Annual Report on Habitat Activities
Habitat and Ecosystem Advisory Panel
Draft - April 2024

Purpose and Scope of this report

In September 2023, the Council approved its Habitat Blueprint, which included a new provision for the Habitat and Ecosystem Advisory Panel (HEAP) to develop an annual report on habitat activities during their spring meeting and present this report at the next scheduled Habitat Committee meeting.

The Blueprint specified that the report should:

- address habitat and ecosystem conservation activities, including consultations, comment letters, future threats, research needs, and use of habitat policies during the prior calendar year.
- highlight the use of habitat policies.
- provide advance notice of developing issues.
- rely heavily on tables, texts and bulleted lists to convey the relevant information efficiently.

In December 2023 the council approved an outline that would provide guidance for the HEAP on what subjects would be appropriate for inclusion in this report. Council Staff and the HEAP then started to build a draft report via email to be further filled out during the April HEAP meeting. This report will be finalized at the June Council meeting.

April 2024 Annual Report of Habitat Activities

1. Status of EFH-related comments submitted by the Council, South Atlantic States, and HCD.

a. On March 19, 2024 the Council submitted a letter regarding the proposed Starship-Super Heavy Operations at Cape Canaveral. The letter is attached as Appendix A.

2. Update of major regional activities/projects in the South Atlantic.

a. Renewable Energy/Wind
b. Port Development -
c. Renourishment, etc.

3. Status of Council Habitat Policy Statements.

a. Usage in submitted comments.
b. Adequacy of existing statements to current activities.
c. Suggestions for revisions of existing policies or creation of new policies.

4. Potential future or developing habitat issues/threats:

a. A living shoreline is a protected, stabilized coastal edge made of natural materials such as plants, sand, or rock meant to stabilize estuary coasts, bays, and tributaries. These are made of natural materials and will grow over time. There is no consistent definition of what a living shoreline is and the consults for there impact on EFH can vary widely. A definition needs to be established for the region to allow managers to provide consistent EFH consultations.
b. Tide gates control water flow between a tidewater area and a diked-off, drained upland area. The number of these projects in development is increasing with sea level rise. What are the short and long-term impacts?
    i. Charleston County is starting to see an increase in the amount of proposed tide gates for our area. Opposition to these projects has been strong and recommendations have been made that the Corps require mitigation for ALL EFH upstream of the tide gates. HCD provides known impacts to EFH as a result of tidal restrictions, and recommendations to avoid and minimize impacts. Two letters from SCDNR opposing Tide gates are attached in Appendix B and C.
c. Thin Layer Placement - regionally, we are seeing this talked about a lot between the Corps, civil works projects, Towns, etc. Thin layer placement is (or at least, should be) a restoration technique to restore elevation to a marsh that cannot

accrete sediment to keep up with SLR. However, we're seeing a trend where TLP is being used as a disposal technique disguised as a restoration. The placement of sediment to a marsh is being used to dispose of that sediment, with little thought going into planning on how that system accretes sediment, or if the marsh system is impacted requiring sediment placement.

