

- Adherence to environmental windows for construction during the winter months when sea turtles are less abundant.
- The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to aquatic Protected Species.
- Time of year and methods for preconstruction surveys for protected bird species will be coordinated with the USFWS.

Additional avoidance, minimization, and mitigation may be considered by the Corps in its decision-making process. Final mitigation measures may be adopted as conditions of the DA permit and documented in the Record of Decision (ROD).

4.7 ESSENTIAL FISH HABITAT

4.7.1 Methods and Impact Definitions

Potential impacts to EFH were addressed in the context of EFH species and habitat based on research, field observations, and best professional judgement. The level of detail to document existing resources within the study area is intended to provide data to analyze potential impacts to existing marine resources identified by NMFS and the field surveys. These data were used as a baseline to further analyze the alternatives through the process of minimization and avoidance. Impacts could include direct, indirect, site specific, or habitat impacts, including individual, cumulative, or synergistic consequences of actions.

Table 4.7-1
Impact Definitions, Essential Fish Habitat

	Negligible	Minor	Major
EFH	Very small alteration to EFH, or to federally managed and/or common fishery species.	A small alteration (in quantity or extent) to EFH that does not impair a species' ability to live.	A large alteration that appreciably diminishes the value of EFH for survival of a species.

4.7.2 No-Action Alternative

Under the No-Action Alternative, the Project site and the River Center project site would continue to be used for mixed use industrial activities. While future land uses and human activities may occur adjacent to and/or within aquatic environments within the study area, it would be speculative to attempt to estimate the acreage of impacts to EFH at this time. Therefore, the acreage of impacts to EFH is unknown, but EFH habitat could experience an adverse impact if these future activities resulted in a reduction in quantity and/or quality of EFH habitat. While population assessments and trends of EFH species are evaluated regularly by NMFS, and the species response to management

plans varies widely, future actions under the No-Action Alternative would likely result in a negligible adverse impact to EFH and federally managed and common fishery species (listed in Table 3.7-1).

4.7.3 Alternative 1: Applicant's Proposed Project (South via Milford / North via Hospital District)

EFH located within the study area includes estuarine emergent marsh, oyster reefs/shell banks, intertidal flats, and estuarine water column. For the assessment of potential impacts, the intertidal flats and estuarine water column EFH types occupy the same areas of land; thus, the acreages are combined to avoid an impacted acreage total greater than the actual area described. The types and quality of EFH and all impacts associated with Alternative 1 (Proposed Project) on EFH are described in detail in Appendix E (EFH Assessment). The following sections provide a brief summary of the impacts described in the EFH Assessment.

Under Alternative 1 (Proposed Project), construction of the drayage road and arrival/departure tracks near tidal salt marsh and Shipyard Creek and bridge improvements, including any temporary construction work areas, in Noisette Creek would directly impact EFH within the study area. As such, construction activities could affect multiple life history stages of all the federally managed species identified in Table 3.7-1. The placement of fill and pilings associated with construction of Alternative 1 (Proposed Project) would directly impact 6.65 acres of estuarine emergent marsh and 1.14 acres of intertidal flats/estuarine water column (Figure 4.7-1).

Other sources that could indirectly impact EFH include shading from bridges, noise resulting from construction and operation activities, and temporary physical barriers from the use of BMPs (e.g., floating semi-permeable turbidity curtains) outlined in Section 4.7.12 from pile installation in Shipyard Creek. The NMFS Pile Driving Calculator Model was used to assess the potential underwater noise impacts from pile driving activities on federally managed species (NMFS 2015). Underwater noise impacts to federally managed species associated with Alternative 1 (Proposed Project) are described in detail in Section 4.6 – Protected Species, and Appendix E.

Additionally, potential spills of contaminants may occur during construction and operation activities; however, the implementation of a SPCC Plan (Section 4.15.12.1) may minimize the impact of a potential spill event on EFH. Off-site truck and rail traffic could result in the potential for minor and/or major (depending on location) indirect impacts to EFH and federally managed species from accidental pollutant spills. However, there are BMPs, mandated requirements, and regulations that cover spills (Section 4.15.3.2); therefore, impacts to EFH from accidental spills would be minor and localized.

