ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

STEPHEN W. MURPHEY
Director

MEMORANDUM:

TO: Courtney Spears, DCM Assistant Major Permit Coordinator

FROM: Curt Weychert, DMF Fisheries Resource Specialist

THROUGH: Anne Deaton, DMF Habitat Assessment Manager

SUBJECT: NCSPA POW Turning Basin Expansion

DATE: November 29, 2018

A North Carolina Division of Marine Fisheries (DMF) Fisheries Resource Specialist has reviewed the CAMA Major Permit application for proposed actions that impact fish and fish habitats. The applicant, North Carolina State Ports Authority (NCSPA) Port of Wilmington (POW), is proposing to modify existing permit No. 47-87 to allow for the removal if an existing wooden pier, installation of a toe wall, and expansion of dredging limits to accommodate larger ships. The POW is proposing to construct a toe wall in order to maintain the new dredge depth of -42' +2' +1'. This toe wall will consist of either 160 to 310 sheet piles and associated support piles. The proposed dredging will take place on both the east and west banks of the river within the POW project template. The eastern, or portside bank will remove approximately 370,000 cubic yards of soft bottom habitat and the western bank, or the Eagle Island side, will remove approximately 190,000 cubic yards of soft bottom habitat. In total, the proposed area of new dredging will be 17.76 acres of NCDMF designated primary nursery area (PNA). The proposed dredging will also remove 1.4 acres of coastal wetland and §404 wetlands. Of the 1.4 acres, 1.01 acres consist of coastal wetland species and 0.39 acres are §404 wetlands.

The POW is in waters which are classified as Primary Nursery Area (PNA), Anadromous Fish Spawning Area (AFSA), Secondary Recreation (SC), and are closed to shellfish harvest. PNA's are estuarine waters where initial post-larval development occurs. Species within this area are early post-larval to juvenile and include finfish, crabs, and shrimp. Species inhabit PNA's because they afford food, protection, and proper environmental conditions during vulnerable periods of their life history, thus protection of these areas are imperative. To protect such sensitive areas, Coastal Resources Commission rules prohibit most new dredging in PNA.

Additionally, this portion of the Cape Fear River has been designated by the NC DMF as an anadromous fish spawning area (AFSA). AFSA's have evidence of anadromous fish

spawning through direct observation, capture of running ripe females, or indication of eggs or early larvae. Anadromous species within the Cape Fear River include American and hickory shad, striped bass, river herring, and both Atlantic and shortnose sturgeon, as well as the catadromous American eel.

The applicant is proposing to dredge over one acre of coastal wetlands. These specific coastal wetlands were calculated to have a "High" wetland rating for coastal wetlands within the impact area based on the NC Wetland Assessment Method (NCWAM). Coastal wetlands are considered among the most productive ecosystems in the world (NCDEQ 2015). Coastal wetlands are a productive detritus-based system that trap nutrients, toxins and sediment, aid in shoreline erosion control, dissipate wave and storm action, provides a barrier to flood damage, and provide nursery functions and support fish production. Recent research indicates that even narrow fringes of wetlands are essential factors for fish utilization and erosion control (Whaley and Minello 2002; MacRae and Cowan 2010; Minello et al. 2011; Gewant and Bollens 2012). An estimated 95% of commercial finfish and shellfish species in the US are wetland dependent (Feierabend and Zelany 1987). Fishery species common to coastal wetlands in the Cape Fear River include sheepshead, red drum, flounder, spot, Atlantic croaker, menhaden, and penaeid shrimp; with a myriad of prey species as well. Wetlands can enhance foraging functions of adjacent habitats, which is why primary (PNA) and secondary (SNA) nursery habitats are closely linked with coastal wetlands. In addition, these wetlands are important to waterfowl feeding and nesting activities.

