty in replacing the lost functions, uncertainty of success and a number of other factors. In addition, it should also be noted that we have not generally accepted filling one aquatic habitat, such as intertidal or subtidal shallows to create another such as wetlands, as compensatory mitigation for aquatic habitat loss somewhere else. Further, compensatory mitigation may be required for NNBFs that involve the conversion of aquatic habitat to uplands, and may be necessary if the conversion of one type or aquatic habitat to another results in a loss of ecological functions for NOAA trust resources.

Data Gaps, Further Analyses and Information Needs

As mentioned in the report, a number of studies and analyses are needed to fully identify and understand the impacts of the TSP. While some studies are specifically mentioned as being in progress or needed, there are a number of additional analyses necessary before the FIFR-EIS is completed. This section captures general topics, data gaps, survey and modelling needs to provide a robust effects analysis of TSP implementation and to develop a complete EFH assessment and BA.

The following presents the additional baseline ecological surveys and analyses needed that cover the entire study area:

- Wetland delineations.
- SAV, benthic invertebrate (including shellfish beds and oyster reefs), and fish census surveys. Surveys should be multi-year and multi-seasonal, highlighting spatial and

temporal frequency/occurrence. Environmental DNA (eDNA) studies could be helpful in assessing the seasonal presence of species within the Study Area and should be considered as a component of the baseline surveys and future monitoring.

- Sediment sampling, which includes grain size and chemical analyses.

In addition to baseline ecological information, impacts of the alternatives on habitats and our resources should be clearly defined, including:

- Direct impact during construction (temporary and permanent impacts)
- Direct impacts of structure footprints (permanent impacts)
- Direct, indirect, and cumulative impacts during operations
- Direct and indirect impacts during maintenance, commensurate with frequency and duration.

Additional modeling of the different alternatives should also be conducted, which includes gate open and gate closed scenarios, to determine direct, indirect, and cumulative impacts. Modeling should include:

- The anticipated effects of climate change.
- Turbidity effects and other water quality impacts on fish respiration, filter feeders, sight feeders, and photosynthesis of SAV beds expected during construction.
- High frequency/magnitude precipitation events and their interaction with tidal abnormalities.
- Scour and sedimentation effects to baseline habitats (i.e., wetlands, SAV, shellfish, mudflats, intertidal and subtidal areas), resources (i.e., prey, larval transport, fish migration, resident species), and navigation (i.e., potential to increase maintenance dredging, infilling rates of existing inlet ebb shoal sand borrow areas).

Comprehensive hydrologic and hydraulic modeling is also needed to fully understand how the project alternatives may affect:

- Salinity (i.e., freshwater inputs vs. marine inputs and impacts on flora, fauna distributions);
- Connectivity (i.e., how often and long is the gate anticipated to be closed in a given year and/or a range of given events);
- Current patterns on both sides of barriers;
- Tidal prism throughout lower and upper wetland tidal regimes;
- Water velocity, flowpath and volume through inlets and bays;
- Water levels on both side of the barriers;
- Dissolved oxygen levels during closure;
- Nutrient distributions;
- Bottom substrate around the barriers; and
- Scour and sedimentation expected in the direct vicinity of barriers and throughout the back bays.
- Sedimentation rates on marshes, marsh edge erosion, and marsh elevation.

In addition to the models discussed in the DIFR-EIS, other models that may be helpful include:

- Finite Volume Community Ocean Model (FVCOM), a multi-scale resolving global-regional-coastal-estuarine integrated model from the University of Massachusetts Dartmouth and Woods Hole Oceanographic Institution:
- Simulating Wave Nearshore Model (SWAN), a numerical wave model used to obtain realistic estimates of wave parameters in coastal areas, lakes, and estuaries from given wind, bottom, and current conditions.
- Durability models on features such as NNBF

Endangered Species Act

Consultation Guidance

At this time, the NJBB CSRM study is conceptual and will require substantial additional information such as rigorous site identification and planning (including timelines and construction schedules), detailed information on construction methods, description of listed species that occur in the project area and their uses of the area, impact assessments to listed species, and any required compensatory mitigation plans for loss of habitat before we can initiate ESA consultation on the project. As the materials provided for our review do not include the information necessary to initiate consultation as described in the implementing regulations of the Endangered Species Act (50 CFR 402.14(c)), we are providing technical assistance and consultation guidance for your consideration as you further develop the FIFR-EIS as it relates to considering impacts to ESA- listed species.

