



State of New Jersey

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October 12, 2021

Mr. Peter R. Blum
Chief, Planning Division
U.S Army Corps of Engineers
Philadelphia District
Wanamaker Building, 100 Penn Square East
Philadelphia, PA 19107-3390

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

Dear Mr. Blum:

The New Jersey Department of Environmental Protection's (NJDEP) hereby offers the following comments on the NEPA Draft Integrated Feasibility Report and Tier 1 Environmental Impact Statement (DIFR/EIS) for the New Jersey Back Bays Coastal Storm Risk Management Study (NJBB). The 950-square mile study area spans five counties from Monmouth County to Cape May County and contains over 182,000 structures and nearly 3,400 miles of both developed and undeveloped shoreline. The Draft Report presents a Tentatively Selected Plan (TSP) to manage risk and reduce coastal storm damage within the study area. The TSP currently consists of significant structural and non-structural features, including the following:

1. Storm Surge Barriers (SSBs) at Manasquan Inlet, Barnegat Inlet, and Great Egg Harbor Inlet
2. Cross-Bay Barriers (CCBs) along Absecon Blvd./Rt. 30 in Atlantic County, and along an old railroad embankment in Cape May County near Ocean City
3. Elevating and/or flood proofing nearly 18,800 structures

A project of this scope and magnitude could have numerous environmental impacts throughout the NJBB region, the nature and extent of which must be identified prior to arriving at a final recommended plan.

At this early stage in the planning process, it does not appear that the level of detail contained in the Tier 1 DEIS is sufficient to adequately assess the potential environmental impacts associated with the TSP. In particular, construction of the storm surge and cross-bay barriers have the potential to disrupt ecological and hydrologic functions including, but not limited to, hydrologic residence time, water quality, and fish migratory patterns. If USACE anticipates seeking a conditional Federal Consistency determination from the State of New Jersey during this Tier 1 feasibility phase, NJDEP would strongly encourage USACE to further define the direct and indirect environmental impacts. Such further analysis would enable USACE

to screen out potentially unviable solutions prior to the Chief's Report and any Congressional authorization that could follow.

Additionally, NJDEP notes that USACE's use of certain conservative methodologies may underestimate the potential benefits that the TSP could provide for the NJBB region. In particular, USACE sea-level rise assumptions may underestimate the range of NJBB sea-level rise risk and similarly underestimate the benefits of the TSP as a safeguard against incremental sea-level rise in addition to its intended function as a storm surge protection project. Finally, given the feasibility stage of this study, a multitude of implementation, operation, and maintenance issues associated with TSP will require further discussion between the federal, state, and affected local governments. These issues are not addressed in detail here and will be explored as the study progresses.

NJDEP OBSERVATIONS BY PROGRAM

The relevant NJDEP Programs identified below reviewed the DIFR/EIS for the purpose of evaluating potential adverse impacts to land and water resources, historical or cultural resources, threatened and endangered species, and migratory birds based upon the information supplied in the DIFR/EIS.

NJDEP offers the following comments and observations based upon the information presently available and hereby reserves the right to offer additional comments as direct and indirect environmental impacts are further defined and evaluated by USACE.

Division of Coastal Engineering (Non-Federal Sponsor for the subject study)

Operations & Maintenance(O&M)

The proposed SSBs and CBBs in the TSP, if implemented, would be among some of the largest surge barriers in the country. The cost of operations and maintenance of these features is currently estimated at \$196M per year. The proposed barriers will affect the Operations, Maintenance, Repair, Replacement, and Rehabilitation (OMRR&R) of three existing Federal Navigation Projects: Manasquan River/Inlet, Barnegat Inlet, and the Intracoastal Waterway. These Federal Navigation Projects are maintained by USACE and operated by the US Coast Guard (USCG). The USCG also maintains aids to navigation in the Great Egg Harbor Inlet. Operation of the proposed sector gates will require significant coordination with USCG and the National Weather Service (NWS). NWS does the storm event forecasting and notification to mariners through the marine weather forecast. Additionally, the proposed gates are highly technical, and their OMRR&R is beyond DEP's expertise and ability.

The estimated \$196M per year is approximately ten times DEP's current annual budget for shore protection projects. **Therefore, this letter serves as the study Sponsor's official request for USACE to perform the OMRR&R of all SSBs and CBBs proposed in the TSP. The Sponsor additionally requests any future WDRA authorization for this proposed project include that USACE will perform the OMRR&R, similar to other surge barriers in the US.**

Further, there should be substantial collaboration with all affected stakeholders regarding the closure frequency and timing of SSBs, including, but not limited to:

- a. Federal Resource Agencies: NOAA, USFWS, EPA
- b. United States Coast Guard
- c. National Weather Service
- d. New Jersey State Police



- e. Commercial fishing industry
- f. Recreational fishing industry
- g. Stevens University (surge forecasting)

This coordination should occur during the feasibility phase to adequately assess the impacts to these stakeholders and to determine if there are steps that can be taken to minimize the impacts.

Aside from once/year for testing and O&M, the SSB gates are currently anticipated to be closed for the .20% AEP (5-yr recurrence interval) storm. The USACE should clarify whether there is a means to forecast the “recurrence interval” of a coastal storm. The 5-yr recurrence interval, or whichever recurrence interval is ultimately chosen after optimization, may need to be associated to a predicted elevation when determining when to close the gates.

Structural

1. The report indicates that additional analyses would need to be run on the existing oceanfront CSRSM projects to determine if the designs would need to be modified to provide the same level of protection offered by the SSBs. A significant portion of the existing dunes do not meet the proposed surge barriers design elevation. As Sponsor, NJDEP requests the existing dunes from Manasquan to Route 72 in Ship Bottom and Absecon Inlet through Ocean City be analyzed to determine what modifications would need to be made to the existing dunes and berm to meet the proposed project’s design level. These modifications would need to be included with the NJBB project’s Water Resources Development Act (WRDA) authorization. NJDEP does not support individual Coastal Storm Risk Management (CRSM) project modification. There are five existing authorized CSRSM projects involved and its unreasonable to perform General Reevaluation Reports and reauthorization of these individually for the NJBB to perform as designed.
2. The primary purpose of the SSBs and CCBs would be to limit the amount of storm surge that enters the back bays during storm events. Northern Ocean County and northern Long Beach Island have no non-structural solutions proposed and are currently shown to benefit from SSBs at Manasquan and Barnegat Inlets. However, it is unclear, that in instances when the SSBs would be closed, what would prevent surge from entering the back bay from the south through Little Egg Inlet which has no SSB and would therefore remain open. The report needs to better clarify 1) what the extent of surge would be north of Rt. 72 as a result of Little Egg Inlet remaining open, and 2) why there is no CCB proposed along Rt. 72 to limit surge that may come from Little Egg Inlet. This area exhibited considerable surge and damage during Superstorm Sandy as a result of shifting winds pushing surge north of the Rt. 72 causeway.

Non-Structural

1. Section 7.2.2.1 Nonstructural Management Measures: The report states that per Planning Bulletin PB 2016-01, “...100% voluntary participation for acquisition, relocation and permanent evacuation is not considered a complete plan and is not acceptable for USACE participation. USACE participation must include the option to use eminent domain, where warranted.” A non-voluntary buyout plan of this size and magnitude would be unprecedented in New Jersey and face substantial opposition and controversy across the entire study area. NJDEP currently administers voluntary buyouts in flood-prone areas through the Blue Acres Program and would need to reassess its existing policy if non-voluntary buyouts would be feasible.



2. Appendix D states that no structures that have previously received disaster assistance for elevating will be eligible for elevation under this plan. USACE should clarify whether this refers to all federal disaster assistance such as FEMA and HUD received by homeowners throughout the years, including prior to Sandy, and whether NFIP claim payouts are considered “federal assistance.” Many of the homes identified for elevation were elevated years ago using federal disaster assistance, and the NFIP Base Flood Elevations (BFEs) may have been lower at the time. Houses elevated prior to Sandy may be elevated only to the BFE that was required at the time with little to no freeboard, thus requiring additional elevation. Therefore, as the Sponsor, and in consideration of these circumstances, it is DEP's position that the homes which previously received disaster assistance should not be disqualified from additional elevation to meet the Target Design Elevation of the plan, plus any applicable freeboard.
3. FEMA may have different freeboard requirements than USACE specifies in the report. USACE should coordinate with FEMA, HUD, NJOEM, NJDEP, NJDCA and municipalities to ensure required freeboard is met in designating Finished Floor Elevation (FFE) for each structure.
4. Appendix D states that structures that require elevation greater than 12 ft. above ground level will not be eligible for elevation due to “engineering and risk related factors.” USACE should clarify whether this applies to all foundation types (i.e., pile, grade beam, piers, etc.) and specify the engineering analyses used to determine the 12 ft. threshold.
5. Appendix D states the following, *“Elements of structure elevation work that are deemed to be potentially eligible project costs include....allowable relocation assistance funds for displaced tenants in accordance with Uniform Relocation Assistance and Real Property Acquisition Policies for Federal and Federally Assisted Programs of 1970, Public Law 91-646, 84 Stat. 1894 (42 U.S.C. 4601), as amended by the Surface Transportation and Uniform Relocation Assistance Act of 1987, Title IV of Public Law 100-17, 101 Stat. 246-256. Relocation assistance for tenants may include, among other things, advisory services, differential housing payments, and reimbursement of costs of moving personal property, rental assistance to supplement the costs of leasing a comparable replacement dwelling, or down payment assistance to purchase a replacement dwelling. (See Appendix E, Real Estate Plan for more detailed information.) Note that a structure is ineligible for nonstructural measures if it would require elevation over 12 ft. above ground level due to engineering and risk related factors. Landowners whose properties are voluntarily elevated will not be eligible for benefits in accordance with URA; however, tenants of these structures may be eligible for these benefits.”* USACE should clarify whether this statement implies that residential property owners will NOT be eligible for temporary relocation assistance. NJDEP notes that residential owners were eligible after Sandy for temporary relocation assistance and should continue to be in this case, as many owners do not have the financial means to pay rent for a temporary residence on top of their monthly mortgage payments.
6. The process of procurement and administration of elevation contracts at the federal level should be further considered given the extremely large number of potential elevations. Following Sandy, NJ had great success under the RREM program by allowing homeowners to pick their own contractors and submit for reimbursement. USACE should continue to coordinate with the Sponsor to determine the most efficient means of administering large clusters of home elevations contracts. NJDEP advises USACE to reconvene the Nonstructural Advisory Committee to bring



together agencies such as NJDEP, NJDCA, NJOEM, and the Governor's Office to further refine and develop the nonstructural implementation plan.