The NC State Ports Authority POW has a history of PNA habitat alteration as a result of Port needs and expansion. Most notably, some of these projects include the 1987 Major Permit 47-87 which authorized hydraulic dredging of the shipping berths and was modified via a CRC variance, the 1996 deepening of the Cape Fear River from 38 to 42 feet deep, the 2015 relocation of a docking facility and associated new dredging which permanently altered 320,000 square feet and 300,000 cubic yards of PNA benthic habitat, a proposed expansion of the aforementioned relocated docking facility which proposes to perform new dredging in PNA that will permanently alter 834,610 square feet of habitat and remove approximately 560,000 cubic yards of benthic material. A permit was received recently in which the NCSPA POW is proposing to perform new dredging in PNA on the adjacent property to the south to remove 88,400 cubic yards of material in a footprint of 4.9357 acres. The NC State Ports Authority is also currently conducting feasibility studies to deepen the Cape Fear River from -42 (+2) feet at mean low water (MLW) to -50 feet NLW.

Dredging impacts associated with the POW are not only limited to one-time projects, there are a number of events which impact benthic habitat and water quality throughout the year, every year in the Cape Fear River. The POW routinely performs agitation dredging along its berthing areas multiple times per year. In 2016, the POW received a permit to perform water injection dredging (WID) which would be used with or in place of agitation dredging. The US Army Corps of Engineers (USACE) performs routine maintenance dredging within the Wilmington Harbor area which includes an area from outside the Cape Fear River Inlet in the Atlantic Ocean to several miles north of the POW into the Northeast Cape Fear River. Sedimentation within the berthing areas of the POW continues to cause

the need for dredging of the bottom within conditioned moratorium periods. The addition of this multi-use facility will require the same if not more frequency of dredging events to maintain accessibility to large vessels. The DMF is and will continue to be concerned with the need for dredging within the moratorium periods for both biological, ecological, and water quality concerns. The increased area of dredging associated with the POW will be considered when reviewing in-water work moratorium relief requests in the future.

The applicant states the impetus and need of this project is to allow the NCSPA to adjust to growth of container ships throughput and handle and transport cargo more efficiently. The area of PNA proposed for dredging will receive large volumes of prop wash from tug boats as they maneuver ships to the terminal pier and the opposite shoreline. The proposed dredge cut will create considerable sloughing and redistribution of the remaining shallow water sediment that will cause deepening and further loss of productivity. The applicant identifies a dredge cut of -42 +2 +1 ft at MLW. Discussions with the Army Corp of Engineers identified that the maintained channel that would be considered connecting waters is maintained at -42 +2 ft at MLW. The shallower depth of connecting waters (-42 +2ft at MLW) is recommended to prevent creating a depression that could cause stagnate waters. Overall the area has been highly developed and routinely impacted by large vessels utilizing the POW as a hub for commerce in the state. Due to Coastal Resources Commission (CRC) rules relating to new dredging within PNA, there is a technical denial based on rule making.

The applicant has stated willingness to mitigate for the dredging of wetland area within the project area by means of creating 3 acres of marsh adjacent to Shellbed Island in the lower Cape Fear River. This project has already been reviewed by several regulatory and resource agencies through scoping meetings and consultation. The DMF has stated that this project may function as a habitat trade-off rather than a restoration project. The DMF also prefers in-kind mitigation projects to occur in the same part of the waterbody where the habitat alteration is occurring.

The applicant is proposing to mitigate fisheries impacts by donating $650,000 USD towards the construction of the proposed modification to the Lock and Dam #1 Rock Ramp Fish Passage Project under the condition that the NMFS provides its Biological Opinion to the USACE within 120 days of receiving the permit. The DMF was not consulted in this process and is hesitant to allow mitigation which 1) has a condition of its approval and 2) has the potential to be removed without the input of NCDMF. It should be noted that in the 2015 proposal to expand the turning basin initially, the 320,000 square feet of shallow PNA soft bottom that were being removed were mitigated by a $750,000 USD donation to the efforts of creating similar fish passage mechanisms at Lock and Dam 2 and 3. In comparison, the current project is proposing to permanently alter 773,625 square feet and is only being offered $650,000 USD as compensatory mitigation for fisheries impacts. At the 2015 rate of proposed mitigation/PNA area disturbed, the current proposed dredge area should be mitigated at $1,813,182 USD.