Given that sea turtles and Atlantic sturgeon may be exposed to stressors associated with construction, maintenance, operation and habitat impacts, we expect the proposed project to adversely affect these species. However, we believe construction activities will result in few injuries or deaths of listed species if the proposed avoidance and minimization measures are refined and implemented. Your preliminary analysis of impacts to water quality, hydrology, SAV, and forage resources indicates that the TSP and perimeter plan, if implemented, would affect the distribution and numbers of listed species within the study area. However, based on the information available about the species' distribution within the study area, their use of the back bays and near-shore coastal waters, and existing information on forage resources within the study area, we do not expect the study area to provide novel or essential habitat, support large numbers of any of the listed species, or be an area of special significance for species viability or recovery. We will provide further technical assistance to identify measures to avoid and, minimize, and restrict effects to listed species as well as the project's effects on ESA-listed species once additional project details and environmental impacts are available.

A key part of the analysis at the tier 1 stage is to consider how the conservation measures built into the TSP will function to offset otherwise adverse effects. By considering individual actions at the tier 1 level, you can propose project design criteria[2], best management practices (BMP)[3], and/or standard operating procedures[4] that avoid or minimize impacts to ESA listed resources. In the FIFR-EIS and BA, you propose several BMPs for construction activities to avoid or minimize effects to listed species. These include measures to minimize noise from pile driving such as use of a cushion block on piles, measures to reduce the risk of vessel strike such as reduced speed and having a dedicated person looking for whales, and implementation of BMPs for sediment and soil erosion control to minimize earth disturbance impacts.

However, minimization measures may have limited utility in setting thresholds on the extent and/or intensity of stressors because their effectiveness commonly depends on the equipment used as part of the defined action, the time of year the equipment is used and the environmental conditions at the project site and the action itself may need to incorporate particular thresholds. Consequently, there is no limit on the maximum level of the intensity and extent of stressors that can be used to analyze the consequences of construction activities or operation of facilities. Therefore, the development of standards and guidelines that limit and set sideboards for the intensity and/or extent of stressors are better suited at the tier 1 level as they define the effects that would be expected by a conceptual plan. An example of a sideboard that can be used to determine the consequences of the proposed project is your BMP that "pile driving should be carried out in a way that avoids exceeding noise thresholds identified for the protected marine species that occur in the action area." In addition, limits on the intensity and/or extent of stressors should be firm and enforceable.

It would benefit the analysis if the TSP included criteria that limit stressors from exceeding intensities and extents that will cause adverse effects. Choice of materials and measures to meet these criteria would then be determined at the Tier 2 level or during the PED phase. Thus, as a cooperating agency and under our ESA authority, we propose the development of an approach that facilitates further interagency cooperation and collaboration to refine those criteria to avoid/minimize impacts to and conserve ESA-listed resources in a manner that supports recovery. We support a tiered approach to your planning if we are able to work together to create a framework for analysis at the early stages that could include identification of thresholds and possible management measures to minimize and avoid effects if construction analysis show otherwise thresholds might be exceeded. Then, at later stages of the process, when project details are further defined and effects understood, we would be able to efficiently conduct an ESA consultation.

Technical Assistance

In our review of the material provided to us, we have considered how the proposed TSP will

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[2] Project design criteria - the specific methods, including the technical and engineering specifications or construction limitations, indicating how a project implemented under the programmatic consultation must be cited, constructed, or otherwise carried out to ensure project consistency and to minimize or avoid adverse effects to ESA listed resources.

[3] Best management practice(s)- a practice, or combination of practices determined to be an effective and practicable (including technological, economic, and agency considerations) means to minimize or avoid adverse effects to ESA-listed resources.