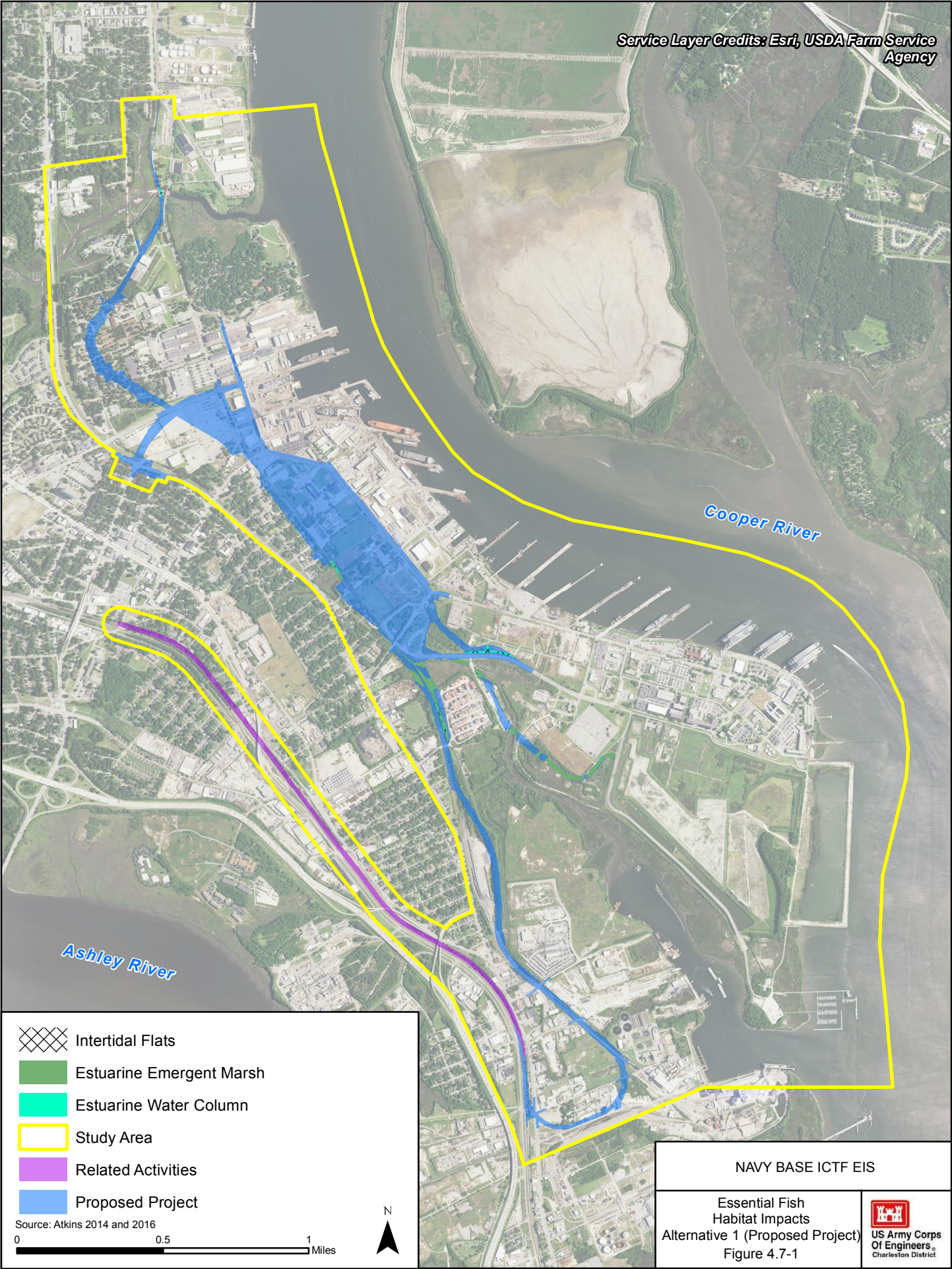
Circulation patterns within Noisette Creek and Shipyard Creek are not expected to be altered. In summary, construction of Alternative 1 (Proposed Project) would have minor impacts to EFH and federally managed species.

Construction of Alternative 1 (Proposed Project) would result in the permanent loss of estuarine emergent marsh EFH. The loss of habitat reduces nursery areas and refuge for the federally managed and fish species (e.g., white and brown shrimp). A reduction in marsh habitat can reduce prey opportunities, while at the same time increase predation due to the loss/reduction of cover and refuge areas. The presence of construction equipment adjacent to and/or within the EFH, and the resulting noise, may also result in the temporary displacement of federally managed species residing in this area; however, impacts to federally managed fish species that use estuarine emergent marsh EFH would be minor, since Alternative 1 (Proposed Project) would not affect federally managed species at the population level. The potential for an indirect, temporary water quality impact (e.g. sedimentation, turbidity) to estuarine emergent marsh EFH in the study area would be reduced to a negligible effect with the use of applicable BMPs, such as silt fence, sediment ponds, inlet protection, and check dams. Where feasible, a 25-foot vegetated buffer will be placed between development and marsh habitat.

Because of the distance between proposed construction activities under Alternative 1 (Proposed Project) and the location of oyster reefs/shell banks in the study area, there would be no direct impact on this EFH type. Oyster clusters that are located on bridge pilings may be directly impacted during bridge improvements in Noisette Creek; however, this impact would be a short-term impact on EFH, as these structures would provide for future oyster settlement and propagation. The potential for an indirect, temporary water quality impact (e.g., sedimentation, turbidity) to the oyster reefs/shell banks EFH in the study area would be reduced to a negligible effect with the use of applicable BMPs, such as silt fence, sediment ponds, inlet protection, and check dams.

The direct impact to intertidal flats EFH would be minor due to the amount of available intertidal habitat that would not be impacted by Alternative 1 (Proposed Project) within the study area. These impacts would result from the construction of the drayage road and arrival/departure tracks and bridge improvements and include the potential for localized, temporary increases in sedimentation; permanent physical barriers to species movement from new piling installation in Shipyard Creek; and temporary physical barriers to species movement from the implementation of BMPs (e.g., floating semi-permeable turbidity curtains) during construction. The potential for an indirect, temporary water quality impact (e.g. sedimentation, turbidity) to intertidal flats EFH in the study area would be reduced to a negligible effect with the use of applicable BMPs, such as silt fence, sediment ponds, inlet protection, and check dams. Loss of habitat could result in a minor impact to federally managed and common fishery species that use the EFH for foraging and refuge. Noise impacts, and the presence of nearby human activity, could also result in the temporary displacement of federally managed fish species that inhabit the intertidal flats EFH.

Service Layer Credits: Esri, USDA Farm Service Agency



- Intertidal Flats
- Estuarine Emergent Marsh
- Estuarine Water Column
- Study Area
- Related Activities
- Proposed Project

Source: Atkins 2014 and 2016
0 0.5 1 Miles



NAVY BASE ICTF EIS

Essential Fish
Habitat Impacts
Alternative 1 (Proposed Project)
Figure 4.7-1



The direct impact to estuarine water column EFH would be minor due to the amount of available estuarine water column that would not be impacted by Alternative 1 (Proposed Project) within the study area. Other impacts to this EFH associated with construction of Alternative 1 (Proposed Project) include the potential for localized, temporary increases in sedimentation (and turbidity); reduced dissolved oxygen (DO) levels; permanent physical barriers to species movement from new piling installation in Shipyard Creek; and temporary physical barriers to species movement from the implementation of BMPs (e.g., floating turbidity curtains) during construction. Increases in sedimentation and turbidity may result in a minor impact to federally managed fish species and the estuarine food chain, but any adverse impacts would be minimized through the use of BMPs, such as silt fence, sediment ponds, inlet protection, and check dams.