7. As the Sponsor, it is NJDEP's position that structure elevations in each area should move forward only if there is a suitable plan to reduce flood risk to the critical infrastructure (CI) that serve those structures (if the CI is not already protected/elevated). All too often homes are elevated in areas that are subject to repetitive inundation of the roads and surrounding critical infrastructure. So, while the homes may be elevated above the design flood elevation, the CI is not, thus periodically inhibiting access to the homes and reducing quality of life. USACE should assess critical infrastructure plans in all areas where home elevations are proposed and ensure there is a plan in place whether it's at the federal, state, and/or local level before investing in home elevations.
8. Appendix D says ancillary structures such as detached garages and sheds are not eligible but does not specify if second/vacation homes are eligible. It is important that USACE clarify the eligibility of second/vacation homes.

Critical Infrastructure Plan (CIP)

The ranking of critical infrastructure measures needs to be coordinated closely with NJDEP as the Sponsor throughout the entire development of the CIP to ensure conformity to the state's Climate Change Resilience Strategy.

Natural and Nature Based Features (NNBF)

The State has concerns regarding the feasibility of incorporating NNBF's into the recommended plan considering NNBF's tend to provide more ecosystem restoration benefits than CSRMs, and the study is only operating under a CSRMs authority. Studies and research have shown that NNBF's are most effective at reducing storm damage when they are implemented on a large scale, which may not meet National Economic Development (NED) standards for a project of this size and scope. The Sponsor encourages USACE to use every means necessary to ensure NNBF's are analyzed fairly and incorporated into the recommended plan to the maximum extent practical.

Division of Land Resource Protection (NJDEP's issuing authority on Federal Consistency Determination and Water Quality Certification)

Federal Consistency

A Federal Consistency determination/Water Quality Certificate (WQC) is required from the NJDEP Division of Land Resource Protection (DLRP) for this project. For this review, it should be noted that the USACE must submit a Federal Consistency/WQC request for the final selected project design and once any proposed impact acreages have been determined. A compliance statement/discussion must be submitted so can confirm that the proposed project is consistent with its Coastal Zone Management rules. As previously noted in discussions between USACE and DLRP, the level of detail provided in the DIFR/EIS is not sufficient to review for federal consistency.

Marine Fisheries Administration (MFA)

The MFA is comprised of the Bureau of Marine Fisheries and the Bureau of Shellfisheries. The MFA's review focused on sections of the report that referenced any resource or stakeholder group under the stewardship of MFA.



Chapter 4 – Existing Conditions

Section 4.8.9 – Submerged Aquatic Vegetation

The MFA is nearing completion of historical and recent GIS-based mapping of SAV resources. Once complete, the data should be incorporated into the characterization of existing conditions, used for planning/avoidance purposes, and for evaluating potential impacts (direct, indirect, and cumulative) resulting from the proposed activities under the TSP. As the Tier 1/Tier 2 phases progress, additional information may become available that is unpublished, and the MFA encourages the study authors to initiate contact for sharing of any unpublished data. As a minor note, sago pondweed was previously classified as *Potamogeton spp.* but is now known as *Stuckenia pectinate* and can be found in central-upper Barnegat Bay.

Section 4.8.13 – Fisheries Resources

Commercial harvesters that target fish and shellfish within each estuarine system should be considered. The table below shows the number of commercial harvesters and trips taken from 2016- 2020 between the three study area regions (north, central, south). The regions align with National Marine Fisheries Service (NMFS) sub areas.

Harvester and Trip data between 2016 – 2020	Active Harvesters (Average)	Number of Trips (Total)
North Region	50	1,773
Central Region	27	7,241
South Region	19	4,014
Total	96	13,028

Source: ACCSP data warehouse (data shown as non-confidential data set)

- Gears fished in regions include (most prevalent to least prevalent)
 - o Pots and traps (Blue crab)
 - o Pots and traps (Eel, Conch, Minnow)
 - o Dredge
 - o Fyke Net
 - o Cast Net
- All other gears (Gill Net, Hook and Line, Dive) have minimal reported landings.

The 2016 Fisheries Economics of the United States report revealed that commercial fishing in New Jersey generated the largest fisheries-employment impacts in the Mid-Atlantic region with 37,100 jobs. Additionally, income impacts were \$1.4 billion, sales impacts were \$6.2 billion, and value-added impacts were \$2.3 billion. New Jersey reported commercial fisheries landing revenue of \$193 million with an increase of 16%, which equates to \$26.8 million. Both New Jersey and New York account for almost all of the Mid-Atlantic squid landings, these landings almost doubled while global squid production fell 30% year-over-year. New Jersey generated the greatest employment impacts from expenditures on saltwater recreational fishing in the Mid-Atlantic region with 15,400 jobs. Additionally, sales impacts were \$1.8 billion, income impacts were \$746.2 million, and value-added impacts were \$1.2 billion. A total of 4.3



million recreational fishing trips were taken from NJ in 2016 while 185 retail seafood establishments and 78 wholesale seafood establishments were in operation. According to the Fisheries of the United States published by NOAA for 2019, New Jersey landed over 175 million pounds of seafood, valued at almost \$200 million – the 8th largest catch nationally. The report also noted that New Jersey was leading in landings of Atlantic Mackerel (5.5 million lbs.), Atlantic Surf Clams (17.6 million lbs.), Ocean Quahog (13.4 million lbs.), Sea Scallops (10.5 million lbs.), and Squid (21.6 million lbs.). The port of Cape May landed 95 million pounds valued at \$90 million, Point Pleasant landed 37 million pounds valued at \$35 million, Atlantic City landed 24 million pounds, and Barnegat Light landings were valued at \$25 million. The Tier 2 report should include anticipated mitigation measures for these well-established fisheries resources.

Annual SSB closures for maintenance and/or training could have the potential to pose a major concern in the event of closures potentially lasting multiple days, which could have significant implications for the commercial fishing operations that rely on these inlets to get to and from port, both in Manasquan Inlet and Barnegat Inlet. The Manasquan Inlet is used to access the docks at Point Pleasant while the Barnegat Inlet provides access to the Viking Village and Lighthouse Marina docks. Significant operational planning and advanced notice to vessels could be critical to reduce adverse impacts to vessels that transit daily and those that are away for several days or weeks. Dock workers, restaurants, charter and head boats, and recreational fishers would all be affected by closures, so a carefully planned operations plan with direct input from the fishing industry will be critical. Timing the closures around peak fishing seasons (while also considering timing restrictions to protect species) should also be considered when developing the operations plan.

Section 4.8.13.3 – Shellfish

The MFA is nearing completion of GIS-based mapping of recent and historical information natural shellfish populations and aquaculture leases. Once complete, the data should be incorporated into the characterization of existing conditions, used for planning/avoidance purposes, and for evaluating potential impacts (direct, indirect, and cumulative) resulting from the proposed activities under the TSP. As the Tier 1/Tier 2 phases progress, additional information may become available that is unpublished, and the MFA encourages the study authors to initiate contact for sharing of any unpublished data.

The section characterizing shellfish aquaculture in New Jersey's Atlantic Coastal estuaries would benefit from revision using the most recent information available directly from the MFA's Bureau of Shellfisheries, the entity responsible for management of the state's shellfish resources. New Jersey's shellfish resources fall into two primary segments; the wild resource available harvested on open access bottom (through the Public Trust) and privately leased submerged state lands used for culture activities issued through the Shellfish Aquaculture Program. There are 948 individual leases currently held accounting for 2,433 acres and 26,476 linear feet in New Jersey's Atlantic coastal bays and rivers. In 2021, over 16,000 shellfishing licenses were sold. This number does account for the thousands of individuals that make up the distribution and supply chain segments.

The description of the Existing Conditions for Shellfish Aquaculture 4.8.13.3 references data from industry summarization report published in 2004. The descriptions and assumptions within this document describing hard clam aquaculture industry in New Jersey are significantly outdated. Since its publication, the aquaculture industry has expanded and changed. For example, hard clam aquaculture had been the main species of focus historically on the Atlantic Coast, but many growers have shifted efforts towards incorporating or exclusively growing Eastern oyster, as the demand for a raw oyster product continues to grow across the United States.