d. What are the space program impacts with increasing launches and historical launches i.e. debris and waste?
e. What are the impacts of sound/pressure from construction projects?
    i. There is an electronic tagging study of (mostly) black sea bass at the Coastal Virginia Offshore Wind area (27nm E of VA Beach). While the main research question is about behavioral responses to construction noise, we will also get information about how fish are using the habitat provided by turbine foundations. The study involves fine-scale tracking of animals in three dimensions, so we will be able to make inferences about their vertical movements in addition to horizontal. This could shed light on the importance of turbine foundations and could be relevant in the South Atlantic. The tagging just started and will not have data until late this year / early 2025. The study is funded by NEFSC.
f. Range expansion/contraction of fisheries resources due to climate change
    i. Over the last year, SC DNR year has examined long-term trends in the status of the blue crab population in South Carolina. There appears to be a break at about the year 2000 where estuarine temperatures started becoming warmer with longer growing seasons, and estuarine salinities became higher. This appears to correlate with a consistent and continuing decline in blue crab stock numbers in South Carolina.
    The report states: “Abundances were generally greater during the 1900s than in the 2000s, a pattern mirrored in North Carolina and Georgia, with declines mainly occurring in the fall.”
    “Shifting climate regimes from cold/wet conditions to warm/dry conditions have impacted blue crab abundance, with warming winters also leading to earlier spawning.”
    “…increases and decreases in blue crab population abundances do appear to be synchronous across the Atlantic coastal range.”
    “The conditions of South Carolina’s estuaries…have changed substantially over the 40+ years… These changes have led to a shift in our estuaries from cold/wet conditions to warm /dry conditions.”
    “The combined effect of temperature and river flow/salinity on adult crabs ultimately explains a high percentage (~>50%) of interannual variability in adult blue crab abundances.”
    “…the environmental conditions that contribute to higher abundance of blue crab (eg. non-drought conditions) also support strong recruitment of red drum.”
    If other estuarine dependent species are similarly negatively impacted by these environmental changes, this could mean a reduced export of estuarine-produced forage stocks that may be prey for coastal ocean fishery resources,

5. **Regional projects of interest to the Council -**
    a. SASMI
    b. SECAS
        i. The 2023 version of the Southeast Conservation Blueprint was released in October 2023. Notable improvements of potential interest to the council include:
        ii. A new marine highly migratory fish indicator focused on important foraging and spawning areas for 3 highly migratory fish species at various life stages (Skipjack tuna, Bluefin tuna, Blue shark)
        iii. An updated Atlantic coral and hardbottom indicator that now includes recent predictive models for cold water coral mounds in the Blake Plateau.
        iv. Indicators for marine birds and marine mammals are now updated.
        v. The short summary of all indicators used is now updated for 2023
    c. The Atlantic States Marine Fisheries Commission Report on Fish Habitats of Concern was approved by the ASMFC ISFMP Policy Board and is available online. https://asmfc.org/files/Habitat/FHOC_Designations_January2024.pdf
    d. There have been reports released regarding the impact of the US Supreme Court Sackett case decision, on wetlands. Given that wetlands provide protection for aquatic, including fish and fishery resources, this should be considered by the council.

6. **Coordination between regions. (Mid Atlantic, Gulf, and Caribbean partnerships or nationwide coordination)**
    a. Offshore wind projects are beginning in Puerto Rico

7. **Funding projects/opportunities.**

8. **Highlight regional research and monitoring activities supporting EFH and review recommended priorities included in the SAFMC Research and Monitoring Plan (completed every odd year).**

9. **Outreach and communication activities: Habitat and ecosystem focused.**
    a. The Habitat Website has been improved and is still an ongoing project. Plans for Habitat month and earth day are underway with the Outreach team.

10.Anticipated future habitat activities of interest.

Appendix A

SOUTH ATLANTIC FISHERY MANAGEMENT COUNCIL

4055 Faber Place Drive, Suite 201, North Charleston SC 29405
Call: (843) 571-4366 | Toll-Free: (866) SAFMC-10 | Fax: (843) 769-4520 | Connect: www.safmc.net

Carolyn N. Belcher, Ph.D., Chair | Trish Murphey, Vice Chair
John Carmichael, Executive Director

March 19, 2024

CCSFS Starship EIS
c/o Jacobs
5401 W. Kennedy Blvd #300,
Tampa, Florida 33609

To Whom It May Concern:

This letter is being submitted in response to solicitation of public comment on the proposed Starship-Super Heavy Operations at Cape Canaveral Space Force Station Environmental Impact Statement.

The South Atlantic Fishery Management Council (Council) is responsible for management of fishery resources in the Exclusive Economic Zone from the North Carolina/Virginia border through Key West, Florida. On behalf of the Council, I thank you for the opportunity to provide comments early in the project's development. The Council understands the purpose of the proposed action is to advance U.S. space capabilities and provide launch and landing infrastructure to further U.S. policies to ensure necessary capabilities to launch and insert Department of the Air Force (DAF) payloads into space. The Council also understands the DAF's need to have access to space without compromising current launch capabilities.