4.7.4 Alternative 2: Proposed Project Site (South via Milford / North via S-line)

Alternative 2 is a variation of Alternative 1 (Proposed Project), where the Northern Rail Connection for NS would be relocated along Spruill Avenue within existing CSX ROW to the S-line, and turn east along Aragon Avenue to the existing NCTC rail line. Alternative 2 would require a bridge crossing over Noisette Creek adjacent to Spruill Avenue, rather than near Noisette Boulevard. The placement of fill and pilings associated with construction of Alternative 2 would directly impact 8.86 acres of estuarine emergent marsh, 0.03 acre of oyster reefs/shell banks, and 1.35 acres of intertidal flats/estuarine water column (Figure 4.7-2).

4.7.5 Alternative 3: Proposed Project Site (South via Kingsworth / North via Hospital District)

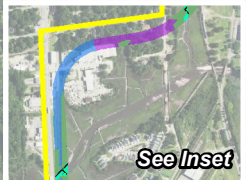
Under Alternative 3, the intermodal facility would include all of the facility components of Alternative 1 (Proposed Project), with the same road improvements. The arrival/departure design would be the same as described in Alternative 1 (Proposed Project); however, the southern rail connection would connect to an existing rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW), which would require acquisition of a new ROW. The placement of fill and pilings associated with construction of Alternative 3 would directly impact 6.66 acres of estuarine emergent marsh and 1.14 acres of intertidal flats/estuarine water column (Figure 4.7-3).

Service Layer Credits: Esri, USDA Farm Service Agency

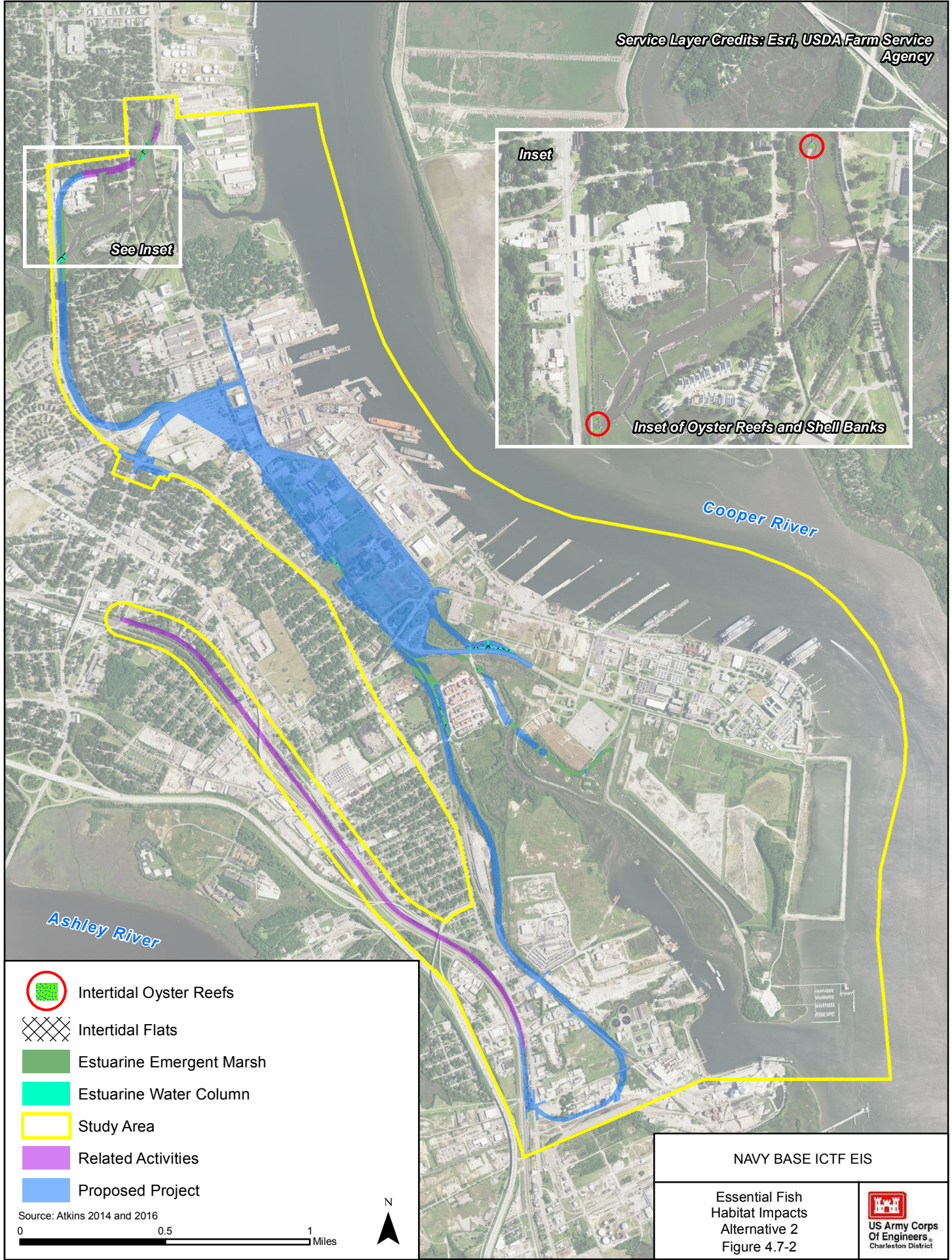


Inset

Inset of Oyster Reefs and Shell Banks










See Inset



Cooper River

Ashley River

-  Intertidal Oyster Reefs
-  Intertidal Flats
-  Estuarine Emergent Marsh
-  Estuarine Water Column
-  Study Area
-  Related Activities
-  Proposed Project

