Biological Assessment

Albany Port District Commission
Port of Albany Expansion Project

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Executive Summary

The Albany Port District Commission (APDC) proposes the development of an industrial site and expansion of their current land holdings. The proposed development will accommodate future growth and help the State of New York in achieving its renewable energy goals by providing additional port infrastructure, building space, cargo and wharf capacity necessary for the manufacturing and distribution of wind turbine components ("the Project" or "Proposed Action"). See **Figure 1** for Location Map.

The purpose of this Biological Assessment (BA) is to serve as consultation with the National Marine Fisheries Service (NMFS) in accordance with Section 7 of the Endangered Species Act of 1973, as amended. Based on information provided by the APDC, it is determined that the Project **may affect, but not likely to adversely affect**, Critical Habitat or species listed by the National Marine Fisheries Service (NMFS) as threatened (T) or endangered (E). More information about the Proposed Action and supporting analysis for this determination are provided below.

The Project is within the geographic range of the following species and critical habitat protected under the ESA (also see Table ES-1):

- Shortnose sturgeon (*Acipenser brevirostrum*)
- Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*)
- Atlantic sturgeon critical habitat

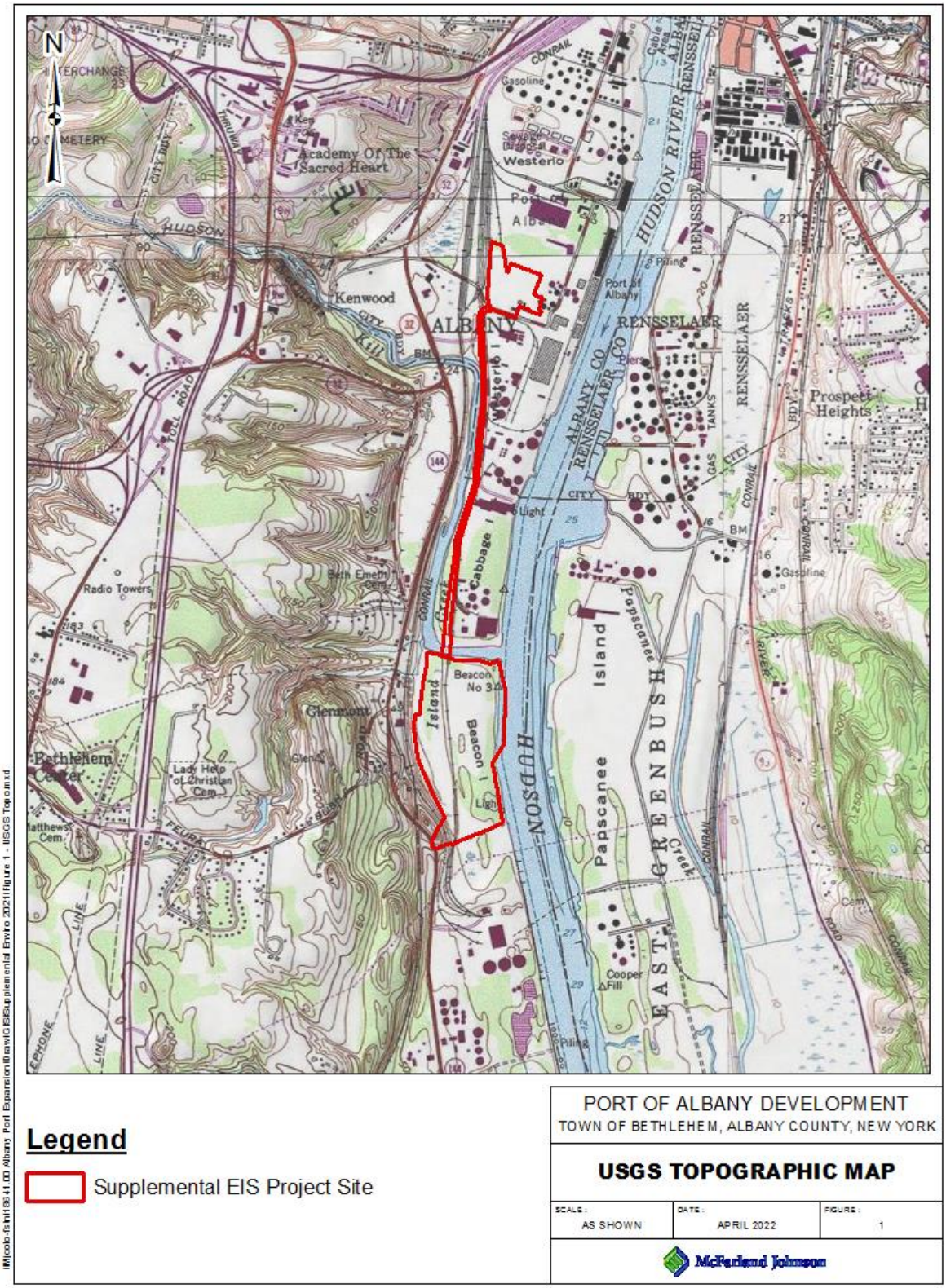
Conservation measures will be incorporated into the Project to avoid or minimize impacts to the tidal habitat within the action area. With the implementation of these measures, the Project is not likely to adversely affect Shortnose sturgeon, Atlantic sturgeon, or designated critical habitat for Atlantic sturgeon (Table ES-1). No other listed, proposed, or candidate fish species are expected to occur in the project's action area.

Table ES-1. Summary of determinations on marine species for the proposed action

Species	Distinct Population Segment (DPS)	Listing Status	Effect Determination	Critical Habitat Determination
Shortnose sturgeon	N/A	Endangered	Not likely to adversely affect	Not applicable, no critical habitat designated
Atlantic sturgeon	New York Bight	Endangered	Not likely to adversely affect	Not likely to adversely affect

Regarding other protected species, the Project is located within the known range of the Northern Long-eared Bat. There will be approximately 72 acres of tree removal. The project was evaluated under the Programmatic Biological Opinion on Final 4(d) Rule for the Northern Long-Eared Bat (January 2016). Using the USFWS determination key, it was determined that the project may affect northern long-eared bat. While tree clearing will occur outside of the recommended seasonal work window, it was determined that the action is not prohibited under the 4(d) rule. The USFWS concurs with the May Affect determination, and agrees that the project is not likely to jeopardize the continued existence of the northern long-eared bat (**Appendix A**).