Upon review of the scoping presentation provided on your website, the Council offers the following comments:

> The Council encourages DAF to include fishery resources in the list of resources to be analyzed in the EIS, including social and economic impacts to fishing communities.
>
> Both proposed Space Launch Complex (SLC) locations (SLC-37 and SLC-50) are in proximity to designated Essential Fish Habitat for fishery resources within the jurisdiction of the Council under the fishery management plans for snapper grouper species, shrimp, and coastal migratory pelagic species.

Although most of the impacts to these resources associated with launch and landing operations are expected to be short-term, cumulative impacts could be of concern as the frequency of launches increases. Additionally, the Council is concerned about the potential for debris associated with space activities at the site posing a hazard to fishing activities in the surrounding waters.

The Council assumes that temporary safety zones would be activated ahead of launches and landings. The Council encourages DAF to include in the EIS analyses of the potential economic impacts of temporary disruptions to fishing activity (commercial and recreational) in the vicinity of the project.

The EIS should include a thorough description of the potential cumulative impacts on the benthic and pelagic habitats supporting local fisheries in the vicinity of the proposed project sites.

Thank you for the opportunity to provide comments and for your consideration of our comments.

Sincerely,

Carolyn N. Belcher, PhD

Carolyn N. Belcher, Ph.D.
Council Chair

LN# 202407
cc: SAFMC Members & Staff

Appendix B

State of South Carolina
Department of Natural Resources

P.O. Box 167
Columbia, S.C. 29202
803-528-4199

Robert H. Boyles, Jr., *Director*
Lorianne Riggin, *Director, Office of Environmental Programs*

March 14, 2024

Ms. Eileen Foss
U.S. Army Corps of Engineers
ATTN: REGULATORY DIVISION
69 Hagood Avenue
Charleston, South Carolina 29403-5107

Ms. Sarah Reed
S.C. DHEC
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
North Charleston, South Carolina 29405

RE: SAC-2021-01162, Seabrook Island Property Owners Association, Captain Sam's Creek, Charleston County

Dear Ms. Foss and Ms. Reed,

The South Carolina Department of Natural Resources (SCDNR) is the agency charged by state law with the management, protection, and enhancement of wildlife, fisheries, and marine resources in South Carolina. In addition to natural resource management responsibilities through research, management, and licensing, the SCDNR is also obligated with statewide responsibilities for regulating watercraft operation and associated recreation on state waters, conducting geological surveys and mapping, promoting soil and water conservation, flood mitigation, drought response, and the coordination of the state scenic rivers program. SCDNR's mission is to serve as the principal advocate for and steward of South Carolina's natural resources (SCDNR authorities and responsibilities are described in Titles 48, 49 and 50, South Carolina Code of Laws (1976), as amended). As such, personnel with the SCDNR have reviewed the public notice referenced above and additional information provided by the applicant, evaluated its impact on natural resources and offer the comments below.

Project Summary

As detailed in the public notice, the Seabrook Island Property Owner's Association is proposing to construct new stormwater drainage infrastructure and muted tide gates within the Ocean Winds Golf Course area along Captain Sam's Creek to reduce flooding associated with king tides and large stormwater events. The proposed project will permanently impact 0.09 acre of wetlands and temporarily impact 0.05 acre of wetlands during construction of a maintenance access road and stormwater drainage system consisting of two 48' diameter reinforced concrete pipes, concrete slab and wingwalls, and two self-regulating tidal flap gates. Temporary cofferdams would be installed during construction on the north and south sides of the proposed tide gates and a pump would be used to drain the dammed areas so that construction would take place on dry land. Draining impacts may occur to critical area wetlands upstream of the project area that are at a higher elevation than the proposed muted tide gates.