Other notable shellfish habitats that should be included in pre-existing condition characterizations, project planning, and impact analysis are the Mullica River oyster reefs and the numerous shellfish enhancement activities throughout the study areas. The Mullica River oyster reefs are the last self-sustaining native eastern oyster population on the Atlantic coast in New Jersey. Updated GIS-based delineations of these beds will be available soon. Oyster reefs are especially vulnerable to predatory and disease pressure. Even minor changes in salinity regimes across the oyster reefs can have significant effects on oyster recruitment, survivorship, and mortality. Enhancement activities in the study area include oyster shell and spat-on-shell planting, or direct planting of hard clam seed. Some of these areas are directly managed by the Bureau of Shellfisheries while others are handled by universities or NGOs. Please contact the MFA for details on where these activities occur.

Section 4.8.17 - Cultural Resources

On page 101, the first full paragraph begins: *Although there are no major commercial ports along New Jersey's Atlantic coast, there has been a consistently high volume of coastal ship traffic off the New Jersey Atlantic coast. Cape May Inlet is heavily used by both commercial fishing vessels that work out of Cape May Harbor and recreational fishing boats and sailing boats.*

The MFA requests clarification that the authors are referencing commercial cargo ports, as there are, as identified above, a number of major fishing ports within the study area (Atlantic City, Barnegat Light, Point Pleasant and Belford). The Shark River Inlet is heavily trafficked by recreational, charter and head boat users as are the Manasquan and Barnegat Inlets. These commercial fishing ports are critical to the state's lucrative fishing industry. For example, the table below summarizes the commercial landings (millions of pounds) and value (millions of dollars) for Atlantic coast NJ ports (excludes Belford and Port Norris).

Atlantic Coast NJ Ports	Quantity -2018 (millions of pounds)	Quantity- 2019 (millions of pounds)	Value - 2018 (millions of dollars)	Value - 2019 (millions of dollars)
Point Pleasant, NJ	43.3	37.3	32.4	35.4
Long Beach-Barnegat, NJ	6.3	7	24.3	24.9
Atlantic City, NJ	24.8	23.5	18.2	17.2
Wildwood- Cape May, NJ	101.2	94.5	66.3	90
Total	175.6	162.3	141.2	167.5

Source: FUS 2019 report/ NOAA port lookup

Chapter 5 – Hydrodynamic Modeling Analysis

Section 5.4.2 Modifications for NJBB

The last paragraph in the section mentions that only tropical storms (not extratropical storms, also known as “nor’easters”) were used in the modeling. This potential omission should, at minimum, be further clarified and explained.

Chapter 6 – Future Without Project (FWOP) Condition

Section 6.4.10 - Fisheries Resources



The impression in this section implies that the FWOP would be a disservice to fisheries resources impacted by climate change and SLR. While climate change may introduce uncertainty in predicting future conditions, it may be helpful to clarify that engineered storm risk mitigation measures will not in themselves mitigate for the potential adverse impacts of climate change and sea level rise on fisheries resources. Given the recognition that structural alternatives could potentially compound adverse climate impacts upon fisheries, it bears noting that an episodic event like a major storm may not have any worse impact when compared to the permanent changes within the estuary resulting from the proposed construction measures.

The report states that: *“Shellfish resources (primarily the hard clam) as reported by BBP (2016) are in a degraded state and no discernable trend in abundance in Barnegat Bay and Little Egg Harbor due to limited sample intervals. It is assumed that other NJBB systems have similar statuses with some local variations for fish and shellfish resources.”*

Barring a scientifically rigorous stock assessment utilizing the appropriate sampling and analysis methodologies, this suggestion is completely unsubstantiated. Although outside of the study area, hard clam population studies conducted by the Department’s Bureau of Shellfisheries in Raritan Bay, Sandy Hook Bay, and the Navesink River have all shown recent hard clam population growth relative to baseline studies. This deviation from the hard clam status of Barnegat Bay emphasizes that trends in one estuary cannot be assumed to apply elsewhere.

Chapter 7 – Plan Formulation

Section 7.4.3.2.1.2 - Navigable and Auxiliary Flow Gates

On page 204, the last paragraph states that “the minimum flow gate depth will need to be further investigated as the study continues.” This minimum depth refers to the proposed area for a flow gate describing an example depth of 1 foot would be too shallow and not generate enough flow in and out of a channel to warrant positioning a flow gate there. The MFA requests clarification on whether the minimum depth been determined, and if not, at what point in the process is it expected to be available.

On page 205, the report indicates that the vertical clearance of lift gates would be high enough to enable recreational boaters to navigate beneath them when they are open. The MFA requests additional information about the series of lift gates used for auxiliary flow gates proposed, and the potential effects of natural air flow and sunlight disruptions to the area immediately surrounding these lift gates; as well as potential disruptions to water flow (i.e., air flow disruptions diverting upper water currents, sunlight disruptions on water temperature and SAV).

Chapter 8 – The Tentatively Selected Plan

The report acknowledges the existing uncertainties regarding the potential direct, indirect, and cumulative effects of the selected structural alternatives on the ecosystems and biological communities within the affected estuaries. Though the authors mention the need for further studies, it is unclear if such studies will be required and executed in an updated Tier 1 study or a Tier 2 EIS, and if they will evaluate the full suite of potential effect combinations (e.g., localized vs. estuarine wide; direct and indirect; short term, long term, and cumulative; open gate vs. closed gate). The MFA strongly recommends that all possible combinations of spatial and temporal impacts, in both open-gate and closed gate scenarios, undergo modeling analysis for water quality impacts. Further, although the modeling for the open-gate scenario suggests minor changes to hydrodynamics and water quality, this does not necessarily translate to negligible short term, long term, localized, and cumulative effects on marine resources and



habitats. For example, the increases in velocity, coupled with substantial restrictions at the inlets, seems unlikely to produce only negligible effects at all trophic levels. Effects on larval transport and changes to finfish migratory behavior are especially concerning. It may be beneficial to link, as practicable, hydrodynamic models with more than one ecosystem model to better predict potential cascading impacts to marine resources and habitats.

The report makes references to the Seabrook Flood Complex as a model for development of the SSB conceptual designs in New Jersey. However, it is unclear whether any modeling exercises for water quality impacts and subsequent flora and fauna impacts conducted, if those model results were compared with actual pre- and post-construction surveying for comparing with the model, and if there has been any significant adverse impact to marine resources.

The nature and extent of further studies will determine the potential impacts of the structures proposed by the TSP, including, but not limited to: baseline studies conducted prior to construction of all biological and environmental characteristics in the estuaries; post-construction studies to monitor any changes to the biological and environmental characteristics of the estuaries, especially to biological community composition, species distributions and abundances, and migratory and dispersal movements.

Section 8.1.4 – Natural and Nature-Based Features Analyses

Figures 82-85 illustrate potential areas for island expansion or creation. Placement on top of SAV beds or aquaculture leases is generally not supported by NJDEP. Placement adjacent to these resources would require careful consideration due to potential adverse impacts from sediment transport and access to leases. Sediment transport has the potential to smother both SAV and shellfish. Careful evaluation of existing benthic resources (shellfish and SAV) and shellfish aquaculture leases adjacent to the proposed expansions must be considered:

- Shark River has a history of high densities of hard clams at the shoreline proposed for island expansion, and Gull Island, in the Manasquan River, has a well-documented history of soft clam production. However, there is flexibility in considering these locations.
- The island creations on the western side of Barnegat Bay between Forked River and Toms River appear to overlap with the ICW.
- The islands off southern IBSP are surrounded by SAV beds and portions of the area have been or are currently used for hard clam enhancement activities. More detail would be needed to understand potential impacts.
- Artificial reef creation within the Barnegat Inlet seems inadvisable due to navigational safety concerns. Moreover, this proposal would warrant further discussion if artificial reefs in these particular nursery waters would even make sense relative to the potential for increased fishing pressure and mortality.
- On the mainland side of Little Egg Harbor (Parkers Run, West Creek, etc.) there are small pockets of established Eastern oysters that need to be considered, as well as aquaculture leases in Rose Cove.



- The islands in southern Little Egg Harbor are nearly surrounded by aquaculture leases or SAV or both. All existing shellfish lease areas are described in the Bureau's Shellfish Leasing Policy (https://njfishandwildlife.com/pdf/marine/shellfish_leasing_policy_atlantic.pdf).
- The portion in Great Bay proposed for island expansion is immediately adjacent to the most concentrated area of aquaculture leases in this waterbody.
- The shoreline development projects highlighted on pages 312 and 313 for island expansion and/or wetland enhancement overlap with several shellfish lease areas. All existing shellfish lease areas are described in the Bureau's Shellfish Leasing Policy (https://njfishandwildlife.com/pdf/marine/shellfish_leasing_policy_atlantic.pdf). For example, two lease areas, Stites Sound and Corsons Sound, appear to fall directly in the island expansion areas shown on page 313. The proposed project area overlaps with 157 commercial shellfish leases and 1 research at Corson's Sound, Ludlam Bay, Stites Sound, Great Sound, and Jenkins Sound within Section A.
- The "Seven Mile Island Innovation Lab" (a subset area described on page 313) is an experimental area that overlaps with aquaculture leases in Jenkins Sounds, Great Sound, and Stites Sound. Great Sound, in particular, has a high density of leases. Recent sediment placement on Gull/Sturgeon Islands is still being evaluated to determine if sediment transport has or will occur in a way that adversely affects adjacent leases. Additional island creation or enhancement should not proceed until the results of the sediment transport studies are available.