Figure 1. Location Map



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1.0 Project Overview

1.1 Federal Nexus

The purpose of this Biological Assessment (BA) is to address the foreseeable effects of the Port of Albany Expansion Project ("the Project" or "Proposed Action") on U.S. Endangered Species Act (ESA) listed species, listed as endangered or threatened, or their designated critical habitat, as per coordination with the National Marine Fisheries Service (NMFS).

The Albany Port District Commission (APDC), on behalf of the US Maritime Administration (MARAD), is pursuing consultation under Section 7 of the ESA to address foreseeable impacts to specific protected fish species that are known to occur in the vicinity of the Project. Section 7 of the ESA assures that, through consultation with the NMFS and/or the U.S. Fish and Wildlife Service (USFWS), federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat. The protected species addressed in this BA were coordinated with NMFS, resulting from a pre-application meeting held on August 10, 2021, including the U.S. Army Corps of Engineers.

1.2 Project Description

The Project will transform an undeveloped property (zoned industrial) into an active port terminal with specialized infrastructure capable of supporting a new manufacturing operation win tower components for renewable energy developments. The Project consists of approximately 626,014 square feet of manufacturing space located in five (5) separate buildings. See **Figure 2** for aerial image with the location of the Project.

Manufacturing would include fabrication of large and heavy OSW, towers, transition pieces, and related elements. These fabricated components would be loaded on barges or other vessels for marine transport to the designated site for final assembly. The size and weight of the fabricated steel tower elements that will be manufactured on-site are significant; tower sections will be up to 165 feet in length, 33 feet in diameter, and weigh up to 600 tons each. Transition pieces are of variable height, between 50 and 115 feet, and will weigh up to 800 tons each; therefore, marine transport is required.

The Proposed Action requires the construction of a new bridge of over Normans Kill, and construction of a new marginal wharf along the eastern edge of Beacon Island and limited dredging in the Hudson River. The general layout of the proposed wharf places the riverside face of structure coincident with the face of the existing timber revetment, so much of the earthwork and construction would be landward, including land excavation. In-water work activity within the mean higher high water line (MHHWL) mainly consists of dredging and foundations elements of the wharf including slope protection. See **Appendix B** for Permit Sketches of the proposed wharf.

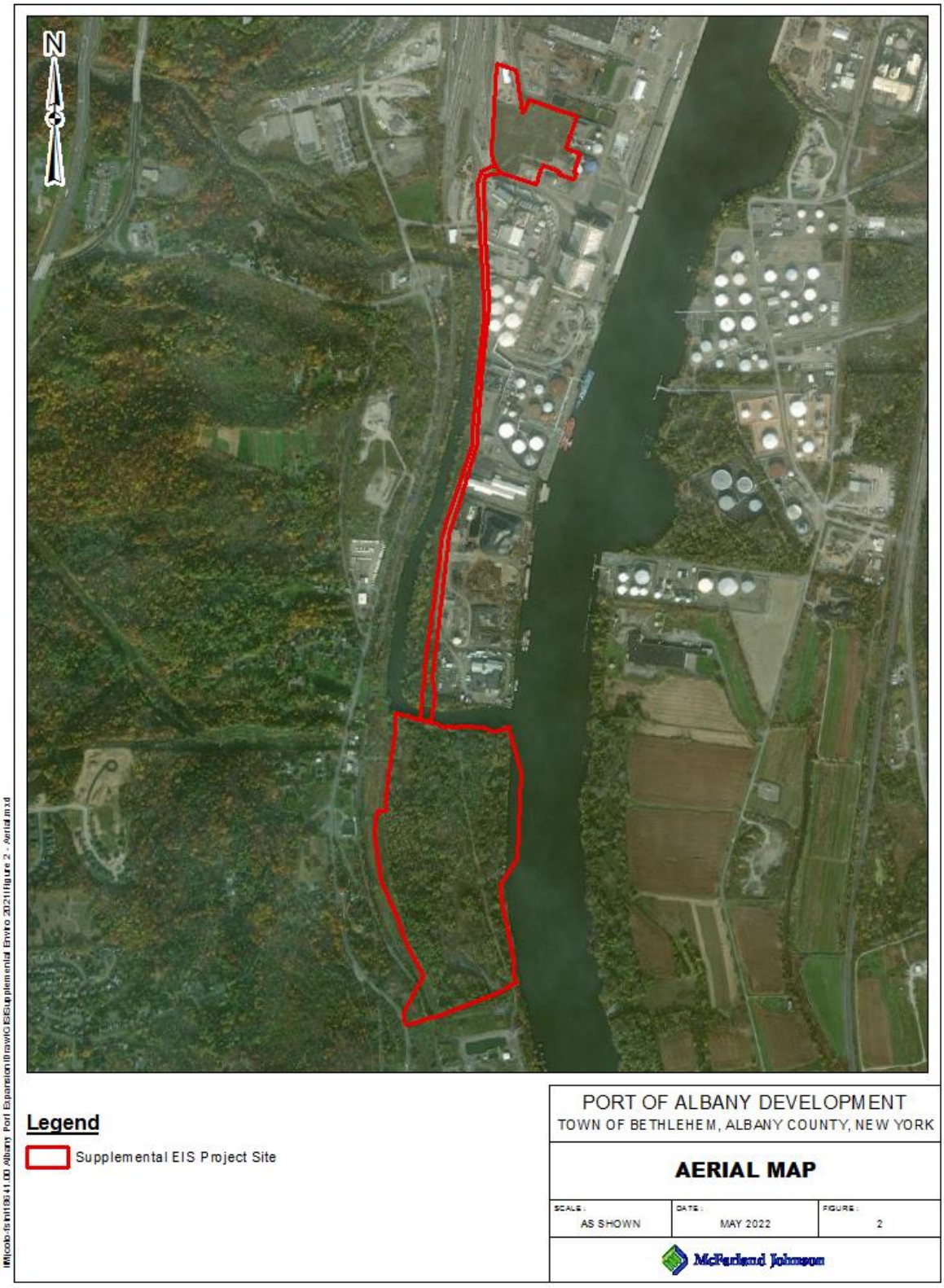
The Project intends to avoid dredging during spawning periods of the Atlantic sturgeon and Shortnose sturgeon. The Project will comply with NMFS and New York State Department of Environmental Conservation (NYSDEC) guidelines and recommended in-water time restrictions to protect life cycles of the Shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrinchus oryrinchus*) which have the potential to occur in the Action Area. As per email from NYSDEC dated November 23, 2011 and Sturgeon Coordination Meeting held on November 18, 2021, with regulatory agencies (NYSDEC, USACE, NMFS and OGS), the regulatory staff discussed the work windows for in-water construction activities

associated with this Project. Traditionally, the NYSDEC's work window is September 1 to October 31 to be protective of sturgeon species. Since there is no documentation of overwintering sturgeon in this location, NYSDEC extended the work window for the Project further into winter. As such, regulatory staff indicated that the work window for this Project could be September 1st through January 31st or ice-in, whichever comes first.