[4] Standard operating procedure(s) - a procedure, or combination of procedures, that describe the expected practices and activities necessary to complete a program or project in accordance with relevant agency regulations, policies, and guidance.

influence the activities it governs and their potential effects, analyzing to the extent we can, given the plan-level context - the nature and scale of the overall impacts to listed species. Because the tier 1 study lacks details about project activities and the overall impacts needed to estimate the level of effects associated with a more clearly defined project, coupled with the fact that the information needed to estimate any potential incidental take will not be available until the PED Phase, we will address the level of effects and any associated take in a subsequent project-specific consultation(s). While project details are lacking and further analysis of how the overall project plan will impact habitat within the NJBB and nearshore coastal areas are needed, we did provide you with comments on July 23, 2021, where we considered at a high level what consequences the NJBB CSRM study, if implemented, would have on ESA-listed species based on available information. Here we provide a preliminary broad-scale examination of the potential effects of implementing the TSP but we cannot analyze the site-specific effects of future individual projects as those project details are not available.

The following ESA-listed species may occur within the NJBB or in New Jersey coastal waters:

Whales
The endangered fin whale (*Balaenoptera physalus*) and the endangered North Atlantic right whale (*Eubalaena glacialis*) occur along the New Jersey coast.

Sea Turtles
Four sea turtles may be found within or near the study area. These are the threatened Northwest Atlantic Ocean Distinct Population Segment (DPS) of loggerhead turtles *(Caretta caretta)*, the threatened North Atlantic DPS of green sea turtles *(Chelonia mydas),* the endangered Kemp's ridley *(Lepidochelys kempii).* The endangered leatherback turtle *(Dermochelys coriacea)* may be found in the waters off the New Jersey coast.

Fish
Five Atlantic sturgeon *(Acipenser oxyrinchus oxyrinchus)* DPSs may be found within the study area. These are the ESA listed endangered New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPSs, and the ESA listed threatened Gulf of Maine DPS. Sub-adult and adult individuals from any of these DPSs could occur within the study area.

Critical Habitat
The study area does not include critical habitat designated for any federally listed species.

Construction of proposed structures could result in several stressors that may affect listed species. These include noise during pile driving, turbidity, entrainment in dredge, vessel strike, and re-suspension of contaminants. Further, there is a possibility that turtles could be impinged when the barriers are closed as they can rest along the bottom.

In addition to effects from construction activities and operation of the flood gates, the TSP and perimeter plan will indirectly impact the aquatic environment and habitats within the NJBBs. These impacts and changes to habitat may affect the distribution of and use by listed species within the action area. However, at this time the DIFR-EIS only provides general information on environmental conditions such as water quality and presence of SAV within the NJBB and does not have enough detail to estimate impacts to habitat and forage organisms at a scale necessary to determine effects on species. Also, increased retention of water within the back bays may affect nutrient loading on the ocean side of the inlets, which may be important for Atlantic sturgeon foraging. Last, sea level rise and changes to climate may exacerbate effects from operation of the gates and the presence of the perimeter structures over time. Future modeling and analysis may provide more information on potential effects to habitat and forage resources. Without the specific information, we assume that the TSP will significantly reduce forage for sea turtles within all or some of the study regions.

Little is known about the presence and use of the New Jersey Back Bays by protected resources. It is reasonable to assume that listed whales do not enter the inlets to the back bays because of their size and preference for open off-shore waters. Therefore, they are not expected to be exposed to stressors caused by construction activities or be affected by the presence of the proposed structures. However, important forage resources for whales are produced in the NJBB, such as, for instance, sand lance and copepods, and a reduction in the production of these organisms within the NJBB may affect whales. Both sea turtles and Atlantic sturgeon can move through the inlets and use the back bays for foraging and, therefore, may be exposed to stressors during construction and operation of the gates or affected by changes to habitat.