Section 8.2.2.1 - Hydraulic Effects

One of the potential effects from SSB would be the reduction in tidal exchange between the ocean and bays.

"A reduction in tidal exchange could lead to other physical impacts including changes in back bay tidal ranges, salinity, sediment transport, and other physical factors. These physical impacts may in turn affect water quality, wetlands, ecological processes, and living resources ..."

The Barnegat Bay system already has high residence times and low exchange rates of water between the ocean and Bay. Even though the tidal prism is modeled to only be reduced by 2.5%, the effect on the biological and physical characteristics of the Bay should be considered. Tidal amplitude changes would range from 1.3-8.3% depending on the location within the Bay, and the effects on local biota should be considered. The change in salinity is characterized as small (at only approximately 2 ppt). In a lagoon-type system like Barnegat Bay, the tipping point in any of the physical variables may be much smaller than within a more open and well-flushed estuary. Study to research these concerns would be appropriate. For example, changing the salinity by only 1 ppt, depending on how large an area this change occurred over, could have significant impacts on the ecology of an oyster reef. This "minor" change could lead to a significant increase in mortality from disease (such as Dermo) or by allowing more predators to access the reefs (both of which are highly salinity dependent). It would also be appropriate to assess the effects of a drop in flushing/exchange on plankton, HAB, larval disbursements and migration, SAV beds and sessile invertebrate fauna. Changes in residence time leading to water quality changes and subsequent impacts to flora and fauna are a concern for all of the estuaries where a SSB is proposed.



The report notes the hydraulic effects of the SSB in the open position, stating that “the velocity at the inlet and structures should be reviewed for impacts to navigation as well as potential sedimentation impacts.” It seems prudent to conduct those evaluations during the Tier 1 phase, as adverse impacts to navigation especially could render the SSB non-viable. Additionally, sedimentation impacts should also be evaluated during Tier 1 as both excessive scour and excessive deposition could result in both local and generalized adverse impacts that would also render the SSB non-viable. More specifically, for example, excessive sediment deposition in local, state, and federal channels may be of concern for navigation and management. Excessive sedimentation may also result in the burial of submerged aquatic vegetation beds.

It is unclear what the data in Figure 92 represents. A written interpretation would assist the reader.

The document also states: “*The restrictions created by the alternative structures and the reduction in tidal prism are not large enough to significantly impact the salinity at the analysis locations.*”

Based upon Figure 93, it appears that the “analysis locations” are limited to the immediate inlet and not the remaining estuary. This should be further studied, as cascading effects of reduced salinity throughout the estuary (especially where residence time already varies significantly, as with Barnegat Bay) may result in reduction in suitable habitat for marine organisms and support the expansion of opportunistic nuisance species, such as sea nettles. Consequently, it is recommended that estuary-wide impacts on changes to salinity, Dissolved Oxygen, temperature, and pH be conducted during the Tier 1 phase, as was conducted with residence time. It would be helpful to clarify the results based on estuary and region.

For the residence time modeling, it would also be helpful to clarify if both Barnegat Bay and Great Egg Harbor are expected to have reduced residence time by 2 to 5 days or if the expected reduction is 2 days for Barnegat Bay and 5 days for Great Egg Harbor.

Modeling of the impacts on residence time and other water quality parameters would be beneficial during the Tier 1 phase. Storm surge is known to have adverse impacts to shellfish populations and the commercial aquaculture industry. For example, after Superstorm Sandy, the poor flushing of cold water, combined with sewer breaks, lead to long closures of shellfish beds by the Bureau of Marine Water Monitoring, substantially delaying the harvest of shellfish products from leases. This in turn resulted in a substantial economic impact to lease holders, which prompted applications for Federal economic disaster relief. Additionally, while most shellfish species are tolerant of periods of reduced water quality, excessive time may result in mortality. For example, along the Delaware Bay, excessive freshwater inputs, combined with storm surge, resulted in the mortality of Eastern oysters from Hurricanes Irene and Tropical Storm Lee. It is possible that a similar situation could occur on the Atlantic Coast when considering the combined effects of the SSB closure with the long-term background effects of a reduction in salinity and residence time. While the bivalve population along the Atlantic Coast is different than Delaware Bay, the modeled information will help determine if those impacts to shellfish and other marine species are likely.

Concurrent with the pre-construction studies should be research into potential behavior modifications in reaction to increased tidal velocities by migratory fish. In flow and out flow scenarios should be considered. Such information would be valuable not only for the current project but also as a resource for fisheries management and for future projects dealing with sea level rise and climate change.

Section 8.2.4.3/Section 8.2.4.7.1- Pre-construction



The document states that “prior to construction, investigations may include wetland delineations, benthic and finfish sampling ...” These investigations should be classified as mandatory. They may consist of desktop research utilizing available literature and research. However, for those areas without available data, pre-construction monitoring should be completed over a two-to-three-year time frame.

Section 8.2.4.12 - General Impact Assumptions

We concur those potential indirect impacts from SSBs and CBBs on hydrodynamics, water quality, “shifts in flora and fauna abundance, distributions and migrations are potentially significant with a higher degree of uncertainty” and that further investigation is warranted. It would be helpful to have such investigations completed before committing to the permitting and installation phases of any structure in the TSP. Early coordination with local, state, and federal agencies will benefit these investigations.

Section 8.2.4.16.1.1.1 - Direct Impacts

The MFA anticipates that any of the alternatives will have moderate to significant impacts to anadromous or migratory fish after installation. For spring spawning species, such as river herring and striped bass, an important thing to consider are the salinities at the time and location of spawning which can have effects on spawning success as well as egg and larval development.

The MFA also anticipates the TSP to have significant impacts on migratory fish during the construction phase and whenever the bay/inlet closure structures are being operated. The scale of each project is very large and will require significant time, equipment, and general in-water disturbance resulting in increased sound and turbidity, at the very least. Given the locations of these projects, restricted chokepoints through which anadromous fish cannot avoid during their spawning migrations in the spring and out migrations in the fall, and the associated massive scale of the construction efforts there will undoubtedly be interruptions/delays/abandonment in migration. It is vitally important that any in-water construction or maintenance operation of the bay/inlet closure be done outside of spring spawning windows whenever possible. Species such as river herring whose spawning runs are principally composed of ~3-year classes can be disproportionately affected by long term construction projects that impede spawning migrations. Three to four years of significantly impacted spawning runs can essentially cause the extirpation of a herring population in a given waterway which would be especially detrimental given that the most recent stock assessment of river herring found the two species (blueback herring and alewife) to be depleted on a coastwide basis. Additionally, striped bass which use these areas have been assessed as overfished with overfishing occurring during the most recent benchmark stock assessment. These areas are also listed by NOAA Fisheries as Essential Fish Habitat for all life history stages of many commercially and recreationally important species including winter flounder, the populations of which are assessed as overfished. For these reasons, it is vitally important that in-water work be avoided when at all possible, during spring spawning windows, and if unavoidable, best management practices need to be used to mitigate concussive sound and turbidity issues associated with pile/sheet driving and resuspension of sediment from construction activities.

The Southern New England/Mid-Atlantic winter flounder stock is near historic lows and the proposed work plans are in regions, including the Absecon Bay Closure construction, which have been determined to be Essential Fish Habitat for all life history stages of winter flounder. The dredging and development timing restrictions for winter flounder, which have been established to protect the spawning and vulnerable life history stages, in areas of 20- feet or less MLLW bathymetric contour is recommended from Jan 1- May 31. Dredging operations north of the 39°22' N latitude including work on the Absecon Bay Closure are recommended to observe the winter flounder timing restriction.



The projected EFH impacts on habitat will affect species that are commercially important to New Jersey. Preliminary estimates are suggesting that inlets will be blocked by as much as 46%. Permanent man-made structures pose an ongoing barrier to fish and reducing the space by almost half is essentially creating a massive funnel that puts certain species at a greater risk of mortality. Levees and floodwalls may be limited to locations where storm surge and CCBs tie into adjacent higher ground, but they are permanent structures that reinforce wave action creating additional erosion as a result.

Section 8.2.4.16.1.1.2; .3 – (Perimeter measures) Indirect and Cumulative Impacts

Additional supporting information about indirect and cumulative impacts to water quality around the gates appears necessary, which should specify the extent of the area being evaluated, and the data/information used to reach the conclusion that only minor impacts are anticipated.

Section 8.2.4.16.1.2.; .32 – (SSB/CBB) Indirect Impacts temporary and long term

Additional investigation is warranted to better determine how these structures may alter tidal flow, including whether there are data to support the anticipation that adverse effects from turbidity are localized.