Overall project construction activities would typically occur between 7am and 7pm seven (7) days a week, with some time-critical activities occurring during nights. Dredging is expected to start in mid-September 2022 and to be completed within 90 days, depending on weather conditions. Construction and landside excavation of the wharf is expected to start in June 2022. Construction of the proposed wharf is expected to be completed within 18 months. Construction in the Hudson River channel (in water-work) will be completed as per NMFS and NYSDEC time restrictions and USACE permit conditions.

Once the wharf is constructed and dredging completed, during the operational phase of the facility, anticipated vessels that will dock and moor at the proposed wharf include a variety of high-capacity deck barges. The "minimum" anticipated barge size is an ABS Ocean Deck Barge (250' length, 72' width, 16' depth); the "maximum" anticipated barge size is a Crowley Series 455, or equal (400' length, 105' width, 25' depth) These barges are towed and rely on propulsion from tugboats. The barges draft varies from six (6) feet (light) to 20 feet (loaded). The draft of tugboats varies from six (6) to ten (10) feet. These vessels are existing; however, routes are unknown at this moment. Regardless the new wharf, these vessels will continue to be part of the maritime traffic that operates and travel at low speed along the navigable waters (e.g., Hudson River). The expected traffic and number of vessels as result of the Project is not expected to exceed the maximum number of vessels (290) previously recorded by the APDC in a single year, traveling to and from the Port of Albany and all other wharf locations along the Hudson River. In addition, the Project is located south of the existing turning basin for the Hudson River; therefore, this area is currently subject to maritime traffic and port activities where all cargo vessels in this area currently navigates and pass the location of the new wharf to turn around and return to the ocean. Based on the latest projections, up to 142 vessels (annually) are expected to continue use the navigational channel and the new wharf, which is less than the 290 vessels using the Port of Albany in a year as recorded. Additionally, the Project will not draw any larger sized vessels than currently utilize the Hudson River or call to the Port of Albany. Please note that maritime vessel size remains restricted by the bridge clearance and vessels' air draft at the Castleton Bridge and therefore transport of cargo produced at the project size will utilize vessels at or below the size of vessels currently in use.

Figure 2. Aerial View



1.3 Project Setting and Action Area

A portion of the Project is located in the Town of Bethlehem and the balance of the Project is located in the City of Albany. See **Figure 2 – Aerial Image**. The portion in the Town of Bethlehem is an 81.6-acre parcel (Main Manufacturing production site/Beacon Island) accessed via River Road/Route 144. The City of Albany parcel is a 14.7-acre parcel for receiving all raw materials and deliveries is accessed via Smith Boulevard and would connect to the main manufacturing site via the existing Normanskill Street and the proposed bridge over the Normans Kill (waterway). See **Appendix B – Permit Sketches**. The 4.5-acre adjoining parcel for employee parking is owned by National Grid and has access via River Road / Routh 144.

In summary, the Project Site is located on the east side of River Road/Route 144 along the Hudson River at approximately Hudson River Mile 142 (HRM 142). The Action Area, for purposes of this BA,ESA Section 7 review and consultation under NMFS, is defined as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 CFR§402.02). The Action Area is the section of the Hudson River along Beacon Island where the Project will occur, the area within the turbidity curtain, all routes traveled by the project vessels, and the 270-foot radius (90 meters) to account for the maximum distance of behavioral impacts on protected species due to sound from pile driving activities. This area is expected to encompass all of the effects of the Project.

It is assumed that the operating vessels using the area after the Project is complete are existing (in waterway) and currently part of the maritime distribution network. The Project is not intended to change current navigation patterns; therefore, it is understood that the Action Area does not need to expand and evaluate additional upstream or downstream areas.

The shoreline along the Project Site is heavily modified ("armored shoreline"). An old timber retaining wall runs nearly the entire length of the study area, and there are various types of shoreline armoring (stone, concrete). The timber revetment was constructed with a single row of timber piles joined by horizontal timber cribbing, and backed by compacted earth, gravel, and stone. Based on other historical documentation, it appears that portions of the revetment may have undergone periodic repairs or improvements, including placement of concrete slabs in lieu of stone surfacing; however, the exact locations and extents of such repair measures cannot be ascertained. The approximate width of the Hudson River at the proposed wharf and dredging area is over 700 feet.

These features have greatly altered intertidal and nearshore subtidal habitats and helped to create a steep depth gradient with little shallow subtidal habitat. SAV is generally absent or sparse. Turbidity likely limits the depth distribution of SAV since sunlight barely penetrates more than five (5) to six (6) feet.

According to the results from Sediment Sampling Analysis, substrate consists of silty clay, sand and some trace of gravel.

1.4 Consultation History

The Project has been discussed during several weekly Agency Coordination Meetings, with multiple state and federal agencies including the USACE, NYSDEC, and MARAD. Also a BA coordination ("pre-application") was help on August 10, 2021, among USACE, NMFS, APDC and the consulting team including McFarland-Johnson, Inc. and Moffatt & Nichol.

2.0 Federally Proposed and Listed Species/Designated Critical Habitat

The Project is located within the range of two (2) fish species listed under the ESA, and within Critical Habitat designated for one species. These species are under the jurisdiction of the National Oceanic and Atmospheric Administration (NOAA), NMFS.

- Fish
  - Shortnose sturgeon (*Acipenser brevirostrum*) (32 FR 4001; Recovery plan: NMFS 1998)
  - Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) (77 FR 5880 and 77 FR 5914)

- Critical Habitat
  - Atlantic Sturgeon Critical Habitat (82 FR 39160)

The following biological assessment provides the most recent species-specific data in order to better understand potential effects the Project may have on the subject federally listed species and critical habitat.