The DMF finds the current proposed mitigation to be wholly insufficient. If the DCM were to issue a permit or in the event that the CRC grants a variance for this project and allows

the work to be performed as currently proposed, the DMF would ask that the CRC require the applicant to create a mitigation plan for the fisheries impacts to be reviewed and accepted by the applicable resource and regulatory agencies. The DMF would suggest that a monitoring plan be created and funded by the applicant to evaluate the effects if the improvements to Lock and Dam 1 and whether the intended improved fish passage was successful.

In summary, the proposed activities have the potential to permanently alter the shallow PNA habitat into a maintained deep water soft bottom, degrading the PNA habitat. Cumulative impact is commonly defined as the impact on the environment that results from the incremental effects of a particular act when added to other acts over a longer timeframe. Though the particular act or impact may be minor by itself, when added to past, present and future impacts the effect can be significant when viewed collectively over time. The POW has received several different permits for different actions at different times. When looking at the POW as a single source of impact, there are few other coastal projects which impact fisheries habitat and resources to this extent. The past work, currently proposed new projects, and continued maintenance associated with the POW would in the opinion of DMF, be considered a significant cumulative impact over time.

The applicant sites the need to widen the turning basin to accommodate larger vessels that will increase the POW's accessibility and maintain the POW as a hub of state commerce. The division understands that the area's functionality is already degraded due to surrounding port development, impacts by prop wash from maneuvering vessels, maintenance agitation dredging adjacent to the location and the offloading of bulk transports. However juvenile fish and migratory species such as striped bass and the federally listed Atlantic sturgeon, continue to utilize this area for foraging and migration through the system. The proposed actions present a significant adverse impact to PNA habitat, protected species, fisheries, and fisheries resources, and the proposed mitigation is inadequate. **The DMF would request denial of this permit application without addressing a more appropriate and adequate compensatory mitigation plan.**

Should a permit be authorized, DMF recommends an AFSA moratorium on in water work, to include dredging, from **1 February to 30 June, to include an observer posted during dredging operations**. This moratorium reduces the negative effects on critical fish life history activities, to include spawning migrations and nursery functions. Due to the potential for both species of sturgeon to inhabit the local area, this moratorium is recommended.

Boswell, K.M., Wilson, M.P., MacRae, P.S., Wilson, C.A. and Cowan Jr, J.H., 2010. Seasonal estimates of fish biomass and length distributions using acoustics and traditional nets to identify estuarine habitat preferences in Barataria Bay, Louisiana. *Marine and Coastal Fisheries*, *2*(1), pp.83-97.

Corbett, D. R., T. West, L. Clough, and H. Daniels. 2004. Potential impacts of bottom trawling on water column productivity and sediment transport processes. NC SeaGrant, Raleigh, NC, NC SeaGrant Project No. 01-EP-04, 57p.

DMF (North Carolina Division of Marine Fisheries). 1999. Shrimp and crab trawling in North Carolina's estuarine waters. DENR, Morehead City, NC, Report to NC Marine Fisheries Commission, 121p.

Miller, J.M. 1998. Physical processes and the mechanisms of coastal migrations of immature marine fishes. Pages 68-76 in M.P. Weinstein, editor. Larval fish and shellfish transport through inlets. American Fisheries Society, Symposium 3, Bethesda, Maryland.

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Fox, W.W. 1992. Stemming the tide: challenges for conserving the nation's coastal fish habitats. Pages 9-12 in R.H. Stroud, editor. Stemming the tide of coastal fish habitat loss. National Coalition for Marine Conservation, Savanah, Georgia.

Gewant, D. and Bollens, S.M., 2012. Fish assemblages of interior tidal marsh channels in relation to environmental variables in the upper San Francisco Estuary. *Environmental biology of fishes*, *94*(2), pp.483-499.