Atlantic sturgeon are known to aggregate along the New Jersey coast in areas less than 50 meters deep with the majority of observations in areas less than 20 meters deep. Atlantic sturgeon aggregations occur often on the coastal side of inlets in waters with lower salinity. We have no specific information about Atlantic sturgeon presence and use of the back bays but assume that their presence is limited to sporadic movement through the inlets to opportunistically forage in the back bays. None of the rivers emptying into the back bays provide for Atlantic sturgeon spawning. All four sea turtle species can be present along the New Jersey coast from May through November during seasonal migration and foraging. None of the four turtle species have established nesting on New Jersey beaches and under current climate conditions the proposed project will not affect nesting or hatchlings. Impingement of turtles on the trash racks on the intakes of the Oyster Creek Power Plant located in the Barnegat Bay do confirm the presence of Kemp's ridley, green, and loggerhead sea turtles in the bays, at least in the North Region. Leatherbacks have been documented in waters off of the New Jersey coast and have also been found stranded on New Jersey coastal and estuarine beaches. However, the only direct access to the bays from the Atlantic Ocean is through narrow inlets. While leatherbacks could enter the bays, it is improbable given that this species is rarely found in inshore waters.

Magnuson Stevens Fishery Conservation and Management Act

Consultation Guidance

As stated above and in our letter dated September 30, 2021, the tier 1 level information contained with the DIFR-EIS and accompanying EFH assessment does not include sufficient information necessary to initiate consultation under the MSA. We recognize that the SMART planning and tiered NEPA processes allow for a level of review that is general in nature and scope, and that documents prepared using this approach describe the project and its impacts at a broader level.

However, the full range of potential effects to both the human and natural environment should still be considered in the document. Regardless of the level of detail with the DIFR-EIS, in order for consultation under the MSA to be initiated, the EFH assessment must evaluate all of the direct, indirect, individual, and cumulative impacts of the action on EFH. As discussed above, we understand that additional information and analysis is planned to be undertaken during the PED phase of the Study, but a significant amount of data, analysis, and information on project impacts, alternatives, construction methods, implementation schedules/plans, NNBFs and compensatory mitigation is necessary before we can consult on the project and provide meaningful EFH conservation recommendations beyond merely recommending that the structural elements of the TSP not be constructed.

Technical Assistance

The required components of an EFH assessment include:

- A description of the action.
- An analysis of the potential adverse effects of the action on EFH and the managed species.
- The Federal agency's conclusions regarding the effects of the action on EFH.
- Proposed mitigation, if applicable.

Additional information. If appropriate, the assessment should also include:

- The results of an on-site inspection to evaluate the habitat and the site-specific effects of the project.
- The views of recognized experts on the habitat or species that may be affected.
- A review of pertinent literature and related information.
- An analysis of alternatives to the action. Such analysis should include alternatives that could avoid or minimize adverse effects on EFH.
- Other relevant information.

The level of detail in an EFH assessment should be commensurate with the complexity and magnitude of the potential adverse effects of the action. Actions such as those described in the DIFR-EIS, that may pose a more serious threat to EFH warrant a correspondingly detailed EFH Assessment. The level of detail currently available on the NJBB and the effects of the actions proposed in the TSP are not sufficient to evaluate the adverse effects TSP implementation would have on EFH. A revised EFH assessment should be developed and submitted to us once the information discussed above and data gaps identified are filled.

The analysis of effects should focus on impacts that reduce the quality and/or quantity of the habitat or result in conversion to a different habitat type for all life stages of species with designated EFH within the action area. Simply stating that fish will move away or that the project will only affect a small percentage of the overall population is not a sufficient analysis of the effects of an action on EFH. Also, since the intent of the EFH consultation is to evaluate the direct, indirect, individual and cumulative effects of a particular federal action on EFH and to identify options to avoid, minimize or offset the adverse effects of that action, it is not appropriate to conclude that an impact is minimal just because the area affected is a small percentage of the total area of EFH designated. The focus of the consultation is to reduce impacts resulting from the activities evaluated in the assessment. Similarly, a large area of distribution or range of the fish species is also not an appropriate rationale for concluding the impacts of a particular project are minimal.