2.1 Shortnose Sturgeon

Shortnose sturgeon occur in rivers and estuaries along the east coast of the U.S. and Canada. In the U.S., they are listed as endangered throughout their range. Shortnose sturgeon prefer slower moving riverine, estuarine, and nearshore marine habitat of large river systems, migrating occasionally into faster moving freshwater areas to spawn. Spawning occurs in freshwater areas. Feeding and overwintering occur in either freshwater or saltwater areas (NMFS 1998). In general, foraging habitat for Shortnose sturgeon and Atlantic sturgeon overlap; however, Shortnose sturgeon spawn farther upriver than Atlantic sturgeon (SSSRT 2010).

Spawning occurs in upper, freshwater reaches, usually within the natal river, over gravel, rubble, timber, scoured clay, cobble and large rocks at areas in the farthest accessible upstream reach of an undammed river or near the base of the dam or in the tailrace in a dammed river (Dadswell 1979, Taubert 1980, Dadswell et al. 1984, Buckley and Kynard 1985a and b, Kynard 1997). Spawning occurs in mid to late spring when water temperatures reach 8-9°C (SSSRT 2010).

Little information is known about young-of-the-year (YOY) behavior and habitat use, but they are typically found in channel areas within freshwater habitats upstream of the salt wedge for about one year, as salinity tolerance increases with age (Dadswell et al. 1984, Kynard 1997).

Older juveniles, age one or older, have similar spatial and temporal patterns and habitat use as adults (Kynard 1997). Adult Shortnose sturgeon have been found at temperatures from 2° C to 34°C, although a temperature preference is unknown and temperatures above 28°C are thought to adversely affect them. They occur at a wide range of depths from a minimum of 0.6 meter (2 feet) to 30 meters (98 feet), but generally less than 20 meters (66 feet) of water in the deepest parts of the river or estuary with suitable oxygen values (Dadswell 1979, Dadswell et al. 1984, Gilbert 1989, Fernandes et al. 2010). Shortnose sturgeon tolerate a wide range of salinities from freshwater (0 ppt) to seawater (32 ppt; Dadswell 1979, Holland and Yeverton 1973). Their complex migratory patterns vary by river system, and they do not appear to make long distance offshore migrations, although coastal migrations of adults to neighboring rivers have been documented. Adult migrations include spring movement from overwintering sites to upriver spawning sites, late spring downstream movements to feeding areas lower in the river and

directed movement in the fall to overwintering sites (SSSRT 2010, Fernandes et al. 2010). In the northern part of its range, Shortnose sturgeon are seldom found in shallow water once temperature exceeds 22°C (Dadswell et al. 1984). Individuals seem to remain in their natal river or the river's estuary (Dadswell 1979).

Overwintering occurs in deep river segments and deep depressions at depths of 10m to 30m (Dadswell et al. 1984). In northern rivers, overwintering juvenile and adult Shortnose sturgeon form tight aggregations in specific, relatively deep sandy segments of the freshwater or saline reaches of the river with little movement or foraging (Dadswell 1979, SSSRT 2010).

Between spring and fall, Shortnose sturgeon forage in shallow water (1 to 15 meters) on sand-mud bottoms covered with aquatic plants consuming mollusks, polychaetes, and small flounders (Dadswell 1979). Shortnose sturgeon feed on a variety of benthic and epibenthic invertebrates including insect larvae, mollusks, crustaceans, and oligochaete worms (Dadswell 1979, Dadswell et al. 1984).

Shortnose sturgeon are anadromous bottom-feeding fish that can be found throughout the Hudson River from the Battery at the mouth of the river to the Federal Dam at Troy. Peterson and Bain (2002) estimated that the Hudson River Shortnose sturgeon population contained about 61,000 fish. Their preferred habitat is deep pools with soft substrates and vegetated bottoms (NYNHP, 2019b). Shortnose sturgeon are listed as endangered throughout their range.

Shortnose sturgeon prefer to spawn in freshwater and on hard bottom substrate. Spawning occurs from late March to mid-May in the region from the Federal Dam downstream to Coxsackie, NY (between river miles 152 and 118) (Dovel et al. 1992, Bain 1997), which includes the Action Area. Early life stages from eggs to post yolk-sac larvae remain near the spawning grounds for approximately eight (8) weeks post-spawn (Buckley and Kynard 1981) and larvae are most commonly concentrated in deeper channel waters where the current is stronger (Hoff et al. 1988, Dovel et al. 1992). Eggs and yolk-sac larvae could be present from March 15 to June 15. Post yolk-sac larvae could be present from March 15 to July 15. Juveniles are distributed throughout the mid-river region during summer and are found downriver of the Action Area, in the Kingston and Haverstraw Bay regions by late fall and early winter (Dovel et al. 1992, Bain et al. 1998, Geoghegan et al. 1992). Adult Shortnose sturgeon range between river miles 23 and 110 during the summer months, at least 30 miles south of the Action Area, and then congregate in overwintering areas at specific locations within that range (NMFS 2013). Based on the spatial distributions and seasonal movement patterns within the Hudson River, Shortnose sturgeon of all life stages have the potential to be present in the Action Area for at least some of the year.

Given the NMFS and NYSDEC recommended in-water work window (September 1 – January 31, or ice-in, whichever comes first), young-of-the year, juveniles and adults may occur in the vicinity of the project site; however, spawning adults, eggs, and larvae are not expected to be present. Transient juvenile and adult individuals could occur in the vicinity of the project site to opportunistically forage. Sturgeon post yolk-sac larvae could also be present in the vicinity of the Project from April to September; however, post yolk sac larvae are mobile and able to swim away into other areas of the Hudson River not to be impacted.