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Ortner, P.B.; L. Crowder, D. Hoss. 1999. The South Atlantic Bight recruitment experiment: introduction and overview. Fisheries Oceanography 8: 1-6.

Paerl, H. W., J. Pinckney, J. Fear, and B. Peierls. 1998. Ecosystem response to internal watershed organic matter loading: Consequences for hypoxia in the eutrophying Neuse River Estuary, North Carolina. Marine Ecological Progress Series 166: 17-25.

Whaley, S.D. and Minello, T.J., 2002. The distribution of benthic infauna of a Texas salt marsh in relation to the marsh edge. *Wetlands*, *22*(4), pp.753-766.

Contact Curt Weychert at (252) 808-8050 or Curt.Weychert@ncdenr.gov with further questions or concerns.

NORTH CAROLINA
Environmental Quality

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

BRAXTON DAVIS
Director, Division of Coastal Management

February 14, 2019

MEMORANDUM:

FROM: **Courtney Spears**, Assistant Major Permits Coordinator
NCDEQ - Division of Coastal Management
127 Cardinal Drive Ext., Wilmington, NC 28405
Fax: 910-395-3964 ***(Courier 04-16-33)***
courtney.spears@ncdenr.gov

SUBJECT: *CAMA / Dredge & Fill Application Review*

Applicant: ***N.C. State Ports Authority Major Mod. 47-87***
Project Location: *1 Shipyard Blvd., adjacent to the Cape Fear River, in Wilm., New Hanover County*

Proposed Project: *To improve and expand an existing turning basin*

Please indicate below your agency's position or viewpoint on the proposed project and ***return this form to Courtney Spears*** at the address above by ***March 8, 2019.*** If you have any questions regarding the proposed project, contact Courtney Spears at (910) 796-7426 when appropriate, in-depth comments with supporting data is requested.

REPLY:

____ This agency has no objection to the project as proposed.
Additional comments may be attached

____ This agency has no comment on the proposed project.

__X__ This agency approves of the project only if the recommended changes are incorporated. See attached.

____ This agency objects to the project for reasons described in the attached comments.

PRINT NAME Curtis Weychert

AGENCY DMF

SIGNATURE Curt Weychert

DATE 3/18/19

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STEPHEN W. MURPHEY
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MEMORANDUM:

TO: Courtney Spears, DCM Assistant Major Permit Coordinator

FROM: Curt Weychert, DMF Fisheries Resource Specialist

THROUGH: Anne Deaton, DMF Habitat Assessment Manager

SUBJECT: NCSPA POW Turning Basin Expansion

DATE: March 14, 2019

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The POW is in waters which are classified as Primary Nursery Area (PNA), Anadromous Fish Spawning Area (AFSA), Secondary Recreation (SC), and are closed to shellfish harvest. PNA's are estuarine waters where initial post-larval development occurs. Species within this area are early post-larval to juvenile and include finfish, crabs, and shrimp. Species inhabit PNA's because they afford food, protection, and proper environmental conditions during vulnerable periods of their life history, thus protection of these areas are imperative. To protect such sensitive areas, Coastal Resources Commission rules prohibit most new dredging in PNA.

Additionally, this portion of the Cape Fear River has been designated by the NCDMF as an anadromous fish spawning area (AFSA). AFSA's have evidence of anadromous fish spawning through direct observation, capture of running ripe females, or indication of eggs or early larvae. Anadromous species within the Cape Fear River include American and hickory shad, striped bass, river herring, and both Atlantic and shortnose sturgeon, as well as the catadromous American eel.