Source: Atkins 2014 and 2016

0 0.5 1 Miles

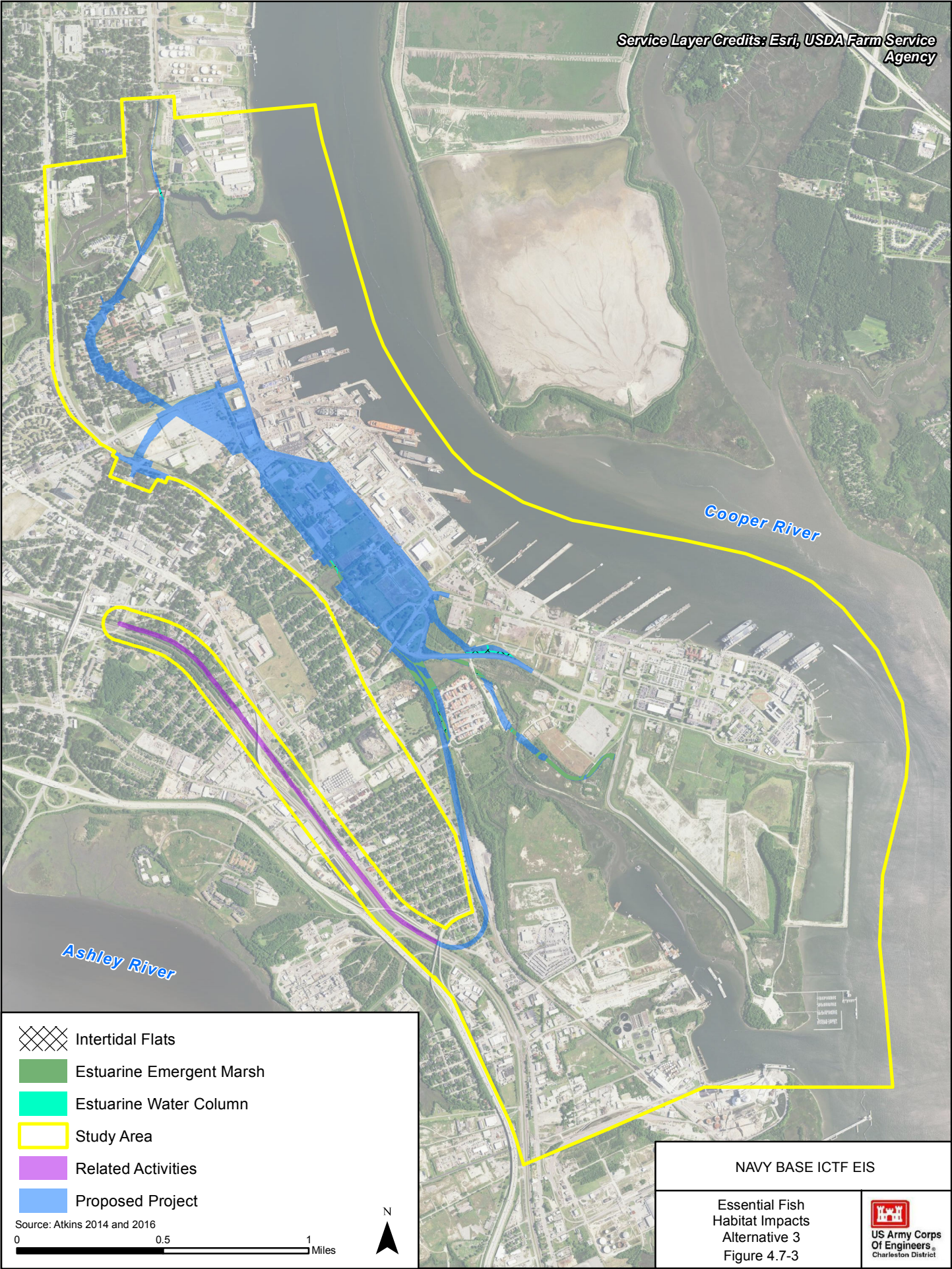





NAVY BASE ICTF EIS

Essential Fish
Habitat Impacts
Alternative 2
Figure 4.7-2



Service Layer Credits: Esri, USDA Farm Service Agency



-  Intertidal Flats
-  Estuarine Emergent Marsh
-  Estuarine Water Column
-  Study Area
-  Related Activities
-  Proposed Project

Source: Atkins 2014 and 2016
0 0.5 1 Miles



NAVY BASE ICTF EIS

Essential Fish
Habitat Impacts
Alternative 3
Figure 4.7-3



4.7.6 Alternative 4: Proposed Project Site (South via Milford)

Under Alternative 4, the intermodal facility would include all of the facility components of Alternative 1 (Proposed Project), with the same road improvements. Rail improvements would be similar to those described for the southern rail connection as part of Alternative 1 (Proposed Project), with the exception that a second track would need to be constructed, which would then tie into the existing rail lines. To the north of the intermodal facility, a rail spur or tail track would extend from the facility through the Hospital District but would stop short of Noisette Creek. The placement of fill and pilings associated with construction of Alternative 4 would directly impact 6.66 acres of estuarine emergent marsh and 1.03 acres of intertidal flats/estuarine water column (Figure 4.7-4).