Agency Comments

The proposed project area is a natural tidal creek system encompassing intertidal saltmarsh and tidal creek habitats and associated species that are critical to healthy estuarine and marine ecosystems. The functions and values of tidal creeks and intertidal habitats are well documented. Tidal creek systems provide critical feeding grounds, spawning areas, and nursery habitats for many species of fish, shellfish, birds, waterfowl, and mammals. Marsh areas provide the basis for the estuarine food chain through the production and transport of detrital material. Non-vegetated intertidal flats represent an important link in

the estuarine food chain by providing habitat that produce microalgae and phytoplankton which is utilized by a variety of consumers and converted to benthic invertebrates. These benthic invertebrates provide a major food source for higher level consumers such as crabs, shrimp, and bottom feeding fish. Most shorebirds are totally dependent on intertidal flats for foraging.

The project as proposed has the potential for significant direct and indirect impacts to sensitive tidal habitats, water quality and aquatic resources by restricting tidal flow. Tide gate structures can result in impacts to natural resources through altering biological, chemical, and physical processes. The blocking of tidal flows can restrict access for fish and invertebrates to and from habitats that are necessary for feeding, spawning, migration, and predator avoidance as well as altering environmental conditions such as salinity, temperature and dissolved oxygen which directly affect an organism's fitness. Tide gates may also affect hydrology and hydrodynamics in creek systems which can cause alterations to physical and chemical dynamics such as sediment and nutrient flux which are critical factors in marsh building processes[1]. In the Southeastern United States, the restriction and blockage of tidal flow in estuarine ecosystems has resulted in the degradation of thousands of acres of habitat[2]. There is the potential for significant, cumulative impacts to tidal, estuarine resources resulting from the authorization of this work and other similar projects.

In addition to potential impacts to natural resources, the SCDNR has concerns regarding impacts on state navigation associated with the proposed project. It appears from the information provided that an existing golf cart bridge path exists over Captain Sam's Creek that allows uninhibited tidal exchange. In the permit package, Captain Sam's Creek is described as Section 10 Traditional Navigable Waters, and that the proposed activity may require evaluation for compliance with construction in State Navigable Waters. Please note that under State Regulations 30-11 for all critical area permits, the South Carolina Department of Health and Environmental Control (DHEC) must consider "The extent to which the activity would harmfully obstruct the natural flow of navigable water" and "the extent to which the development could affect existing public access to tidal and submerged lands, navigable waters and beaches, or other recreational coastal resources."

The SCDNR's mission is to serve as the principal advocate for and steward of the state's natural resources in order to enhance human quality of life through wise use and safe enjoyment of the state's diverse and accessible natural resources. Recreational boating and fishing are of great interest to the agency; therefore, there is concern regarding the potential for the proposed tide gate to block public access to state navigable waters. The SCDNR requests that coordination occurs with DHEC, as the agency with regulatory authority over the state's navigable waters, to determine whether public access and use of navigable waters will be impacted as a result of the proposed activities. As part of that coordination, the SCDNR requests that additional information on the size/depth and navigability of these waters be shared with SCDNR to further evaluate this potential impact.

According to the applicant, the proposed project will permanently impact 0.09 acres of salt marsh and therefore, in accordance with Nationwide Permit General Condition 23(c), requires no mitigation. Please note that Nationwide Permit General Condition 23(c) only applies to projects that are utilizing Nationwide Permits. It is the understanding of the SCDNR that this is an individual permit. It is noted that the Charleston District U.S. Army Corps of Engineers typically does not require mitigation for less

[1] Giannico GR, Souder JA. 2005. The effects of tide gates on estuarine habitats and migratory fish. Oregon Sea Grant. ORESU-G-04-002.
[2] NOAA Restoration Center & NOAA Coastal Services Center. 2010. Returning the Tide, A Tidal Hydrology Restoration Guidance Manual for the Southeastern U.S. NOAA, Silver Spring, MD.

than 0.1 acres of impact. However, this project will impact critical area wetlands and S.C. Regulation 30-4 (G) states that mitigation may be required for any projects impacting tidelands at the discretion of the DHEC. If DHEC should require mitigation, regulations state:

> *Mitigation shall take the form of wetland creation and/or wetland enhancement and restoration. Wetland creation shall be performed at a ratio of 2:1, wetland created to wetland altered, for private projects and 1:1, wetland created to wetland altered, for projects deemed in the public interest. Enhancement and restoration projects should normally be coupled with some wetland creation and must clearly be an improvement ecologically over the existing system. Approved mitigation work must be performed and completed concurrently with permitted work unless otherwise authorized by [DHEC].*

Therefore, the SCDNR finds that an assessment for compensatory mitigation associated with the project should be considered. Information was not provided to support the frequency and duration of closure of the tide gate under current hydrologic regimes. The SCDNR finds that any mitigation assessment should include both initial tidal resource impacts from construction related activities and impacts associated with tide gate operation. It cannot be assumed that impacts to areas upstream from the proposed tide gate would be temporary or minor without specific information to support such, including the length of time gates will remain closed during each king tide or large stormwater events and baseline information including water quality data, biological data (e.g., benthic invertebrate, crustaceans, finfish, etc.) and a functional assessment of the upstream habitat. A tide gate malfunction or obstruction could result in a loss of a function to the existing ecosystem through complete inundation or disconnection upstream.

The SCDNR questions a proposed solution to reduce flooding impacts on the golf course that would result in new stormwater infrastructure restricting navigation and preventing the movement of aquatic organisms in a natural tidal creek. For the above reasons, the SCDNR objects to the project as currently proposed and requests the applicant consider pursuing less damaging alternatives to the state's natural resources. The SCDNR finds it important to consider alternatives with a greater emphasis on the use of nature-based measures. Nature-based and layered resilience alternatives promote the establishment of tidal vegetation and other important natural resources; provide flood reduction benefits; and provide important ecological functions, such as water purification and wildlife habitat.

Should the applicant choose not to pursue a nature-based solution for mitigating flooding and the regulatory agencies move forward with permitting, the SCDNR requests that the following information is provided to fully evaluate the effects of the proposed project to natural resources:

1) alternatives analysis that includes nature-based solutions and not solely tide gates;
2) modeling to understand the hydraulics and geomorphology of the project area; and
3) a detailed design, operation and maintenance plan outlining construction, monitoring, and management of the proposed tide gate.

Information regarding operational factors such as the system's settings for when to open and close the gates (both for now and for adaptive management in the future to combat sea level rise and additional land use changes that will influence hydrology in the watershed and thus frequency and duration of tide gate closures), duration of opening time, and a monitoring plan to outline how often the structures will be checked for obstructions or deterioration are necessary in considering potential risks to coastal resources. Failure of the tide gates to remain fully operational may lead to significant impacts to water quality and tidal habitats in the project area. Reduced flushing, changes in salinity and DO, and extended nutrient

resident times could have detrimental impacts on overall water quality and associated aquatic resources; these topics should be included in discussions on water quality impacts of the proposed project.

Thank you for the opportunity to review this project and provide comments. If you have any questions related to these recommendations, please contact me at Crowes@dnr.sc.gov.

Sincerely,

Stacie Crowe
Coastal Environmental Project Manager
Office of Environmental Programs, SCDNR
PO Box 12559
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843.953.9092 Office
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cc: USFWS
NMFS
EPA

Appendix C

State of South Carolina
Department of Natural Resources

P.O. Box 167
Columbia, S.C. 29202
803-528-4199

Robert H. Boyles, Jr., *Director*
Lorianne Riggin, *Director, Office of Environmental Programs*

December 8, 2023

Mr. Matthew Murphy
U.S. Army Corps of Engineers
ATTN: REGULATORY DIVISION
69 Hagood Avenue
Charleston, South Carolina 29403-5107

S.C. DHEC
Office of Ocean and Coastal Resource Management
1362 McMillan Avenue, Suite 400
North Charleston, South Carolina 29405

RE: SAC-2021-02023, Charleston County Public Works, James Island Creek, Charleston County

Dear Mr. Murphy,

The South Carolina Department of Natural Resources (SCDNR) is the agency charged by state law with the management, protection, and enhancement of wildlife, fisheries, and marine resources in South Carolina. In addition to natural resource management responsibilities through research, management, and licensing, the SCDNR is also obligated with statewide responsibilities for regulating watercraft operation and associated recreation on state waters, conducting geological surveys and mapping, promoting soil and water conservation, flood mitigation, drought response, and the coordination of the state scenic rivers program. SCDNR's mission is to serve as the principal advocate for and steward of South Carolina's natural resources (SCDNR authorities and responsibilities are described in Titles 48, 49 and 50, South Carolina Code of Laws (1976), as amended). As such, personnel with the South Carolina Department of Natural Resources (SCDNR) have reviewed the public notice referenced above and supporting documentation, evaluated its impact on natural resources and offer the comments included below.