The applicant is proposing to dredge over one acre of coastal wetlands. These specific coastal wetlands were calculated to have a "High" wetland rating for coastal wetlands within the impact

area based on the NC Wetland Assessment Method (NCWAM). Coastal wetlands are considered among the most productive ecosystems in the world (NCDEQ 2015). Coastal wetlands are a productive detritus-based system that trap nutrients, toxins and sediment, aid in shoreline erosion control, dissipate wave and storm action, provide a barrier to flood damage, provide nursery functions, and support fish production. Recent research indicates that even narrow fringes of wetlands are essential factors for fish utilization and erosion control (Whaley and Minello 2002; MacRae and Cowan 2010; Minello et al. 2011; Gewant and Bollens 2012). An estimated 95% of commercial finfish and shellfish species in the US are wetland dependent (Feierabend and Zelany 1987). Commercially and recreationally important fishery species common to coastal wetlands in the Cape Fear River include sheepshead, red drum, flounder, spot, Atlantic croaker, menhaden, blue crab, and penaeid shrimp; with a number of prey species as well. Wetlands can enhance foraging functions of adjacent habitats, which is why primary (PNA) and secondary (SNA) nursery habitats are closely linked with coastal wetlands. In addition, these wetlands are important to waterfowl feeding and nesting activities.

The NC State Ports Authority POW has a history of PNA habitat alteration as a result of Port needs and expansion. Most notably, some of these projects include the 1987 Major Permit 47-87 which authorized hydraulic dredging of the shipping berths and was modified via a CRC variance, the 1996 deepening of the Cape Fear River from -38 to -42 feet deep, the 2015 relocation of a docking facility and associated new dredging which permanently altered 320,000 square feet (7.76 acres) and removed 300,000 cubic yards of PNA benthic habitat. An additional new permit was received in which the NCSPA POW is proposing to perform new dredging in PNA on the adjacent property to the south to remove 88,400 cubic yards of material in a footprint of 4.9 acres. The NC State Ports Authority is also currently investigating feasibility studies to deepen the Cape Fear River from -42 (+2) feet at to -47 (+2) feet.

Dredging impacts associated with the POW are not only limited to one-time projects, there are several events which impact benthic habitat and water quality throughout the year, every year in the Cape Fear River. The POW routinely performs agitation dredging along its berthing areas. In 2016, the POW received a permit to perform water injection dredging (WID) which would be used with or in place of agitation dredging. The US Army Corps of Engineers (USACE) performs routine yearly maintenance dredging within the Wilmington Harbor area which includes an area from outside the Cape Fear River Inlet in the Atlantic Ocean to the POW into the Northeast Cape Fear River. Sedimentation within the berthing areas of the POW continues to cause the need for dredging of the bottom within conditioned moratorium periods. Increasing the area of the turning basin will require the same if not more frequency of dredging events to maintain accessibility to large vessels and will ultimately increase the dredge area footprint of dredging performed by the POW. The DMF is and will continue to be concerned with the need for dredging within the moratorium periods for both biological, ecological, and water quality concerns. The increased area of dredging associated with the POW will be considered when reviewing in-water work moratorium relief requests in the future.

The applicant states the impetus and need of this project is to allow the NCSPA to adjust to growth of container ships and handle and transport cargo more efficiently. The area of PNA proposed for dredging will receive large volumes of prop wash from tug boats as they maneuver ships to the terminal pier and the opposite shoreline. The proposed dredge cut may create considerable sloughing and redistribution of the remaining shallow water sediment that will cause deepening and further loss of productivity in areas outside the dredge footprint area. The applicant identifies a dredge cut of -42 +2 +1 ft at MLW. Discussions with the Army Corp of Engineers identified that the maintained channel that would be considered connecting waters is maintained at -42 +2 ft at MLW. The shallower depth of connecting waters (-42 +2ft at MLW) is recommended to prevent creating a depression that could have negative impacts on water circulation and water quality.

Overall, the area has been highly developed and routinely impacted by large vessels utilizing the POW as a hub for commerce in the state.