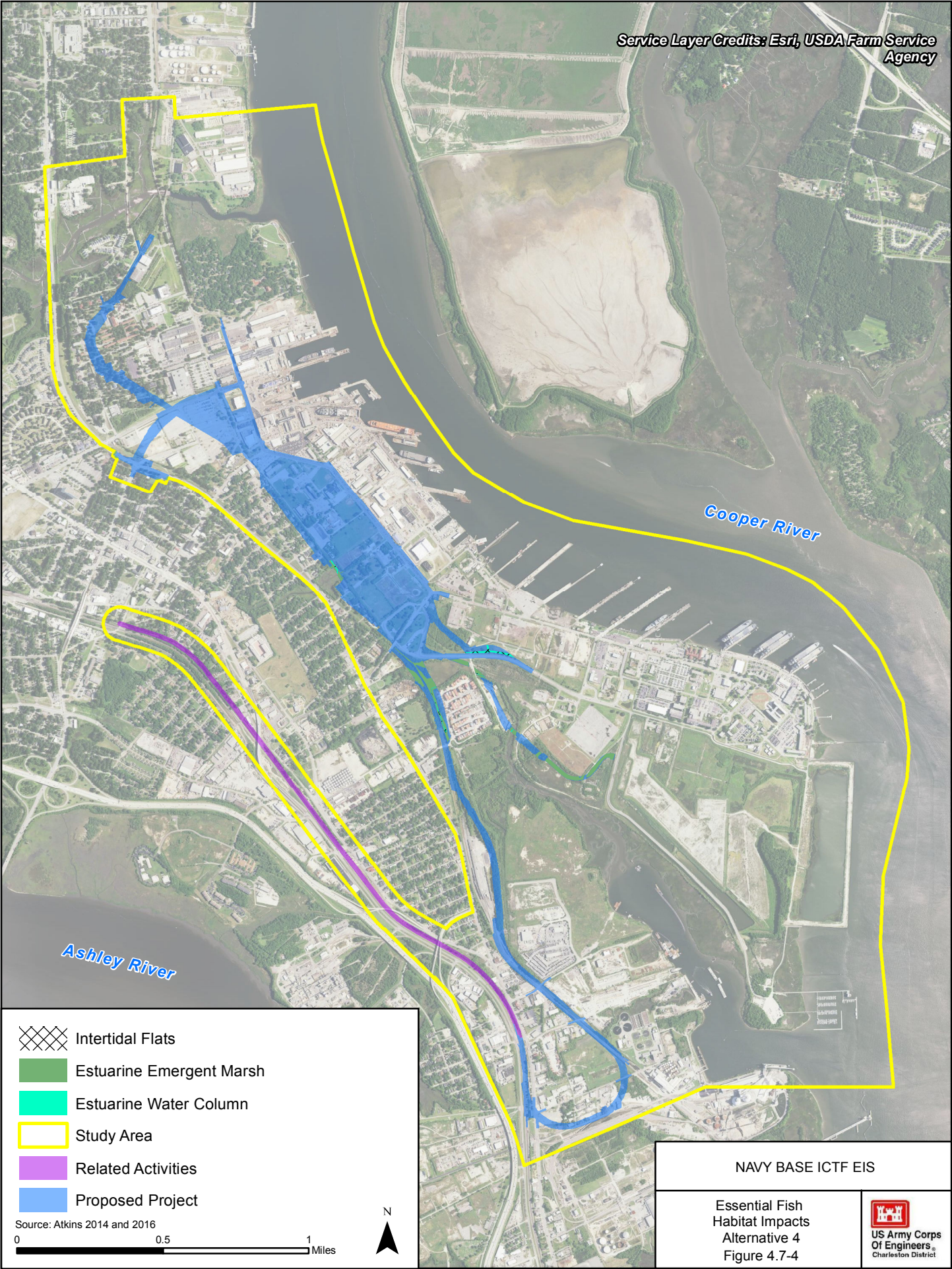
4.7.7 Alternative 5: River Center Site (South via Milford / North via Hospital District)


Alternative 5 is a variation of Alternative 1 (Proposed Project) with the ICTF being moved to the River Center project site. The intermodal facility would include all of the facility components of Alternative 1 (Proposed Project), with the exception of a sound attenuation and security wall that would be constructed adjacent to Noisette Boulevard along the length of the eastern boundary of the facility site. To accommodate NS rail access, a new rail bridge would be constructed, similar to the one described under Alternative 1 (Proposed Project). The NS rail connection would cross Noisette Creek and tie into the existing NCTC tracks along Virginia Avenue. The placement of fill and pilings associated with the construction of Alternative 5 would directly impact 5.29 acres of estuarine emergent marsh and 1.01 acres of intertidal flats/estuarine water column (Figure 4.7-5).

4.7.8 Alternative 6: River Center Site (South via Kingsworth / North via Hospital District)

Under Alternative 6, the intermodal facility would include all of the facility components, road improvements, and northern rail connection as described in Alternative 5. Rail improvements would be similar to those described for the southern rail connection in Alternative 5, with the exception that the southern rail connection would connect to an existing rail line near Kingsworth Avenue (and adjacent to existing NS rail and ROW) and would require acquisition of new ROW. The placement of fill and pilings associated with the construction of Alternative 6 would directly impact 5.29 acres of estuarine emergent marsh and 1.01 acres of intertidal flats/estuarine water column (Figure 4.7-6).

Service Layer Credits: Esri, USDA Farm Service Agency



-  Intertidal Flats
-  Estuarine Emergent Marsh
-  Estuarine Water Column
-  Study Area
-  Related Activities
-  Proposed Project