Section 8.2.4.16.1.2.4 – Open-Gate Scenario

The authors state that: *...based on these model outputs, it is reasonable to conclude that the small changes in residence times would not contribute to large scale increases in stagnation and/or water quality degradation associated by nutrient loading in areas most affected by SSBs. However, subtle changes are more difficult to model, thus implementation of these structures still present a higher risk for either overestimating or underestimating water quality impacts especially in estuarine systems stressed by nutrient enrichment. In order to mitigate this risk, additional modeling, and refinements along with collecting long-term data sets on measured attributes would provide a better baseline to compare changes prior to any SSB implementation.*

It is reassuring that more investigations need to be made to specifically model potential subtle but significant changes. However, the proposal seems to be speaking only on the physical effects, not the down-stream effects to biota from physical changes. It is important to note that even subtle shifts in physical characteristics may have significant impacts on planktonic organisms, HAB, SAV, migrations, nursery habitats—all important biological members or events/characteristics of estuaries. For example, the tidal prism reduction of 4.8% at Great Egg Harbor may or may not have cascading consequences on the Great Egg Harbor River, a Wild and Scenic River with an historic oyster population.

Section 8.2.4.18.1.2.1 – Direct Impacts

It is mentioned that all efforts would be made to move or re-align structures to avoid SAV beds. However, in areas where that is impossible, compensatory mitigation will be considered especially for historic beds along Barnegat Inlet SSB. However, this structure, along with the potential use of floodwalls and levees, has the potential to significantly affect SAV, a population and habitat already in decline. Placement of structures in SAV beds is strongly discouraged, especially considering that mitigation through planting and seeding is costly and has a poor track record of success.

Section 8.2.4.19.1.1.1 – Perimeter floodwalls, Direct & Cumulative Impacts

The MFA concurs with the assessment that there would be significant benthic habitat loss resulting from the installation of perimeter structures, especially those with wide-base footprints. For example, the



report states 40 acres of subtidal soft-bottom habitat and essential fish habitat for winter flounder, a species near record low abundance levels, will be lost. The DIFR/EIS should explain how this habitat loss would be mitigated. If such measures are advanced for further consideration, the MFA recommends creative design considerations that provide habitat or mimic the land-water continuum as much as possible, similarly to that of a living shoreline.

Section 8.2.4.20 – Terrestrial Habitats

The footprints of the impermeable barriers to be used for CBB and for flanking the SBB components would impede bottom sediment species that typically migrate over the sediment. A short length would not be very problematic, but the CBBs are a concern since they may be a chokepoint for invertebrate migrations.

Section 8.2.4.22.1.2 - Inlet SSBs/CBBs (TSP Features for 3E(2) and 4G(8))

While the initial impacts of installation can be modeled and anticipated, it should be noted that each time a SSB is closed, while temporary, it has the potential to increase residence time and decrease water quality. The extent of this is dependent on how long the SSB is closed, and how often it closes. These impacts need to be carefully studied.

Section 8.2.4.23.1.2 - Indirect Impacts

The authors acknowledge that indirect effects include significant spatial blockages from the structures which would lead to increased velocities in tidal flows during the open-gate conditions. Very little is known about the effects of these water current changes on fish behavior and larval dispersal, and the potential exists for severe impacts to finfish and shellfish resources.

Additional modeling and fish census studies would need to be conducted to better understand these effects before proceeding with implementation. These actions can be implemented prior to the completion of the Final Tier 1 EIS and/or during the Tier 2 – Engineering and Design phase.

Section 8.2.4.23.1.3 - Cumulative Impacts

The authors state that “the direct cumulative losses of aquatic habitats for finfish, shellfish, and EFH over long distances of SSBs, CBBs and perimeters are significant based on the current estimated impacts.” Considering these uncertainties and estimated impacts, further studies on how predicted changes in water quality, current movement and spatial constrictions would affect the biological community in these estuaries should be completed.

Section 8.2.4.24 - Invertebrates

The authors state that: *the direct cumulative losses of benthic habitats over long distances of SSBs, CBBs and perimeters are significant based on the current estimated impacts. Operation of SSBs and CBBs could potentially affect bay-wide benthic communities by affecting hydrodynamics and water quality. These effects coupled with the effects of climate change and sea level rise are likely to contribute to stressors on benthic habitats, population abundances, and distributions.*

Having acknowledged the potential detrimental impacts to benthic communities, the authors make no mention of conducting any studies to quantify the potential changes in distribution and abundance nor extrapolate on possible down-stream effects to the entire ecosystem. The authors speak of such studies in the finfish section, and they should include the need for benthic community studies in this section as well. These communities support valuable fisheries including hard clam and blue crab.



Section 8.2.4.28 - Recreation

The authors state that: *additionally, gate openings (when open) may permanently constrict flows causing higher velocity changes around these structures and could have significant adverse effects on recreational boaters. Therefore, further evaluation of potential effects on velocity changes would be required to determine if there are any indirect effects such as changes to navigation channel velocities and effects on recreational water uses.*

Potential changes to boat traffic around the structures may have detrimental effects on biological communities especially during migrations as well disrupting larval dispersal.

Section 8.2.4.33 - Noise

Noise has been shown to negatively affect migrating anadromous species such as river herring. Priority should be placed on avoiding such noise-producing activities like pile-driving during peak migratory periods for anadromous fish.

Fishing Industry Impacts

Potential impacts to fishing industries, both recreational and commercial, may result from the TSP, and NJDEP recommends that the authors include analysis of potential impacts. Such analysis now will benefit any future permit application for compliance with N.J.A.C. 7:7-16.2 Marine Fish and Fisheries and Prime Fishing Areas under N.J.A.C. 7:7-9.4.

Division of Fish and Wildlife (DFW)

Endangered and Nongame Species Program (ENSP):

Section 3.6: Critical Assumptions

3.6.3 Environmental

Future coordination with the ENSP is strongly recommended, especially prior to submittal of required state permitting that addresses endangered and nongame species and/or habitat conservation.

A number of ENSP concerns, particularly potential impacts to area-wide tidal wetlands, appear to require more detailed H&H modeling, which the report acknowledges has not been performed at this time.

Section 4.8 – Effected Environment and Cultural Resources

4.8.10 – Wetlands and Tidal Flats

The report notes the high value of both tidal flats and tidal wetlands, including reference to the varied components of tidal wetlands (high marsh/low marsh) and the associated wildlife habitat implications. These critical functions and features need to be more specifically assessed in the subsequent project impact analyses, where minor alterations to tidal prism, amplitudes or the effects of altered salinity, flushing or sediment transport are (or should be) addressed.

4.8.12 – Wildlife

Overall, while it was noted that consultation had been initiated with the USFWS, direct consultation should also occur with the NJDEP DFW to ensure that all applicable species, habitats, and species/habitat associations are accurate.

The source of the wildlife species cited in the report is unclear but should be based upon a current NJDEP Natural Heritage Program data request and/or deference to New Jersey's Landscape Project mapping for the project area. In several instances, omissions were noted in species/habitat relationships (ex. Table



105: reference to species utilizing “Vegetated Dunes and Beaches”). There was no apparent reference to New Jersey’s “Endangered and Nongame Species Conservation Act” or requirements for state permitting with explicit wildlife or wildlife habitat requirements.

Section 5 – Hydrodynamic Modeling Analysis

Generally, it was not clear if the degree of hydrodynamic modeling performed facilitated the assessment of project-derived impacts on sediment transport throughout tidal wetlands and waters in the entire study area.

Section 6 – Future Without Project Condition

6.2.2 – Historical and Projected Sea Level Change (SLC)

It is unclear if the report adequately addressed the degree to which the proposed project might retard *existing* sediment deposition or biomass accumulation processes, and in so doing might adversely affect the ability of tidal marshes to adapt to SLC.

6.4.7 – Wetlands and Tidal Flats

The report notes that “*In general, wetlands both inside and outside of the NJBB CSRM Study area are at increased risk of degradation and loss from sea level change. Wetlands may erode further or be at increased risk of becoming too inundated to support vegetation while not keeping up with sediment accretion rates. Eventually, sea level change may cause estuarine and freshwater wetlands to retreat inland (USACE, 2017).*” It is unclear if the report adequately addressed the degree to which the proposed project might retard *existing* sediment deposition or biomass accumulation processes, and in so doing adversely affect the ability of tidal marshes to adapt to SLC. According to the report, the main objective of the project is – on average - to preclude one major storm surge event every 5 years. This sole benefit must be clearly weighed against the potential that the project will retard natural processes that facilitate *all tidal wetlands within the study area* adapting to SLC. Such a result would not only have devastating impacts to wetlands and tidal flats, but those impacts would also in turn adversely affect wildlife.

The NJDEP suggests including more recent studies on current expected effects of SRL on tidal wetlands, including the following:

- a. Haaf, LeeAnn, Elizabeth Burke Watson, Tracy Elsey-Quirk, Kirk Raper, Angela Padeletti, Martha Maxwell-Doyle, Danielle Kreeger, and David J. Velinsky. "Sediment accumulation, elevation change, and the vulnerability of tidal marshes in the Delaware Estuary and Barnegat Bay to accelerated sea level rise." *Estuaries and Coasts* (2021): 1-15.
- b. Ganju, Neil K., Zafer Defne, Tracy Elsey-Quirk, and Julia M. Moriarty. "Role of tidal wetland stability in lateral fluxes of particulate organic matter and carbon." *Journal of Geophysical Research: Biogeosciences* 124, no. 5 (2019): 1265-1277.
- c. NJDEP Science Advisory Board report: THE STATUS AND FUTURE OF TIDAL MARSHES IN NEW JERSEY FACED WITH SEA LEVEL RISE <https://www.nj.gov/dep/sab/sab-salt-marsh.pdf>
- d. See the Marsh Retreat Layer from Rutgers Flood Mapper (Developed by Ritk Lathrop at CRSSA for the discrepancy. <https://www.njfloodmapper.org/>

Finally, in Table 31, NJDEP requests that USACE include SLR in feet for consistency to other SLR references.