Deepening of shallow-water soft bottom results in loss of nursery habitat for some estuarine-dependent species (Rozas 1992). When waters are deepened close to the shoreline, predator protection is abated. Productivity is affected because primary and secondary production of the benthic community is higher in shallow habitat, where microalgae thrive on the sediment surface. Fish also grow faster in this environment. Converting shallow habitat to deeper channels reduces this productivity (Wendt et al. 1990). Navigational dredging can similarly lower productivity in deeper waters by temporarily removing existing benthic infauna from the affected areas, reducing food availability to bottom feeding fish and invertebrates (Peterson et al. 2000). By removing this foraging habitat, benthic -pelagic coupling may be interrupted until recruitment and recolonization occurs. The applicant states that this one-time dredging event will only cause temporary impacts to the benthic community and that recovery will happen rapidly. However, the DMF would argue that the continued maintenance of navigable depths will not allow the necessary time for benthic communities to completely recover; studies of biological benthic recovery times from dredging and bottom-disturbing gears vary from 6 months to 2 years.

Specific Biological Concerns

The NCDMF has several long-term fisheries independent surveys to help manage various fisheries. One of these is the juvenile trawl survey (PRG120), a statewide estuarine trawl survey which was initially intended to identify the primary nursery areas and produce annual recruitment indices for economically important species such as spot, Atlantic croaker, weakfish, flounders, blue crab, and brown shrimp. Now, the program can be used to investigate catch per unit of effort (CPUE) which is a proxy for relative abundances of fish species. By reviewing available data from the past 10-18 years, CPUE can show spatiotemporal trends in the relative abundances of specific species. Stations exist above and below the port.

Juvenile southern flounder (*Paralichthys dentatus*) CPUE near the project vicinity indicate relatively high recruitment in soft bottom habitat near the port. Tagging information has shown that adult southern flounder occur on the east side of the Port of Wilmington property. Juvenile southern flounder also utilize coastal marsh habitat for refuge and foraging habitat. Tagging data also demonstrates that adult southern flounder utilize the western side of the river, along Eagle Island, another area the Port is proposing to dredge.

Juvenile spot (*Leiostomus xanthurus)* and Atlantic croaker (*Micropogonias undulates*) in these areas of the CFR utilize lower salinity soft bottom habitat to forage for benthic invertebrates. Spot also utilize coastal marsh habitat for refuge and foraging habitat.

Blue crab (*Callinectes sapidus*) exclusively inhabit benthic habitat after their larval stage. Dredging will have an initial impact on foraging for blue crab by removing the benthic communities. Permanent impacts from the dredging will also impact blue crab habitat due to associated lower dissolved oxygen and reduced water quality associated with deeper depths.

Atlantic menhaden (*Brevortia tyrannus*) are an important prey species for many economically important fish species in the CFR such as striped bass, trout, and bluefish. Menhaden larvae drift into sheltered estuaries and juveniles inhabit shallow areas.

Striped bass (*Morone saxatilis*) in the CFR is a historically important anadromous fishery species. Striped bass tagging has indicated that the confluence of the Brunswick and Cape Fear Rivers as well as the confluence of the Northeast CFR and Cape Fear River are heavily utilized by subadult and adult striped bass. NCDMF striped bass monitoring in 2018 showed that in the Central

Southern Management Area (CSMA) did not capture any juvenile striped bass in the Pamlico, Neuse, and Cape Fear Rivers. However, the Northeast Cape Fear River produced 24 individual juvenile striped bass. This is indicative of a naturally spawning population within the Northeast CFR. Widening the turning basin and dredging productive PNA habitat could indirectly impact striped bass by reducing prey in the areas surrounding the Port. Additionally, noise pollution and water quality degradation during construction could affect the presence of striped bass in the project area during construction.

Despite the existing degradation from the port and adjacent development, this portion of the river remains relatively productive for juvenile recruitment of several species. However, juvenile CPUE of southern flounder, spot, croaker, blue crab, and menhaden have shown declines over the past 15 years. These species are therefore vulnerable to any additional habitat and water quality degradation in this area. The removal of already limited juvenile nursery habitat, including soft bottom and wetlands, will have a negative impact on habitat function, foraging habitat, prey species availability, benthic communities, and water quality.

Mitigation

The applicant has stated willingness to mitigate for the dredging of 1.4 acres of wetland area within the project area by means of removing 1.75 acres of existing Phragmites to be restored with native coastal wetland species on the NCSPA POW property. An additional 2.25 acres of Phragmites will restored to native coastal wetland species on a POW property located nearby along the Brunswick River.