Source: Atkins 2014 and 2016
0 0.5 1 Miles

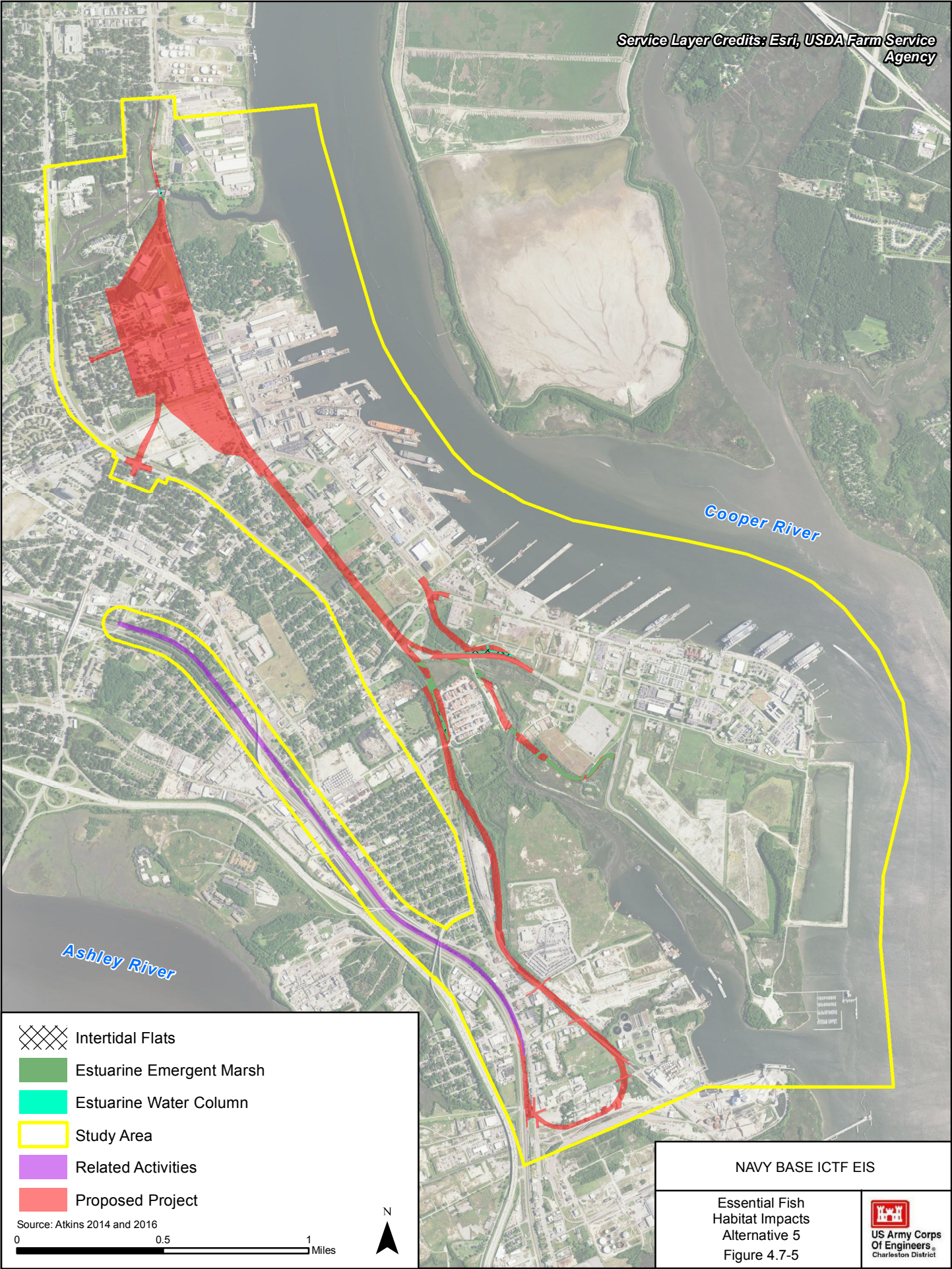


NAVY BASE ICTF EIS

Essential Fish
Habitat Impacts
Alternative 4
Figure 4.7-4



Service Layer Credits: Esri, USDA Farm Service Agency



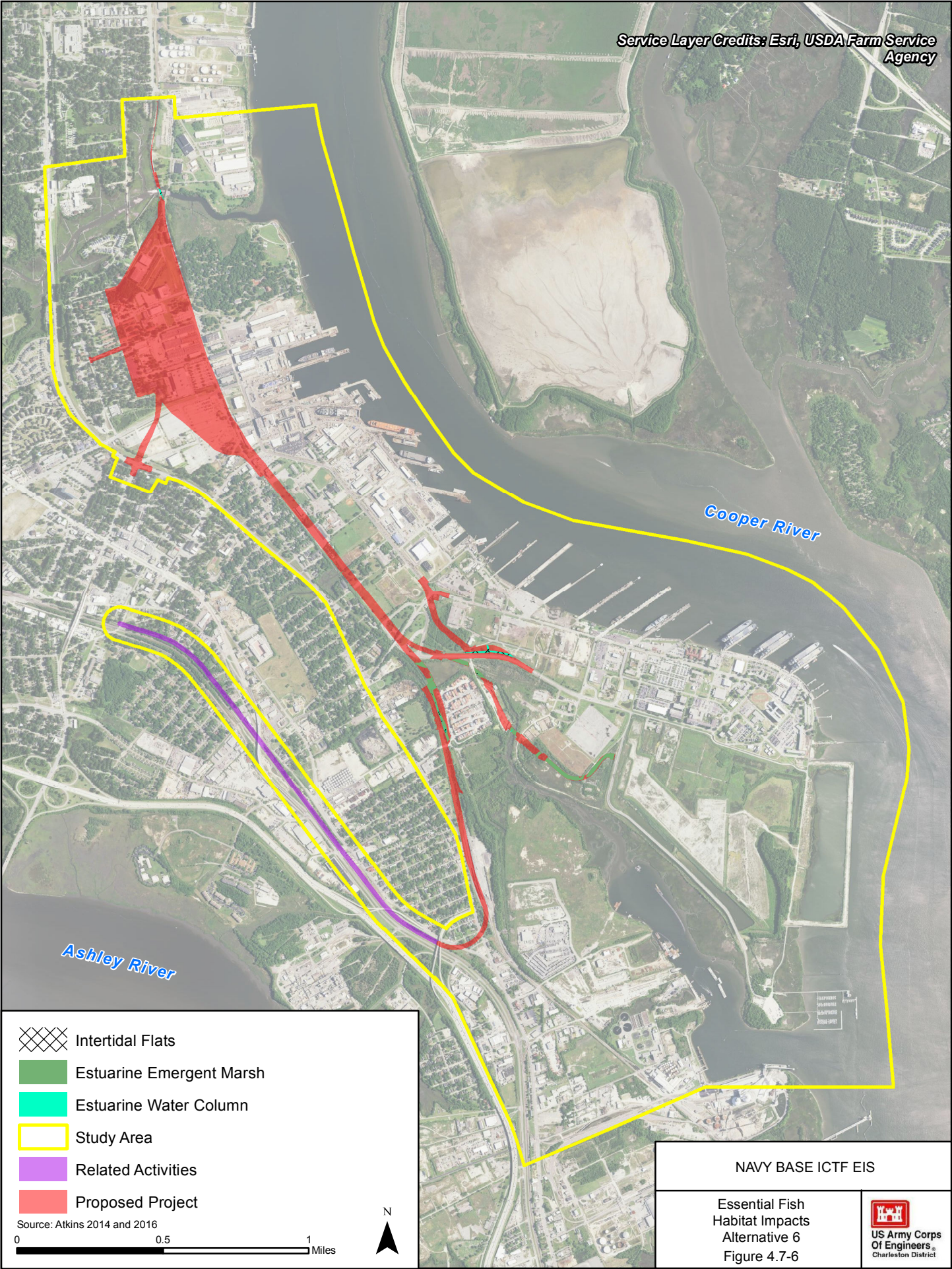
- Intertidal Flats
- Estuarine Emergent Marsh
- Estuarine Water Column
- Study Area
- Related Activities
- Proposed Project