6.4.9 - Wildlife



The report notes that *“with no action, impacts to wildlife as described in the Affected Environment section are expected. Projections for sea level change have the potential to adversely affect wildlife species based on losses of irregularly flooded marshes, freshwater wetlands, and some upland habitats.”* However, the report’s emphasis on the future effects of sea level change on wildlife are unclear, especially given that the basic project purpose of the TSP does not address sea level change in itself. The potential for adversely affects upon wildlife should be further addressed given the TSP’s potential to adversely affect natural processes that facilitate tidal wetlands throughout the study area.

6.4.12 – Special Status Species

It is noted that *“The FWOP/No Action alternative would involve no additional USACE actions to mitigate against coastal storm risk. In this scenario, impacts to Federal and State listed threatened and endangered species are likely.”* However, potential impacts to threatened and endangered species are not identified in the event that USACE fails to take action to mitigate against coastal storm risk via the TSP. It is suggested that the analysis of “future without project” focus on the difference between a future where “a \$16 billion project addresses a storm surge event the coast may experience once every 5 years” vs. “a future *without* the \$16 billion project, where such storm surges would in fact occur.” Such an analysis may help to identify potential impacts to listed species should the USACE take no specific action to mitigate against coastal storm risk.

Section 7 - Plan Formulation -

7.2.1 – No Action

The report states that *“The No Action plan provides no additional measures to provide flood risk management in the study area. The No Action plan represents the FWOP condition against which alternatives plans will be evaluated. Without any action taken our models indicate that the study area will be subject to future storms, sea level rise and coastal flooding resulting in a projected \$1,808,610,000 in Without-Project AAD over a 50-year period of analysis with Intermediate RSLC between 2030 and 2080”.* This section presents issues similar to Sections 6.4.9 and 6.4.12, and DEP refers to the discussion there, name the need to better identify the impacts of a “no action” alternative given the implications of sea-level rise independent of storm surge.

7.2.2.1 – Nonstructural Management Measures

The ENSP commends USACE and encourages further investigation and stronger consideration of Nonstructural Management Measures, including Managed Coastal Retreat, as well as Nature and Nature-Based Features. The ENSP applauds recognition of the Columbia School of Law’s report on “Managed Coastal Retreat” and points to others like it, such as the Georgetown Climate Center’s “Managed retreat Toolkit.”

Section 8 – The Tentatively Selected Plan

The ENSP has significant concerns regarding the effects associated with the SSB proposed at Barnegat Inlet, Great Egg Harbor Inlet, and to a somewhat lesser extent the Manasquan Inlet. The ENSP is concerned about the effects associated with CBBs or interior bay closures. ENSP also has significant concerns about the effects of perimeter measures when constructed in special areas and/or wildlife habitats.

8.2.2 - SSB Hydraulic and Operation Considerations

The ENSP is concerned that even very minor effects to natural hydraulic conditions may have severe consequences throughout the study area. For example, the report noted elsewhere that tidal wetlands are highly valuable yet highly dynamic ecosystems. The DIFR/EIS provides a myriad of ecological services



and do so across and according to a gradient of tidal marsh conditions, largely associated with elevation and exposure to tidal inundation, starting with high-vigor *spartina alterniflora* wetlands and ranging all the way inland to high marsh and scrub-shrub upland interfaces. As it is, these gradients are under siege by sea level rise, with many failing to adapt timely. Any additional stressors on these systems can amplify or accelerate the degree to which they decline or fail. It appears that the TSP might adversely affect the ability for tidal wetlands in the entirety of the study area to adjust to SLR by retarding natural hydraulic functions. The report acknowledges that daily tidal amplitude and prism will be permanently affected, and per the basic project purpose, the effects of major event storm surges (estimated to occur once every 5 years) will be eliminated. These are natural hydraulic processes that govern the degree and extent of sediment transport and deposition in tidal systems (Orton, et al, 2020). It is conceded that these effects have not been fully addressed. It is unclear if the DIFR/EIS estimate for required compensatory mitigation included the assessment of such impacts upon all tidal wetlands within the study area. It is also unclear if the alternatives analysis weighed the purported benefits of precluding a storm surge event for one or more days out of every 1,825 (5 years) against effects that reduced marsh accretion would have on the tidal wetlands, the habitat they provide for wildlife, their capacity to contribute to coastal resiliency, effects on mosquito populations, etc., etc. each and every one of those 1,825 days.

8.2.2.1 – Impacts of closures

Hurricanes and associated storm surges can have certain positive effects on ecosystems, resetting habitat conditions or creating disturbed conditions that many species of plants or wildlife have evolved depending upon for their persistence. Complete elimination of these stochastic natural influences would adversely affect these ecosystems.

SSB closures during severe storm events could potentially reduce opportunities for significant tidal marsh sediment accretion, thereby hampering the ability to adapt to sea level rise. This could not only adversely affect the wetlands ecosystem and the wildlife that depend upon them, but also adversely affects coastal resiliency.

8.2.4.12 – General Impact Assumptions

The report notes that SSBs and CBBs in the TSP would have significant direct impacts on aquatic habitats. It also noted that potential indirect impacts of these structures (particularly inlet SSBs) on hydrodynamics, water quality, shifts in flora and fauna abundance, distributions and migrations are potentially significant with a higher degree of uncertainty. Further study and analysis of the range of potentially adverse impacts will be necessary for NJDEP to make the findings necessary to render both permitting and Federal Consistency determinations.

8.2.4.19 – Wetlands, Tidal Flats and Subtidal Habitats

Indirect impacts were noted to range from “minimal to significant.” Further study and analysis of the range of potentially adverse impacts would be necessary for NJDEP to make the findings necessary to render both permitting and Federal Consistency determinations.

Based on the results of the Adaptive Hydraulic modeling, it can be assumed that even small reductions in tidal amplitude caused by the TSP could result in initial significant conversions of transitional intertidal habitats such as high marshes to upland and some of the intertidal mudflats to open water. Orton et al. (2020) found that SSBs have the potential to change geomorphic processes that shape and maintain saltmarsh habitats and recommended that effects for SSBs should be evaluated for the following possibilities: 1.) whether reductions in tidal amplitude will decrease sediment accretion through reduced



biomass production and sediment deposition, 2.) whether reduction in high water levels will decrease inundation time and sediment deposition, and 3.) whether reduction in water levels in severe storms will modify edge erosion process, and changes to estuary salinity or its extremes could cause an evolution of marsh species (e.g. conversions of salt marsh species to Phragmites). Additional indirect impacts on study area habitats relate to potential changes in salinity from gate closures and influxes of freshwater from precipitation, which could result in floral and faunal community shifts within these habitats. Additional studies should be performed to fully address these concerns.

8.2.4.21 – Wildlife

The study identified a number of adverse impacts associated with the various project elements, including the loss of habitat, barriers to wildlife movement, and indirect alterations to the food chain. The ENSP should be consulted to address prohibited “take” of endangered and nongame wildlife and to assist in addressing state regulatory compliance obligations.

Referenced:

Orton, Phillip., Sarah Fernald, Kristin Marcell, Bennett Brooks, Bram van Prooijen, and Ziyu Chen. 2019. Surge Barrier Environmental Effects and Empirical Experience Workshop Report. Project workshop report produced under funding from the National Oceanic and Atmospheric Administration (NOAA) National Estuarine Research Reserve Science Collaborative (NERR-SC).

State Historic Preservation Office

Based on the DIFR/EIS, the proposed project would require consultation with USACE, pursuant to their obligations under Section 106 of the National Historic Preservation Act, as amended, for the identification, evaluation, and treatment of historic properties within the project’s area of potential effects. According to the documentation submitted, USACE is recommending the execution of a Programmatic Agreement to govern the implementation of the Section 106 review process as the project develops. The HPO looks forward to further consultation with the USACE regarding completion of the Section 106 review for this project.

Green Acres

The project would impact NJDEP-held properties, as well as both municipal and county Green Acres and National Park Service (Land and Water Conservation Fund) encumbered parkland, along the coast throughout Monmouth, Ocean, Atlantic and Cape May counties. NJDEP will provide more detailed comments once a list of real estate interest is provided which details the specific impacts to encumbered properties (i.e., properties listed for full acquisition and/or location of temporary and permanent easements).

While Green Acres rules indicate that flood control facilities (such as levees, berms, and flood walls) do not constitute a diversion of parkland if the facility does not have any negative effects on the natural resource or recreational value of the encumbered park property, NJDEP would need to complete a site-specific review of each structure to determine whether the specific activity constitutes a diversion of parkland.

Blue Acres

The non-structural implementation plan currently identifies non-voluntary (mandatory) buyouts as the only acceptable way to implement buyouts to warrant federal participation. Currently Blue Acres and NJDEP only utilize voluntary buyouts, which must meet a minimum participation rate for communities to



be eligible. The State's policy would need to be re-examined to implement mandatory buyouts, if required by USACE.