Table 1 – Shortnose Sturgeon Distribution, Life Stages and Seasonal Movement in Hudson River

Body of Water (State)	Distribution / Range in Watershed	Life Stages	Use of Watershed	References
Hudson River (NY/NJ)	Up to Troy Dam, NY (approximately RKM 246)	eggs, larvae, YOY, juveniles, and adults	**Spawning** - Documented from late March to early May when water temperatures reach 10°-18°C[1] from Coxsackie to below the Federal Dam at Troy[1][3] (RKM 190-246) **Rearing** - Eggs on the spawning grounds; larvae downstream to at least RKM 104; YOY downstream to at least RKM 64[1] **Foraging** - Throughout the Hudson River (RKM 38-175)[3][5] with concentrations in Haverstraw Bay[1] (RKM 56-64) **Overwintering** - Late fall to early spring[3]; largest area (mainly spawning adults) near Kingston[2] (RKM 137-149); smaller overwintering areas are located from Saugerties to Hyde Park[2] (RKM 123-170) and in the Croton-Haverstraw Bay area[2] (RKM 54- 61); many juveniles overwinter in the lower river (RKM 0-64)[1] (RKM 55-63)[4]	[1] Dovel et al. 1992; [2] Geoghegan et al. 1992; [3] Bain 1997; [4] Bain et al. 2007; [5] Pendleton et al. 2018

2.2 Atlantic Sturgeon

There are five (5) DPSs of Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) listed as threatened or endangered. Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, South Atlantic and Carolina DPSs are listed as endangered; the Gulf of Maine DPS is listed as threatened. The marine range of all DPSs extends along the Atlantic coast from Canada to Cape Canaveral, Florida. Atlantic sturgeon from any of the five DPSs may occur in the Action Area.

Atlantic sturgeon spawn in freshwater reaches of estuaries, in flowing water between the salt front and fall line of large rivers or estuarine tributaries (ASSRT 2007, Greene et al. 2009). Silt-free hard bottom substrates such as gradient boulder, bedrock, cobble-gravel, and coarse sand are required to spawn adhesive eggs (Collette & Klein-MacPhee 2002, Greene et al. 2009).

Atlantic sturgeon eggs, larvae, and young-of-the-year do not tolerate high salinities, with mortality documented at salinities as low as 5 ppt to 10 ppt (Green et al. 2009). Juveniles are found over sand, mud, cobble, rocks and transitional substrates and remain in their natal estuary for up to six years before migrating out to sea.

Sub-adults emigrate out of their natal estuarine habitats and migrate long distances in the marine environment. Larger juveniles migrate back and forth between coastal and estuarine habitats (ASSRT 2007). Juveniles overwinter in brackish water near the mouth of estuaries, and adults and sub-adults overwinter in deeper coastal nearshore areas (ASMFC 2012). During winter months (November – March),

Atlantic sturgeon primarily occupy deeper water, generally deeper than 20 meters. Shallower waters are inhabited in summer and early fall (May – September) (Erickson et al. 2011). However, Atlantic sturgeon do not overwinter exclusively in higher reaches as do Shortnose sturgeon. Adult Atlantic sturgeon do not overwinter exclusively in riverine habitats; they are often found foraging during the winter in near shore marine water at depths less than 250 feet (Colette and Klein-MacPhee 2002).

Juvenile and adult Atlantic sturgeon frequently aggregate in upper estuary habitats around the saltwater interface (Greene et al. 2009). Adults have been documented in moderately shallow (7 meters to 50 meters) sand and gravel nearshore habitats (Stein et al. 2004, Laney et al. 2007, Greene et al. 2009). Prey items include polychaetes, amphipods, isopods, decapods, mollusks, and sand lance (*Ammodytes spp.*; Scott and Scott 1988, Johnson et al. 1997).

Atlantic sturgeon are anadromous bottom-feeding fish that spawn in freshwater sections of the Hudson River and overwinter throughout the New York Bight, off the south shore of Long Island, and throughout Long Island Sound (Waldman et al. 1996, Bain 1997, Savoy and Pacileo 2003). Adults migrate from the ocean upriver to spawn in fresh water above the salt front from late April to August (Dovel and Berggren 1983). The primary spawning area for Atlantic sturgeon is near Hyde Park, New York (river mile 83) (NMFS 2013), well downriver from the Action Area. Additional data collected in 2014 confirmed the presence a few spawning individuals upstream of river mile 120 from late April through late July (Fox and Hattala 2014). Given the time of year, the reproductive conditions of these fish, and the known presence of suitable spawning substrate upstream of river mile 120, the presence of these individuals suggests that Atlantic sturgeon spawn further upstream in the Hudson River than previously suspected, including within the Action Area. Females migrate from the river back to marine waters following spawning, but males may remain in the river until October or November. Early life stages (i.e., eggs, larvae, and young-of-year) are intolerant of salinity and occur primarily in freshwater habitats; young-of-year Atlantic sturgeon exhibit poor survival at salinities ranging from 5 to 10 ppt, and older juveniles may tolerate salinities up to 12 ppt (Kynard and Horgan 2002, ASMFC 2012). Juveniles may forage throughout the river during most of the year and may be found as far upriver as the Troy Dam, with the exception of the winter months when they migrate to marine overwintering areas (Dovel and Berggren 1983). According to surveys conducted by NMFS and multiple state agencies in the region, the majority of Atlantic sturgeon occurred in waters between 10 and 15 meters (32 and 49 feet) in depth (Dunton et al. 2010). Based on the spatial distributions and seasonal movement patterns within the Hudson River, all life stages of Atlantic sturgeon could be present in the Action Area. Spawning adults and early life stages could be present from approximately April through September, and non-spawning adults could occur year-round. Juveniles could also be found in the Action Area year-round, although they are more likely to migrate downriver or to marine habitats in the winter months. Eggs and yolk-sac larvae could be present from April to August 31. Post yolk-sac larvae could be present from April to September 30.

Given the NMFS and NYSDEC recommended in-water work window (September 1 – January 31, or ice-in, whichever comes first), young-of-the year, juveniles, subadults, and adults may occur in the vicinity of the project site; however, spawning adults, eggs, and larvae are not expected to be present. Transient individuals could occur in the vicinity of the project site to opportunistically forage. Sturgeon post yolk-sac larvae could also be present in the vicinity of the Project from April to September; however, post yolk sac larvae are mobile and able to swim away into other areas of the Hudson River not to be impacted.