Project Summary

The proposed work consists of constructing new stormwater drainage infrastructure and muted tide gates for drainage improvements and flood control within the Central Park Road drainage basin. In detail, the applicant proposes to permanently impact 0.088 acre of vegetated wetlands and 0.04 acre of unvegetated wetlands, and temporarily impact 0.086 acre of vegetated wetlands during construction. The existing dual culvert (54-inch and 25-inch diameter) concrete pipes under Central Park Road would be replaced with three 48' diameter Reinforced Concrete Pipes (RCP) with two flow-variable "muted" tide gates and one check valve. Temporary cofferdams would be installed during construction on the north and south sides of Central Park Road and a pump would be used to drain the dammed areas so that construction may take place on dry land. The proposed project may result in draining impacts to critical area wetlands upstream of the muted tide gates. According to the applicant, the purpose of the proposed project is to reduce flooding associated with king tides and large stormwater events within the Central Park Road drainage basin.

Agency Comments

The proposed project area includes intertidal, shallow subtidal, and vegetated tidal marsh habitats and species that are critical to healthy estuarine and marine ecosystems. The functions and values of tidal creeks and associated intertidal habitats are well documented. Tidal creek systems provide critical feeding grounds, spawning areas, and nursery habitats for many species of fish, shellfish, birds, waterfowl, and mammals. Marsh areas provide the basis for the estuarine food chain through the production and transport

of detrital material. Non-vegetated intertidal flats represent an important link in the estuarine food chain by providing habitat that produce microalgae and phytoplankton which is utilized by a variety of consumers and converted to benthic invertebrates. These benthic invertebrates provide a major food source for higher level consumers such as crabs, shrimp, and bottom feeding fish. Most shorebirds are totally dependent on intertidal flats as a feeding ground.

The applicant evaluated several alternative plans to avoid and minimize wetland impacts while meeting the project goals including:

- No action alternative,
- Improved culverts without tide gates,
- Installation of back flow prevention valves,
- Raising the elevation of Central Park Road without additional drainage improvements, and
- Improved culverts with muted tide gates (preferred alternative).

To fully evaluate the effects of the proposed project on natural resources associated with the preferred alternative, a detailed design and construction plan and an operation and maintenance plan of the tide gates should be provided.

Self-regulating tide gates have a very specific task of draining from the upstream area while also providing tidal inundation. To achieve the proper balance of flow, it is important to understand the hydraulics and geomorphology of the project area to properly design and operate the system. Although the terms "model and modeling" were used in the applicant's supporting documentation, details regarding a specific model or modeling results were not provided. The SCDNR finds that this is important information to understand the impacts associated with use of tide gates. Additionally, the SCDNR would recommend that any project involving tide gates must include an operations and maintenance plan. Information regarding operational factors such as the system's settings for when to open and close the gates (both for now and for adaptive management in the future to combat sea level rise and additional land use changes that will influence hydrology in the watershed and thus frequency and duration of tide gate closures), duration of opening time, and a monitoring plan to outline how often the structures will be checked for obstructions/interference or deterioration, are necessary in considering potential risks to coastal resources. Failure of the tide gates to remain fully operational may lead to significant impacts to water quality and tidal habitats in the project area. Reduced flushing, changes in salinity and DO, and extended nutrient resident times could have detrimental impacts on overall water quality and associated aquatic resources; these topics should be included in discussions on water quality impacts of the proposed project.