Division of Parks and Forestry
Natural Lands Management (ONLM)

The 2019 Natural Heritage Database Report indicated that the boundary of the Tentatively Selected Plan includes the following:

- 964 occurrences of vascular plant species tracked by the Natural Heritage Program as [State Endangered \(codified at N.J.A.C 7:5C-5.1\) or Plant Species of Concern](#), including species listed by the U.S. Fish and Wildlife Service as endangered or threatened pursuant to the Endangered Species Act of 1973, as amended.
- 12 non-vascular plant species similarly tracked by the Natural Heritage Program
- 35 terrestrial ecological communities tracked by the Natural Heritage Program
- 53 Natural Heritage Priority Sites, which were created by the Natural Heritage Program to identify critically important areas to conserve New Jersey's biological diversity, with particular emphasis on rare plant species and ecological communities.

General Comments

Based on this boundary analysis, the Tentatively Selected Plan, which includes installation of structural elements (SSBs, CBBs, elevation of floodproofing of 18,800 structures, perimeter measures) as well as non-structural measures, has the potential to impact a significant portion of the rare flora and ecological community composition of the State.

The ONLM additionally recognizes that taking no action may also result in dramatic impacts to New Jersey's native flora and community integrity.

The ONLM recommends that each component of the Tentatively Selected Plan be thoroughly reviewed for potential impacts to rare plant species and ecological communities and a plan developed for each to first avoid, second minimize and third mitigate for the alteration or loss of these elements of biodiversity.

Specific Comments and Observations

The DIFR/EIS includes recognition of the existence of the various State Parks, Forests and Wildlife Management Areas encompassed within the boundary of the Tentatively Selected Plan (see Section 4.8.2.1.4 p. 40). Further, the DIFR/EIS summarizes the significance of State Natural Areas and includes a summary table of the nine Natural Areas within the boundary of the Tentatively Selected Plan (see Section 4.8.2.1.5 p. 40-41).

The section on Special Status Species in the DIFR/EIS (see section 4.8.15 beginning on p. 90) is divided into separate subsections for Federally Listed Species and State Listed Species. While the section on Federally Listed Species includes the federally threatened seabeach *bullata*, Knieskern's beaked-rush (*Rhynchospora knieskernii*) and sensitive joint vetch (*Aeschynomene virginica*), which also occur within the boundary of the Tentatively Selected Plan and were included in the Natural Heritage Database Report dated April 26, 2019. All three species are listed as threatened by the U.S. Fish and Wildlife Service under the Endangered Species Act. These species and appropriate summaries for each should be added to this section.



Additionally, the section on State Listed Species fails to recognize the existence of any of the numerous New Jersey State Endangered Plant Species and Plant Species of Concern documented within the boundary of the Tentatively Selected Plan. Exceptions include only the three of the four federally listed plant species that are also listed as State Endangered in New Jersey (*Amaranthus pumilus*, *Helonias bullata* and *Rhynchospora knieskernii*; *Aeschynome virginica* was again omitted and should be added). Among the many State Endangered Plant Species and Plant Species of Concern are four plant species ranked S1.1 by the Natural Heritage Program. These are species within only a single occurrence in the state, ever, and their loss will result in the loss of these species from the State. The ONLM recommends that Table 16 within this section be revised to include all State Endangered Plant Species and Plant Species of Concern included in the Natural Heritage Database Report dated April 26, 2019. Further, the ONLM strongly recommends that USACE take occurrences of all State Endangered Plant Species and Plant Species of Concern into consideration in advance of implementation of any and all components of the Tentatively Selected Plan. This must include analysis to first avoid, second minimize and third mitigate for the alteration or loss of these elements of biodiversity.

The DIFR/EIS fails to acknowledge the existence of the 35 terrestrial ecological communities and 53 Natural Heritage Priority Sites included in the Natural Heritage Database Report dated April 26, 2019. The DIFR/EIS should be amended to include this information.

Finally, the ONLM was not able to determine if the Database Report, dated April 26, 2019, was included in Appendix G: Natural and Nature-Based Features. If not included in Appendix G, then this section should be revised to include the Database Report.

Division of Parks & Forestry

State Park Service – Island Beach & Barnegat Light State Parks

As shown in the DIFR/EIS at Sections 8.2.2 and 8.2.2.1, the proposed SSB at Barnegat inlet will be constructed on both Island Beach State Park (IBSP) and Barnegat Lighthouse State Park (BLSP) properties. The primary concern for BLSP is the integrity of the existing bulkhead/shoreline surrounding the lighthouse as well as the lighthouse structure itself. The lighthouse sits very close to the shoreline and could be easily comprised if flooded.

The two (2) primary concerns for IBSP are an increase in erosion of both our ocean front and bay front beaches. The ocean front beaches have seen recent significant erosion with frequent closings to Mobile Sport Fishing Vehicle access (MSFV) at Gillikens, A-7 & A-23 due to high surf conditions and narrow beach. The bayfront beaches at IBSP have also experienced significant erosion. To date, IBSP is receiving funding from the Department of Defense (DOD) Readiness & Environmental Protection Integration (REPI) Program. Specifically, this plan is a Shoreline Stabilization Project along A-15, which has been reviewed by the NJDEP's Bureau of Coastal Engineering and Division of Land Resource Protection.

In summary, the proposed SSB at Barnegat Inlet could have adverse impacts to the protected resources at both Island Beach and Barnegat Light State Parks, including potential impacts to aches & dunes (increased erosion), coastal wetlands, marine fisheries, shellfish, submerged aquatic vegetation, navigation, T&E habitat, (i.e., shore nesting birds) historic resources and public access to the waterfront at both.

Air Quality Bureau of Evaluation and Planning

8.2.4.30 Air Quality



The Draft EIS states, “The structural alternatives will temporarily produce emissions associated with diesel-fueled equipment used for either water-based or landside construction activities. Construction schedules and durations for any of the structural alternatives are unknown at this time, although it is likely that construction would be in phases over several years.”

When preparing a General Conformity Applicability Analysis and Conformity Determination, USEPA guidance (General Conformity Guidance: Questions and Answers, July 13, 1994 (epa.gov)) indicates that a project cannot be broken into segments to be below the de minimis levels. Although this project will be implemented in phases over several years, all reasonably foreseeable emissions must be included as a whole for the entire project when completing an applicability analysis, and possibly a conformity determination.

9.2 Clean Air Act

“At this stage, no accounting for emissions estimates for temporary construction or long-term operations and maintenance activities have been performed. Emissions estimates will become available in subsequent phases as design and construction details become more refined.”

There are important considerations for the performance of a General Conformity applicability analysis and determination during the project planning process:

- a. Section 93.157 (d) (Reevaluation of Conformity) of the Federal General Conformity regulation (40 CFR 93. 153) states, “If the Federal Agency originally determined through the applicability analysis that a conformity determination was not necessary because the emissions for the action were below the limits in 93.153 (b) and changes to the action would result in the total emissions from the action being above the limits in 93.153 (b), then the Federal agency must make a conformity determination.”
- b. All changes, including construction and potential design changes, made during future planning and design phases of this project must be accounted for in the General Conformity Applicability Analysis and emission estimates. A Conformity Determination in accordance with 93.157 (d) of the Federal General Conformity regulations must be prepared, if necessary.

Appendix F.8 - 3.0 NJABB Air Quality

Appendix F.8, pg. 8, states, “Monmouth County is part of the Northern New Jersey-New York-Connecticut Area that have been reclassified from serious to moderate non-attainment status in 2016.”

Currently there are two National Ambient Air Quality Standards (NAAQS’s) for ozone that need to be considered when addressing General Conformity; the 2008 8-hour ozone standard (75 ppb) and the 2015 8-hour ozone standard (70 ppb). For each standard, nonattainment areas are initially classified, however some areas are reclassified if attainment of the NAAQS is not achieved by the attainment date corresponding to the classification level. At this time, the New York-Northern New Jersey-Long Island (NY-NJ-CT) nonattainment area is classified as “serious” for the 75-ppb standard and “moderate” for the 70-ppb standard. Also, the Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE nonattainment area is classified as “marginal” for both the 75-ppb standard and the 70-ppb standard. One or both of these areas may be reclassified by the USEPA to a higher classification in the future. The nonattainment classifications that are in effect at the time of the General Conformity applicability analysis and determination for all



standards and nonattainment areas must be used for the establishment of de minimis levels. For example, on 9/23/19, the USEPA issued a Final Order (Federal Register Vol. 84, No 164) which reclassified the New York-Northern New Jersey-Long Island (NY-NJ-CT) nonattainment area from “moderate” to “serious” nonattainment for the 2008 8-hour ozone National Ambient Air Quality Standard. Monmouth County is a part NY-NJ-CT nonattainment area. The corresponding de minimis level for a “serious” nonattainment area in the Federal General Conformity regulation (40 CFR 93. 153) is 50 tons per year (tpy) for NOx or VOC, and 100 tpy for PM2.5 (and precursors).

Appendix F.8 - Section 7.0 Conformity of General Federal Actions

Appendix F.8, pg. 27, states, “The TSP will include components located within Monmouth, Ocean, Burlington, Atlantic, and Cape May counties. With the exception of Monmouth County, these counties are part of Philadelphia-Wilmington-Atlantic City, PA-NJ-MD-DE ozone nonattainment area that is currently classified as “marginal” in terms of compliance with the current 8-hour ozone standard. Monmouth County is part of the New York-N. New Jersey-Long Island, NY-NJ-CT ozone nonattainment area that is currently classified as moderate.”