Source: Atkins 2014 and 2016
0 0.5 1 Miles



NAVY BASE ICTF EIS	
Essential Fish Habitat Impacts Alternative 5 Figure 4.7-5	 US Army Corps Of Engineers Charleston District

Service Layer Credits: Esri, USDA Farm Service Agency



-  Intertidal Flats
-  Estuarine Emergent Marsh
-  Estuarine Water Column
-  Study Area
-  Related Activities
-  Proposed Project

Source: Atkins 2014 and 2016

0 0.5 1 Miles



NAVY BASE ICTF EIS

Essential Fish
Habitat Impacts
Alternative 6
Figure 4.7-6



4.7.9 Alternative 7: River Center Site (South via Milford)

Under Alternative 7, the intermodal facility would include all of the facility components of Alternative 1 (Proposed Project), with the exception that the sound attenuation and security wall would be constructed adjacent to Noisette Boulevard along the length of the eastern boundary of the site. Operational activities and roadway improvements for Alternative 7 would be the same as those described under Alternative 5 with the exception of the northern rail access which would enter and exit the Navy Base ICTF from a second southern rail connection. Rail improvements and modifications would be similar to those described under Alternative 5. The placement of fill and pilings associated with the construction of Alternative 7 would directly impact 5.32 acres of estuarine emergent marsh and 0.92 acre of intertidal flats/estuarine water column (Figure 4.7-7).

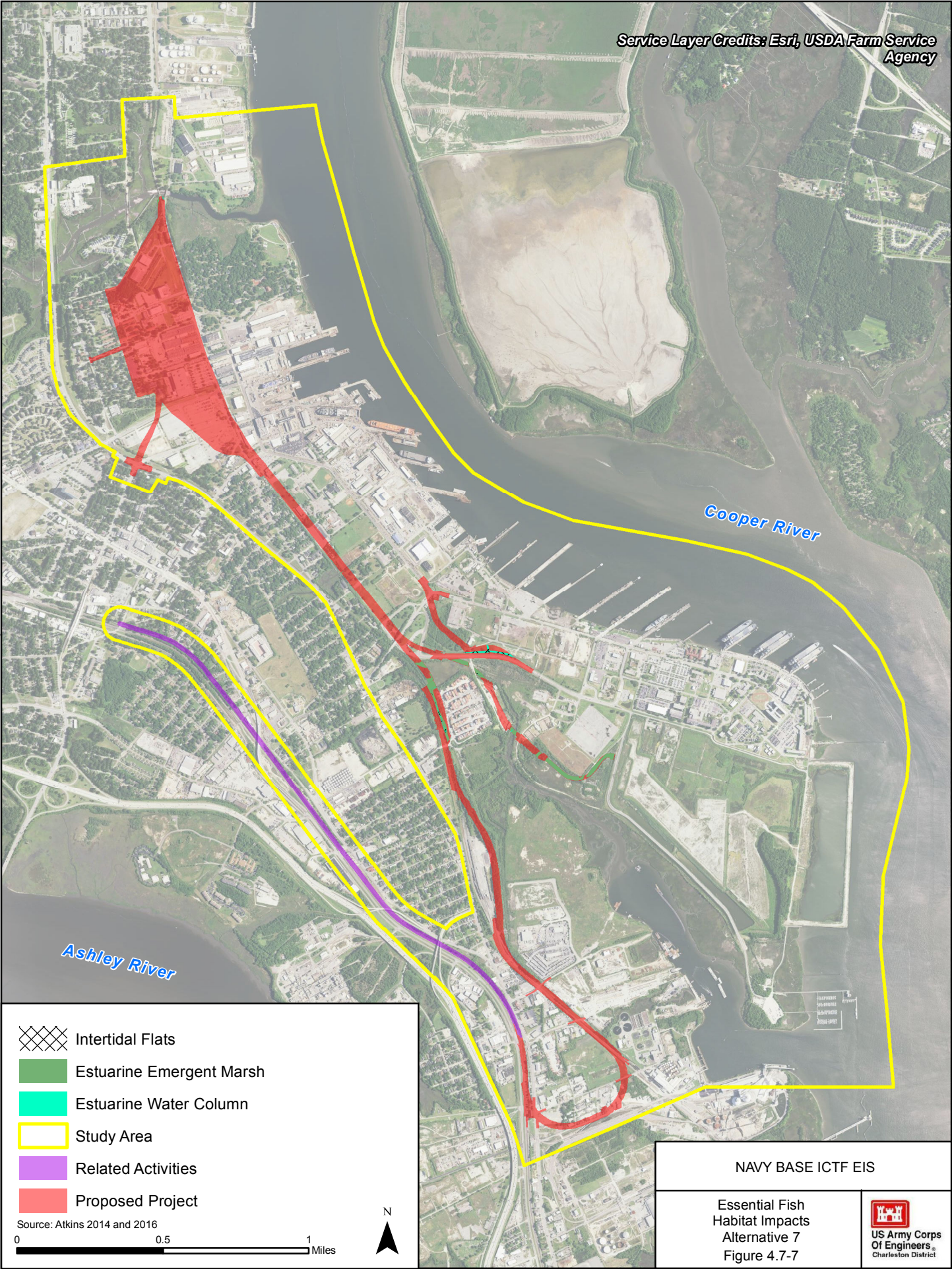
4.7.10 Related Activities

The Related Activities include two components, the southern rail connection, which occurs for all alternatives, but has unique alignments for Alternatives 3 and 6, and the northern rail connection, which is only proposed for Alternative 2. Despite the unique rail alignments for Alternatives 3 and 6, impacts to EFH for those sections have been successfully avoided. Under Alternative 2, the placement of pilings associated with construction of the Related Activity (a new railroad bridge across a portion of marsh that drains Noisette Creek) would directly impact 1.77 acres of estuarine emergent marsh, 0.007 acre of oyster reefs/shell banks, and 0.20 acre of intertidal flats/estuarine water column. There would be no other impacts to EFH from construction of the Related Activity associated with each of the other Project alternatives.