Table 2 – Atlantic Sturgeon Distribution, Life Stages and Seasonal Movement in Hudson River

Body of Water (State)	Distribution / Range in Watershed	Life Stages	Use of Watershed	References
Hudson River (NY/NJ)	Up to Troy Dam, NY (approximately RKM 246)	eggs, larvae, YOY, juveniles, subadults, and adults	**Spawning** - April through July[7], notably around Hyde Park (RKM 129-135) [4] and Catskill (RKM 182)[2], as well as throughout RKM 113-184[4]; evidence strongly suggests that there is also spawning further upstream of RKM 193[6] **Rearing** - larvae and YOY - RKM 60-148[1] [3]; remain upstream of the salt wedge[2]; juveniles - RKM 63-140[1][3]; utilize the estuary up through Kingston (RKM 148)[1]; Newburgh and Haverstraw Bays (RKM 55-61) are areas of known juvenile concentrations[5] **Foraging** - assumed to occur wherever suitable forage is present **Overwintering** - juveniles - RKM 19-74 from fall through winter[1]; some juveniles were recorded in Esopus Meadows (RKM 134)[3]	[1] Dovel and Berggren 1983; [2] Van Eenennaam et al. 1996; [3] Bain 1997; [4] Bain et al. 1998; [5] Sweka et al. 2006; [6] Dewayne Fox, DSU, and Kathy Hattala, NYDEC, personal communication April 2014; [7] Breece et al. 2021

2.3 Atlantic Sturgeon Critical Habitat

According to the ESA Section 7 Mapper[1] from the NOAA Fisheries Greater Atlantic Region, the Hudson River is identified as spawning and foraging grounds for the Atlantic Sturgeon.

The Project and its associated Action Area is located within designated critical habitat for this species (New York Bight DPS, Hudson River Unit). Critical habitat is defined by Section 3 of the ESA as "(1) the specific areas within the geographical area occupied by the species, at the time it is listed, on which are found those physical or biological features (a) essential to the conservation of the species and (b) which may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination by the Secretary that such areas are essential for the conservation of the species (NOAA 2016)."

[1] https://noaa.maps.arcgis.com/apps/webappviewer/index.html?id=1bc332edc5204e03b250ac11f9914a27

River features crucial to the reproduction and recruitment in Atlantic sturgeon were considered when determining critical habitat NMFS identified the following physical and biological features (PBFs) as essential to the conservation of Atlantic sturgeon (NMFS 2017):

- PBF #1 - Hard bottom substrate (e.g., rock, cobble, gravel, limestone, boulder, etc.) in low salinity waters (i.e., 0 to 0.5 parts per thousand (ppt) range) for settlement of fertilized eggs, refuge, growth, and development of early life stages.
- PBF #2 - Aquatic habitat with a gradual downstream salinity gradient of 0.5 up to as high as 30 ppt and soft substrate downstream (e.g., sand, mud) between the river mouth and spawning sites for juvenile foraging and physiological development.
- PBF #3 - Water of appropriate depth and absent physical barriers to passage (e.g., locks, dams, thermal plumes, turbidity, sound, reservoirs, gear, etc.) between the river mouth and spawning sites necessary to support unimpeded movement of adults to and from spawning sites; seasonal and physiologically dependent movement of juvenile Atlantic sturgeon to appropriate salinity zones within the river estuary; and staging, resting, or holding of subadults or spawning condition adults. Water depths in main river channels must also be deep enough (e.g., at least 1.2 m) to ensure continuous flow in the main channel at all times when any sturgeon life stage would be in the river.
- PBF #4 - Water between the river mouth and spawning sites, especially in the bottom meter of the water column, with temperature, salinity, and oxygen values that, combined, support spawning; annual and interannual adult, subadult, larval, and juvenile survival; and larval, juvenile, and subadult growth, development, and recruitment (e.g., 13°C to 26°C for spawning habitat and no more than 30°C for juvenile rearing habitat, and 6 mg/L dissolved oxygen or greater for juvenile rearing habitat).

According to environmental surveys conducted, the Project area contains limited physical and biological features identified under PBFs 1, 3, and 4, when compared to available habitat along the Action Area. Considering that the Project area is located near river mile 140 and environmental setting is more broadly defined by freshwater conditions with salinity <0.5‰, optimal habitat for juvenile foraging and physiological development (PBF 2)[2] does not occur in the area of the Project. There is no critical habitat designated for Shortnose sturgeon.

3.0 Environmental Baseline

The Hudson River is tidal from the mouth of the river up to the Federal Dam in Troy, a distance of about 153 miles. The portion of the river within the Project Area, located near river mile 140, is considered freshwater, tidal, as salinity levels are less than 0.5 percent. The area of the Project is characterized by high turbidity levels and low visibility.

Multiple site investigations and environmental studies have been conducted for the Project including:

- Wetland Delineation
- Submerged Aquatic Vegetation (SAV) Survey
- Freshwater Mussels Survey

[2] Aquatic habitat with a gradual downstream salinity gradient of 0.5 up to as high as 30 ppt and soft substrate downstream (e.g., sand, mud) between the river mouth and spawning sites for juvenile foraging and physiological development.

- Terrestrial Threatened and Endangered Species (T&E) Survey
- Sediment Sampling

Following is a summary of the findings from the environmental surveys conducted within the Action Area.

Table 3 - Summary of Environmental Conditions

Wetlands	• USACE Regulated Wetlands (9.46 acres):
	  • +/- 1.49 acres of wetlands within Beacon Island
	  • +/- 7.13 acres of wetlands within adjoining National Grid property
	  • +/- 0.84 acre of wetland along Normanskill Street (including +/- 0.04 acre of wetland on the north embankment of Normans Kill)
	• No NYSDEC regulated wetlands

SAV Survey	• Hudson River: Three (3) patches detected along the eastern edge of Beacon Island
	  • Dredging area: One (1) with a very low density of *Vallisneria americana* (water celery) along with very few solitary *Trapa natans* (water chestnut) and *Potamogeton crispus* (curly-leaf pondweed)
	  • Outside Project limits: One (1) with a moderate to high density, and one (1) with very low density of *V. americana* and very low densities of *T. natans* and *P. crispus*

Freshwater Mussels Survey	• 113 of *Elliptio complanata* (S2S3)and 36 *Leptodea fragilis* (S1S2) were found in the Hudson River • Eight (8) *Leptodea fragilis* located within the proposed dredging area • No live mussels were found in Normans Kill • Zebra mussels existed at moderate to high densities in subtidal areas
Threatened and Endangered Species	• Rare Plant Species Investigation conducted, and no protected species found within Project site.
Sediment Sampling	• 15 cores / samples performed; 12 within the approximate dredging area • Classification of the dredging material consists of silty clay, sand and some trace of gravel.