The applicant is proposing to mitigate fisheries impacts of permanently altering 17.76 acres of PNA and AFSA by donating $800,000 towards the construction of the proposed modification to the Lock and Dam #1 Rock Ramp Fish Passage Project and provide monitoring to study the improvements in fish passage. The applicant is also proposing to create 6.75 acres of shallow-water tidal pool habitat by excavating existing Phragmites areas along the Brunswick River property and create connectivity to adjoining creeks and rivers. The applicant proposed a 6.75 acre area because it reflects the area of dredging less than -13'. A depth of -13' was selected from literature provided by the NMFS indicating that depths greater than -13' serve less productive nursery functions (Reilly et al. 1999). The DMF considers the entire designated PNA area within the project footprint as nursery area and does not qualify habitat based on depth. The DMF prefers a 1:1 ratio for mitigated area of permanent impacts to PNA bottom, but has verbally agreed to the proposed conceptual mitigation. More review for adequacy will be required once the POW has specific plans.

The DMF found the process of the mitigation negotiations to be inadequate in allowing enough time to review the impacts of the project on fishery habitat and make fully informed decisions related to compensatory mitigation. In the future, the DMF would request enough time to review project impacts and proposed compensatory mitigation before a permit modification is submitted. Because the NCSPA did not put a hold on the permit application due to their internal schedule, the DMF did not have the appropriate time to analyze the equivalence of ecosystem services of the impacts in comparison to proposed mitigation and provide appropriate comment to the CRC before the 150-day deadline. For that reason, this mitigation decision should **not** serve as precedence for what is to be considered adequate mitigation for any future projects.

In summary, the proposed activities have the potential to permanently alter the shallow PNA habitat into a maintained deep water soft bottom, degrading the PNA habitat. Cumulative impact is commonly defined as the impact on the environment that results from the incremental effects of a particular act when added to other acts over a longer timeframe. Though the particular act or impact may be minor by itself, when added to past, present and future impacts the effect can be significant when viewed collectively over time. The POW has received several different permits for

different actions at different times. When looking at the POW as a single source of impact, there are few other coastal projects which impact fisheries habitat and resources to this extent. The past work, currently proposed new projects, and continued maintenance associated with the POW would in the opinion of DMF, be considered a significant cumulative impact over time.

The applicant sites the need to widen the turning basin to accommodate larger vessels that will increase the POW's accessibility and maintain the POW as a hub of state commerce. The division understands that the area's functionality is already somewhat degraded due to surrounding port development, impacts by prop wash from maneuvering vessels, maintenance agitation dredging adjacent to the location and the offloading of bulk transports. However juvenile fish and migratory species such as striped bass and the federally listed Atlantic sturgeon, continue to utilize this area for foraging and migration through the system. The proposed actions present a significant adverse impact to PNA habitat, protected species, fisheries, and fisheries resources.

While mitigation for the entire 17.76 acres of PNA proposed for dredging is preferred, NCDMF has verbally agreed to the proposed conceptual mitigation. More review for adequacy will be required once the POW has specific plans. To assure mitigation success, a minimum of seven years of monitoring of tidal pool and wetland enhancement is required. The consultant agreed to this during mitigation discussions.

Should a permit be authorized, DMF recommends an AFSA moratorium on in water work, to include dredging, from **1 February to 30 June, to include an observer posted during dredging operations**. This moratorium reduces the negative effects on critical fish life history activities, to include spawning migrations and nursery functions. Due to the potential for both species of sturgeon to inhabit the local area, this moratorium is recommended.

Boswell, K.M., Wilson, M.P., MacRae, P.S., Wilson, C.A. and Cowan Jr, J.H., 2010. Seasonal estimates of fish biomass and length distributions using acoustics and traditional nets to identify estuarine habitat preferences in Barataria Bay, Louisiana. *Marine and Coastal Fisheries*, *2*(1), pp.83-97.

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