4.7.11 Summary of Impacts Table

Table 4.7-2 summarizes the environmental consequences to EFH from Alternative 1 (Proposed Project) and all the alternatives.

Service Layer Credits: Esri, USDA Farm Service Agency



-  Intertidal Flats
-  Estuarine Emergent Marsh
-  Estuarine Water Column
-  Study Area
-  Related Activities
-  Proposed Project

Source: Atkins 2014 and 2016

0 0.5 1 Miles



NAVY BASE ICTF EIS

Essential Fish
Habitat Impacts
Alternative 7
Figure 4.7-7



Table 4.7-2
Summary of Impacts, Essential Fish Habitat

Alternative	Habitat Loss	Federally Managed and Common Fishery Species Displacement
No-Action	Negligible effect on EFH that currently exists within the study area.	Negligible Potential exists for a small short-term impact (in number, quantity, or extent) to federally managed species during construction, such as brown and white shrimp, which are relatively abundant and adapted to living in close association with human activity and infrastructure.
1: Proposed Project: CSX – Milford / NS – North via Hospital District	Minor Approximately 7.79 acres of EFH, including 6.65 acres of EEM and 1.14 acres of IF/EWC, would be impacted.	Minor Potential exists for a small short-term impact to federally managed species during construction, such as brown and white shrimp, which are relatively abundant and adapted to living in close association with human activity and infrastructure. Negligible short-term impact to oysters with the implementation of water quality BMPs and the potential for future oyster settlement and propagation with the new pilings.
2: CSX – Milford / NS – S-line	Minor Approximately 10.24 acres of EFH, including 8.86 acres of EEM, 0.03 acre of OR/SB, and 1.35 acres of IF/EWC, would be impacted.	Same as Alternative 1
3: CSX – Kingsworth / NS – Hospital	Minor Approximately 7.80 acres of EFH, including 6.66 acres of EEM and 1.14 acres of IF/EWC, would be impacted.	Same as Alternative 1
4: CSX & NS – Milford	Minor Approximately 7.69 acres of EFH, including 6.66 acres of EEM and 1.03 acres of IF/EWC, would be impacted.	Same as Alternative 1
5: River Center Site: CSX – Milford / NS – North via Hospital District	Minor Approximately 6.30 acres of EFH, including 5.29 acres of EEM and 1.01 acres of IF/EWC, would be impacted.	Minor Potential exists for a small short-term impact to federally managed species during construction, such as brown and white shrimp, which are relatively abundant and adapted to living in close association with human activity and infrastructure.
6: River Center Site: CSX – Kingsworth / NS – Hospital	Minor Approximately 6.30 acres of EFH, including 5.29 acres of EEM and 1.01 acres of IF/EWC, would be impacted.	Same as Alternative 5

Alternative	Habitat Loss	Federally Managed and Common Fishery Species Displacement
7: River Center Site: CSX & NS – Milford	Minor Approximately 6.24 acres of EFH, including 5.32 acres of EEM and 0.92 acre of IF/EWC, would be impacted.	Same as Alternative 5

Source: Atkins 2017.

EEM = Estuarine Emergent Marsh; OR/SB = Oyster Reefs/Shell Banks; IF/EWC = Intertidal Flats/Estuarine Water Column

EFH Impact Definitions

Negligible = Very small alteration to EFH, or to federally managed and/or common fishery species.

Minor = A small alteration (in quantity or extent) to EFH that does not impair a species' ability to live.

Major = A large alteration that appreciably diminishes the value of EFH for survival of a species.

4.7.12 Mitigation

4.7.12.1 Applicant's Proposed Avoidance and Minimization Measures

The Applicant has committed to several measures that avoid and/or minimize potential impacts of Alternative 1 (Proposed Project). These measures are taken from Palmetto Railways Mitigation Plan provided in Appendix N. Some of these measures are required under federal, state, and local permits; others are measures that Palmetto Railways has incorporated into the design and operations of Alternative 1 (Proposed Project). Each mitigation measure is also designated as one that either helps to avoid an impact or one that minimizes an impact.

- Where possible limit the placement of pilings for bridges within waterways, ensuring channels are not blocked (including use of the existing bridge over Noisette Creek). (Minimization)
- Contractors will be required to use bubble curtains or sleeve piles to mitigate underwater noise while driving piling in EFH areas. (Minimization)
- The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25 to 40 percent of the pile driver's energy followed by a one-minute waiting period. (Minimization)
- During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place. (Minimization)
- Adherence to environmental windows for construction during the winter months when sea turtles are less abundant. (Avoidance)
- The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to marine resources and EFH. (Avoidance)

- Implement an SPCC plan to minimize the impact of a potential spill on EFH. (Minimization)
- Permanent loss of EFH habitat will be mitigated through the mitigation plan and efforts described above. (Mitigation)

These avoidance and minimization measures, except the items noted with an asterisk (*), have been considered in the preceding impact analysis. The complete list of Applicant-proposed avoidance and minimization measures for Alternative 1 (Proposed Project) is provided in Chapter 6, Table 6.1.

4.7.12.2 Additional Potential Mitigation Measures

The following additional mitigation measures as recommended by the Corps would further minimize and/or reduce potential effects of Alternative 1 (Proposed Project) on EFH.

- The contractor will utilize soft-start techniques for pile driving activities. This will consist of a series of taps at 25–40 percent of the pile driver’s energy, followed by a one-minute waiting period.
- During in-water work, a floating semi-permeable turbidity curtain will be deployed around areas where pile driving is taking place.
- Adherence to environmental windows for construction during the winter months when sea turtles are less abundant.
- The contractor will hire a qualified marine biologist to be on-site during in-water construction activities to avoid potential impacts to marine resources and EFH.
- Implement an SPCC plan to minimize the impact of a potential spill event on EFH.

Additional avoidance, minimization, and mitigation may be considered by the Corps in its decision-making process. Final mitigation measures may be adopted as conditions of the DA permit and documented in the Record of Decision (ROD).