Use the information on our EFH consultation website and NOAA's EFH Mapper to complete the EFH assessment. The mapper is a useful tool for viewing the spatial distribution of designated EFH and HAPCs. Because summer flounder HAPC (defined as: "all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH") does not have region-wide mapping, local sources and on-site surveys will be needed to identify submerged aquatic vegetation beds within the project area. The full designations for each species may be viewed as PDF links provided for each species within the Mapper, or via our website links to the New England Fishery Management Councils Omnibus Habitat Amendment 2 (Omnibus EFH Amendment), the Mid-Atlantic Fishery Management Councils FMPs (MAMFC -Fish Habitat)https://www.mafmc.org/habitat, or the Highly Migratory Species website. Additional information on species specific life histories can be found in the EFH source documents accessible through the Habitat and Ecosystem Services Division website. This information can be useful in evaluating the effects of a proposed action. Habitat and Ecosystem Services Division (HESD) staff have also developed a technical memorandum Impacts to Marine Fisheries Habitat from Non-fishing Activities in the Northeastern United States, NOAA Technical Memorandum NMFS-NE-209 to assist in evaluating the effects of non-fishing activities on EFH.

For your planning purposes, you should be aware that many in-water construction activities require seasonal work restrictions to avoid and minimize adverse impacts to EFH, federally managed species and other commercially, recreationally or ecologically valuable species under our jurisdiction either through the MSA or the FWCA. This includes seasonal protections for winter flounder early life stages and their EFH, SAV/summer flounder HAPC, anadromous fish migration, overwintering blue crabs, and sandbar shark pupping. If the structural elements of the TSP remain in the FIFR-EIS and are submitted to Congress for approval in a Chief's Report, the impact these restrictions may have on the construction and operation schedule of the structural elements should be factored into project costs and construction schedules.

Marine Mammal Protection Act (MMPA)

The MMPA prohibits the take of marine mammals, with certain exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce (as delegated to NOAA Fisheries) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if the taking will be of small numbers, have a negligible impact on the affected species or stock, and will not have an unmitigable adverse impacts on the availability of the species or stock(s) for taking for subsistence uses (where relevant). Some of the activities proposed by the USACE (e.g., floodgate construction) may harass marine mammals. The USACE should engage early with our Headquarters' Office of Protected Resource to identify measures that could avoid and minimize potential take. Information related to the potential need for an MMPA incidental take authorization can be found at: https://www.fisheries.noaa.gov/permit/incidental-take-authorizations-under-marine-mammal-protection-act.

Conclusion

As discussed above, the DIFR-EIS, which includes the EFH assessment and BA included a multitude of data gaps needed to fully analyze the direct, indirect, individual and cumulative effects of the construction of the TSP actions on aquatic resources and their habitats. Specifically, the document does not contain sufficient detail on the specific actions and analyses described in the TSP, does not provide an adequate impact assessment due to the lacking baseline information, excludes appropriate modeling scenarios, does not adequately incorporate the effects of climate change or high frequency precipitation events into the analyses, and does not provide appropriate mitigation measures. As a result, consultations under the MSA and Section 7 of the ESA cannot be initiated at this time.

The document itself is lengthy and contains numerous errors and inconsistencies. Coordination prior to the issuance of the DIFR-EIS did not follow the jointly developed SMART planning guidance and the information we provided since the inception of the Study in 2016 does not appear to have any meaningful influence on the development of the TSP. However, based upon the information in the report, it is clear that the significant impacts to NOAA trust resources will occur if the TSP is implemented as proposed. As outlined above, significant data collection and analysis is necessary should the Study move forward. However, we strongly recommend that the District re-evaluate the TSP and work collaboratively with the cooperating agencies and other stakeholders to develop a revised plan that uses a systems approach that incorporates natural, social, and built systems as a whole to identify practicable solutions to reduce damages from coastal flooding that affect population, critical infrastructure, property, and ecosystems while minimizing adverse impacts to NOAA trust resources and coastal ecosystems. The revised plan should prioritize the use of non-structural and other land use management options and natural and nature-based solutions.

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