The proposed project includes raising Central Park Road to an elevation of 6.3 feet to prevent inundation from extreme tides and tidal surges, which is an elevation that exceeds the 50-year planning horizon for critical infrastructure against sea level rise based on the City of Charleston's Sea Level Rise Strategy Document [1]. While the proposed road elevation was designed with future conditions in mind, an analysis of projected sea level rise for the project area over the expected life of the structure, including anticipated frequency of gate closures, is needed to understand the long-term use of the tide gates. Increasing sea levels will result in higher low tide elevations and will trigger more frequent closures.

According to the applicant, the proposed project will permanently impact 0.088 acres of wetland and therefore, requires no compensatory mitigation. Assessments for compensatory mitigation should include

[1] Nationwide Permit/Critical Area Permit Supporting Documentation provided by Terracon

both initial tidal resource impacts from construction related activities and impacts associated with tide gate operation. The applicant states, "The upstream area having no tidal flow while the gate is closed is not anticipated to have a negative impact on marine species as the habitat will largely remain unchanged and the depth of the water will provide adequate habitat conditions for marine species to survive until the gates open as the tide recedes." It cannot be assumed that impacts to the area behind the tide gates would be temporary or minor without specific information to support such, including the length of time the gate will remain closed during each king tide or large stormwater event and baseline information including water quality data, biological data (e.g., benthic invertebrate, crustaceans, finfish, etc.) and a functional assessment of the upstream habitat. A tide gate malfunction or obstruction could result in a loss of a function to the existing ecosystem through complete inundation or disconnection upstream.

The SCDNR has concerns regarding the potential for significant direct and indirect impacts to tidal habitats, water quality and aquatic resources by restricting tidal flow. Tide gate structures can result in impacts to natural resources through altering biological, chemical, and physical processes. The blocking of tidal flows can restrict access for fish and invertebrates to and from habitats that are necessary for feeding, spawning, migration, and predator avoidance as well as altering environmental conditions such as salinity, temperature and dissolved oxygen which directly affect an organism's fitness. Tide gates may also affect hydrology and hydrodynamics in creek systems which can cause alterations to physical and chemical dynamics such as sediment and nutrient flux which are critical factors in marsh building processes[2]. In the Southeastern United States, the restriction and blockage of tidal flow in estuarine ecosystems has resulted in the degradation of thousands of acres of habitat[3].

The SCDNR finds that an additional alternative should be considered prior to the use of tide gates due to the risks associated with long-term impacts to functioning ecosystems. This alternative would include raising Central Park Road and improving drainage by replacing undersized culverts, which may meet project goals and avoid impacts to coastal resources. The SCDNR finds it important to consider all possible alternatives including those with a greater emphasis on the use of non-structural measures that minimize impacts to natural resources associated with this project.

Summary

The SCDNR finds that additional information is needed for impacts to natural resources to be fully evaluated prior to permit issuance for the project as currently proposed. Please provide the following additional project information:

- Detailed design plans and construction sequencing.
- Operation and Maintenance Plan outlining monitoring and management of the structure.
- Model use and modeling results for the proposed preferred alternative.
- Analysis of projected sea level rise for the project area over the expected life of the structure, including frequency of gate closures.
- Baseline data on existing water quality parameters and biological resources and a discussion of how they may or may not be impacted, as well as a functional assessment of the upstream habitat.
- Discussion of the alternative proposed by SCDNR (raising Central Park Road and improving drainage by replacing undersized culverts).

[2] Giannico GR, Souder JA. 2005. The effects of tide gates on estuarine habitats and migratory fish. Oregon Sea Grant. ORESU-G-04-002.

[3] NOAA Restoration Center & NOAA Coastal Services Center. 2010. Returning the Tide, A Tidal Hydrology Restoration Guidance Manual for the Southeastern U.S. NOAA, Silver Spring, MD.

Thank you for the opportunity to review this project and provide comments. Should you have any questions or need more information, please do not hesitate to contact me by email at CroweS@dnr.sc.gov.

Sincerely,

Stacie Crowe
Coastal Environmental Project Manager
Office of Environmental Programs, SCDNR
PO Box 12559
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