Section 93.150 (e) (Prohibition) of the Federal General Conformity Regulation (40 CFR 93. 153) states, “If an action would result in emissions originating in more than one nonattainment or maintenance area, the conformity must be evaluated for each area separately.” The actions proposed within the Draft EIS occur in two ozone nonattainment areas within New Jersey; the PA-NJ-MD-DE ozone nonattainment area, and the NY-NJ-CT ozone nonattainment area. General Conformity must be evaluated separately for each of the nonattainment areas.

Division of Science and Research

Executive Summary

The DIFR/EIS states, “*all three USACE SLC scenarios and the STAP SLC scenarios will be considered during future NJBB CSRM Study phases.*” It is not clear if this refers to moving forward from this report or that the STAP curve should be considered throughout this report.

3.2 Planning Considerations

Problems and Opportunities

“Compensatory mitigation estimates for indirect effects have not been fully assessed at this time. It is assumed that there could be significant losses of saltmarsh and intertidal habitats over large areas due to small tidal amplitude changes along, with potential effects on fish larval/egg transport due to increases in velocity in the vicinity of the SSB and CBB gates. Therefore, the cost estimates currently include a 5% contingency (based on first construction costs of the TSP feature) for compensatory mitigation and adaptive management for indirect effects. It is assumed that as modeling is further advanced (Ad H -closed gates scenarios and NYBEM), impact estimates will become better quantified and compensatory mitigation can be derived based on applying the available NYBEM ecosystem model. Additionally, subsequent design phases will continually investigate avoidance and minimization measures that would reduce hydrodynamic changes that drive these indirect effects.”

It is recommended that this be done before moving forward with selecting a plan so that the costs of structural vs non-structural plans can be weighed on equal footing. Additionally, the loss of habitats is permanent, while the benefits of adding these structures is not. As wetlands, SAV, and fish are lost, there will be impacts not only for those systems and the species that use them, but also to the ecosystem services they provide. If a plan that minimizes flood control structures that block tidal flow or



prevent habitat migration and maximizes NNBF can be effective, the State should seriously consider this plan even if it is more expensive.

4.8.22 Climate and Climate Change

The DIFR/EIS should be updated to include the NJ Climate Science Report, which is a more current reference regarding temperature change and sea level rise.

Section 6.2.1 Sea Level Change Guidance

The DIFR/EIS should be edited to add the melting of polar ice as a significant contributor of SLR. Also, USACE should consider updating the final comparison statement regarding the three sea level change curves to reflect the latest Intergovernmental Panel on Climate Change (IPCC) projections.

Section 6.3.1 Model Results

The DIFR/EIS should include losses associated with natural capital. Further, Figures 33-35 should include legends to explain the color gradient.

Section 6.4.19 Climate and Climate Change

NJDEP recommends that the temperature change references be updated to use more recent projections as summarized in the NJ Climate Change Report.

Section 7.4.2 Nonstructural Management Measure Development

NJDEP notes that a scenario with STAP projections is not included, and under moderate emissions, the STAP 50% likelihood estimate is 2.6 ft. Also, an additional concern is that designing to the 1% AEP (100 yr storm) may not be adequately protective, especially given that the recurrence intervals, if anything like the precipitation intensity values, could be grossly out of date and not representative of current and future conditions.

Further, given that these are likely to be large negative impacts to the ecosystem with the TSP, the full study of nonstructural options should be completed before moving forward and should be earnestly considered even if they are more expensive. Consideration of the how long the options last should also be considered. If this much money is to be spent with such great disruption, the projects should plan for the foreseeable future, not just to 2080.

Appendix B.4

NJDEP recommends being consistent with units. For example, historical SLC is shown in mm/yr, however imperial units are used in other areas throughout the report.

Also, NJDEP reiterates a comment made above that the USACE projections are considered outdated in comparison to the 2019 STAP and recent IPCC assumptions which included accelerated polar ice melt. Flood projections should be updated with values presented in 2019 STAP. Using NJDEP supported STAP sea-level projections will likely increase capital, operations, and maintenance costs. In some cases, the TSP's projects may be insufficient to prevent flooding, increasing the residual damages. Additionally, the study-area's boundaries are determined by the current .20 % AEP floodplain, without consideration of changing development or climate change beyond the USACE projection horizon. It is likely that increasing climate-related flood risk would expand the floodplain and associated area under threat. Because of this assumption, we would expect the TSP's AANB to be greater than reported in Section 8.1.



Given the use of sea-level rise projected over an outdated floodplain, it's difficult to understand how the benefit-cost ratio is ultimately impacted.

Regarding the storm surge modeling, NJDEP requests clarification on the following:

- a. The use of mean water level values utilized for design instead of a higher confidence interval. (pg. 25)
- b. The use of a reduced set of NACCS save points (96/772) to represent the AEP water levels, and an explanation of how USACE determined whether a save point was an outlier. (pg. 28)
- c. Models only appear to be inclusive of the 100 yr storm. The barriers will inevitably need to be protective against the lower-frequency higher-intensive storms, i.e., 500yr storm. Adjustments were made to the hazard curves to ensure that comparisons were consistent with the "current" (1983-2001) National Tidal Datum Epoch (NTDE, pg. 34). However, the period of record was shorter for the USGS tidal gages than the NOAA gages (pg. 36). For some USGS stations, records were only available from 1993 or 2000 onwards. NJDEP requests clarification on how the SLR trends removed for these stations are consistent with the current NTDE.

Overall, significant direct, indirect, and cumulative impacts will result from construction of these barriers. Such impacts are recognized and described by USACE. NJDEP reminds USACE that impacts should be minimized to the greatest extent possible and alternative measures are proposed and implemented to maintain valuable resilient ecosystems and resources.

Moreover, the NJDEP encourages USACE to prioritize ecological projects, and restoration and preservation funds, through a Coastal Ecological Restoration and Adaptation Plan (CERAP) that is currently under development with funding from the EPA. This effort builds on work funded by NOAA through the Coastal Management Program to create a methodology to prioritize opportunities for preservation, restoration, and enhancement of natural resources within the coastal zone.

Division of Economic Analysis

Benefits

While understanding that quantification of regional economic and social benefits is complex, the Sponsor considers all of these items to be important. This includes impacts on the statewide economy—including opportunity cost of the funds for the project, impact on tourism and recreation, sales, and property tax receipts, short- and long-term impacts on property values, and distributional impacts on LMI and/or EJ communities. The study should also attempt to understand how the TSP would impact flood insurance rates in impacted communities and how to monetize and incorporate ecosystem service values.

In addition, the persistence of damages following a predicted storm in USACE's models should be accounted for if it is not already. Damage functions often assume near immediate financial recovery following a flooding event. However, as we know from experience, this is not the case.

Finally, while it may be outside USACE's guidelines, not accounting for the direct and indirect economic losses associated with frequent, sunny day flooding in the study area likely distorts the findings. Given what we know about SLR, there is little reason to assume the TSP AANB would not be impacted by minor flooding events. In other words, the analysis assumes the communities will remain relatively intact throughout the time period. DEP's SLR projections cast some doubt on this assumption. Although these impacts are difficult to quantify and monetize, it is still important for ACE to take them into account to have a full understanding of all impacts.



Section 3.6 Critical Assumptions

Additionally, Dunn, Baker, and Fleming (2016, [LINK](#)) describes the HEC-FDA model as one that “represents the system as a number of independent projects rather than an integrated system.” From the description in the Report, it is unclear if or how this limitation impacted the risk assessment assumptions, but this should be addressed in future revisions.

Section 4.6 Economics

Use of the .20% AEP floodplain likely understates the potential economic damages described, as well as the extent of damages to environmental and cultural resources described in 4.8.

As noted in the report, this analysis “reflects only depreciated replacement structure and content value within the detailed structure inventory and does not account for additional benefit categories such as infrastructure damages, vehicles damages, emergency costs, or transportation delays.”

Section 6.3 Economic and Social Without Project Condition

Even within the proposed study area, the damage estimates are very limited. The report acknowledges this on page 135, stating “benefit streams reflect only primary, or direct, damage values. Future analysis will incorporate secondary, or indirect, damage from disruptions to critical infrastructure including interruptions to power plants, government operation centers, wastewater treatment facilities, utility lines, and communication centers.” Including these additional factors is an important step, but the true damage from a flooding event will likely still be understated. As noted above, additional projected losses should include lost tourism revenue, sales and property tax receipts, and increased expenses associated with clean-up.

Thank you for providing the New Jersey Department of Environmental Protection with the opportunity to comment on this project. NJDEP commends USACE on its monumental efforts to carry out this study thus far and looks forward to continuing coordination to arrive at a system of coastal storm risk management solutions that are in the best interest of the State of New Jersey.

If you have any questions, please do not hesitate to call me at (609) 292-3600.

Sincerely,



Megan Brunatti, Director
Office of Permitting and Project Navigation

Cc:

Dave Rosenblatt, Chief Resilience Officer and Assistant Commissioner, Climate and Flood Resilience

William Dixon, Director, Division of Coastal Engineering

Vincent Mazzei, Assistant Commissioner, Watershed and Land Management