4.0 Project Details

4.1 Project Timeline and Duration

Overall project construction activities would typically occur between 7am and 7pm seven (7) days a week, with some time-critical activities occurring during nights. Dredging is expected to start in mid-September 2022 and to be completed within 90 days, depending on weather conditions. Construction and landside excavation of the wharf is expected to start in June 2022. Construction of the proposed wharf is expected to be completed within 18 months. Construction in the Hudson River channel (in water-work) will be completed as per NMFS and NYSDEC time restrictions and USACE permit conditions.

4.2 Dredging and Wharf

As part of the overall development, the APDC intends to undertake the construction (landward) of approximately 500 linear feet of marginal wharf along the eastern edge of Beacon Island (81.6-acre parcel) on the Hudson River. The northern limit of the wharf is located approximately 300 feet south of the confluence of the Normans Kill with the Hudson River. The purpose of the wharf facility is to facilitate the marine-based import and export of materials and manufactured components wind tower components for renewable energy facilities. The proposed wharf consists of a deep foundation-supported concrete-framed open-type wharf structure that provides overall dimensions of 500 feet in length by 93 feet in width. The wharf includes a heavy stone slope revetment, high-modulus steel sheet pile cutoff wall, and drilled shaft supported open wharf and relieving platform. **This maritime infrastructure includes all dredging, foundations, marine structural components, and ancillary items that accommodate vessels at berth, and support equipment and products that are transferred to and from vessels and the site.**

The total area of the wharf is approximately 45,500 square feet (SF). The area of the wharf provided over water (outboard of the sheet pile cutoff wall) is approximately 27,500 SF. The entire ballasted wharf deck is located above the mean higher high water (MHHW) elevation (MHHW is approximate elevation +4.56 NAVD29; elevation +3.78 NGVD88); hence, the structures below MHHW are limited to the 136 - 48" diameter drilled shaft foundations with permanent steel casing, and rip-rap. The design also takes into consideration sea level rise. The 136 in-water drilled shaft foundations have an equivalent area of coverage of approximately 1,710 SF. Coordinates:

- Latitude: 42°36'19.02"N
- Longitude: -73°45'46.99"W

Dredging is required to match current depth of Hudson River navigation channel providing adequate separation and safe draft to vessels at the proposed wharf, which will travel along the existing federal navigational channel (Hudson River) and Atlantic Ocean. However, specific navigational routes and other destination points are unknown. The proposed dredging area is approximately 118,483 SF (approximately 2.72 acres). The volume of material to be removed from this area in the Hudson River is limited to approximately 78,768 cubic yards of sediments to reach a minimum depth of -33 feet at mean lower low water (MLLW). Proposed depth is approximately -33 feet below the MLLW line, plus approximately two (2) feet of allowable overdredge.

For the dredging activities ("construction phase"), one (1) dredging barge is anticipated. However, the number of scows and tugboats to support the temporary and short-term dredging activities is unknown at this moment. The homeport of the dredging and construction vessels is currently unknown. Dredging

is expected to be completed in approximately 90 days, if not interrupted by weather.

Dredged material will be disposed (upland) at authorized facilities. The Project Action does not consider disposal / discharges of dredged or fill material into the Hudson River or Navigable Waters of the U.S. The dredged material would be loaded into dredge scows or barges, towed by tugboats, and offloaded into the designated and authorized disposal site. The upland disposal site is unknown at this moment. The Dredging Contractor will be responsible to develop a Dredge Material Management Plan (including dewatering plan) in accordance to USACE and NYSDEC permit conditions and applicable regulations.

The wharf will provide space for docking/mooring one vessel at any given time. Any additional vessels associated with the wharf operations (e.g., tugboats) would be docked and moored at the existing Port of Albany facility that is located upriver of the site. The vessels will be docked and moored at the wharf for a duration required for loading wind tower components; once load-out is complete the vessels will depart for downriver transport. The current concept of operation indicates that up to three (3) barges could be loaded per week, which means each barge would be at berth for approximately two (2) days each.

As part of the operation and maintenance of the wharf, recurrent maintenance dredging is expected to be required throughout the service life of the proposed facility to maintain the proposed depth of -33.0, plus two (2) feet allowable overdredge. The frequency of and volumes of material removed during maintenance dredging are expected to be variable, based on both natural processes (i.e., river sediment load, flow velocities, flow patterns) and use of the facility. Currently, it is anticipated that maintenance dredging could be expected at approximate 5-year intervals within the 10-year period from the approval date of the Department of the Army Permit.

4.4 Maintenance Dredging

Maintenance dredging is expected to be required periodically throughout the service life of the proposed facility. The frequency of and volumes of material removed during maintenance dredging are expected to be variable, based on both natural processes (i.e., river sediment load, flow velocities, flow patterns) and use of the facility. Currently, it is anticipated that maintenance dredging could be expected at approximate 5-year intervals, which is the same approximate interval at which the Port of Albany turning basin (located upstream of the project site) undergoes maintenance dredging. Around 30,000 cubic yards of material is estimated for future maintenance dredging.

The existing habitat in the Action Area (primarily coarse rock and silt/muck¬ out into deep water, with more sand and gravel in deeper areas and sparse SAV) is expected to provide limited benthic foraging resources and thus, does not constitute preferred foraging habitat for sturgeon or other protected species. However, transient individuals may at times opportunistically forage where limited benthic resources are available. Protection measures and Best Management Practices (BMPs) will also be implemented during maintenance dredging events.

As previously stated, disturbed habitat in the Action Area is expected to recover within one year after completion of project activities. Thus, transient individuals will once again be able to opportunistically forage after habitat has recovered.

Given that there will be only approximately one (1) dredging event approximately every five (5) years, this will allow benthic habitat to recover enough to provide forage in between dredge events. Additionally, habitat surrounding the Action Area provides foraging for listed species, and thus individuals are not

limited to only opportunistically foraging within the Action Area. As such, aggregate effects of repeated habitat disturbance on listed species will not accumulate over the 10 year duration of the permit and effects are expected to be too small to be meaningfully detected and are therefore insignificant.

4.5 Proposed Bridge over Normans Kill

The Project includes a bridge over Normans Kill necessary to connect site operations between the 81.6-acre parcel and the 14.7-acre parcel north of this waterway (700 Smith Boulevard) and to provide trucking transportation in and out of the proposed manufacturing facility on existing Port property. The design of the proposed structure consists of a three (3) span bridge that allows for fully spanning the Normans Kill Floodway and avoids fill below the MHHW line. The configuration of the proposed bridge is in included in **Appendix B** (Permit Sketches), including both a plan and profile view.

Coordinates:

- Latitude: 42°36'26.99"N
- Longitude: -73°45'58.37"W

The Normans Kill channel is not proposed to be altered, modified, filled or excavated. Also, the Project does not involve construction in the floodway. The proposed layout has two (2) piers comprised of reinforced concrete drilled shafts to avoid and minimize environmental impacts. The piers would be constructed outside of the MHHW line and the floodway, avoiding impacts to the Normans Kill. Each pier would consist of a single row of reinforced concrete drilled shafts. A drilled shaft consists of a circular steel casing that is installed into the ground, excavated, and filled with reinforced concrete. The steel casing acts as a "cofferdam" that contains the excavation activities and greatly limits ground disturbance and impacts as compared to other foundation types. The proposed drilled shaft pier foundations for this project do not have a conventional footing and the only structure area that impacts the ground is the diameter of each drilled shaft.

In terms of bridge construction impacts, no in-water work is proposed. A temporary construction access would be required to construct the foundations, erect the steel girders, and place the concrete bridge deck. The temporary construction access is anticipated to include earthen causeway and/or pile supported work trestles. Pile supported work trestles may be considered due to the poor soil strengths and high-water table. By rearranging the bridge span configuration and relocating the piers, the temporary construction access would occur outside or above the MHHW line and is not anticipated to result in environmental impacts.

See **Appendix B** for Permit Sketches. The construction access concept shown provides area to mobilize drilled shaft installation equipment, deliver and erect structural steel girders, and deliver and place the concrete bridge deck. Additional temporary impacts between the pier and abutment on the north approach may be considered to provide flexibility for contractor means and methods. The temporary impact areas associated with construction are above MHHW line, outside the floodway, and would be returned to pre-construction upon completion of the Project. As all the work involving the construction of the bridge will be out of the MHHW line and in the dry, the effects of the bridge construction is not required to be considered further.

4.6 Avoidance and Minimization Measures

Avoidance and minimization efforts implemented as part of the overall project design include:

- Wharf was relocated and size reduced to avoid dredging in submerged aquatic vegetation (SAV) bed with moderate to high density of water celery (*Vallisneria americana*).
    - *Water celery* (sparse, low density) detected within the proposed dredging area would be transplanted and added to the other SAV beds outside the project limits and to remain.
- General layout of the proposed wharf places the riverside face of structure coincident with the face of the existing timber revetment.
- Proposed bridge over Normans Kill was redesigned and to be constructed outside MHHW (no "in water work" construction).
- Reconfiguration of proposed surface parking to avoid wetland impacts and construction of a fill type retaining wall to minimize the need of fill in wetland area.
- Proposed site grading or fill above and avoiding current MHHW line.

In addition, the following is proposed as BMPs and mitigation measures to further avoid and minimize potential impacts or adverse effects for species under NMFS jurisdiction (i.e., Atlantic sturgeon and Shortnose sturgeon).

- All in-water work areas for both dredging and wharf construction will be completed within the confines of a weighted turbidity curtain, which will isolate work areas from other areas of the river. The turbidity curtain is also anticipated to serve as a barrier that excludes potential entry of fish and other marine species into the work area during the time it is deployed.
    - Turbidity curtains are proposed to avoid and minimize potential impacts to Atlantic sturgeon and Shortnose sturgeon. Additionally, floating turbidity curtains, staked turbidity barriers and/or silt-fence would be installed to protect SAV beds to remain.
    - Large portion of the channel will remain open for aquatic organism passage.
- The Project intends to avoid dredging during spawning periods of the Atlantic sturgeon and Shortnose sturgeon. Timing restrictions (March 15th to September 30th) for dredging would be implemented as per guidelines from the NOAA National Marine Fisheries Services
- Use of a clamshell (closed) bucket to minimize resuspended sediments and dredged material will be placed in barges in a manner that minimizes high turbidity levels.
    - Dredged material will be placed deliberately in the barge to prevent spillage of material overboard.
    - The closed clamshell environmental bucket would be lifted slowly through the water, at a rate of approximately two (2) feet per second.
    - No dragging of the dredge bucket along the sediment surface, nor use of drag beam for profiling the dredge surface.
- For the wharf construction, the permanent steel casing for the drilled shaft foundations and the sheet pile wall components would be vibrated in, rather than utilizing an impact hammer. An impact hammer would be used only to seat the steel casing within the first few inches in the top

of rock. The overall construction is somewhat similar to the previous dock reinforcement project recently undertaken by the APDC for improvements to the docks at Sheds No. 4 and 5, and more recently the Cargill/Ardent Mills Grain Wharf Reconstruction. Other BMPs considered include:

  - Use of pre-drilling prior to vibratory hammering
  - Implement soft start (i.e., pile tapping) prior to full energy impact hammering
  - If necessary, cushion blocks, air bubbles curtain or other noise attenuating tools would be implemented when impact hammering to avoid reaching noise levels that could cause injury or behavioral disturbance to these species.

- Dredged sediments would be placed in a scow, dewatered, and transported offsite for upland disposal
- Use of nets, tarps, and/or pans during construction of the bridge deck over the Normans Kill and removal of any debris that falls into the water.
- A SWPPP has been prepared and presented in the Joint Permit Application outlining the Erosion and sediment control measures to be implemented and address potential water quality impacts.

4.7 Shoreside Alterations

All shoreside work will be located above the MHHWL and would not require in-water work. All appropriate sedimentation and erosion control measures would be installed during construction to avoid and minimize water quality impacts to the river.

5.0 Effects Analysis

The general layout of the proposed wharf places the riverside face of structure coincident with the face of the existing timber revetment, so much of the land disturbance would be landward (**Figure 3**). However, dredging and some elements of the proposed wharf are within the Hudson River and known range of ESA-listed species and in designated critical habitat. Section 4 of this BA lists avoidance and minimization measures that will be employed to minimize the potential for adverse effects to listed species. The sections that follow provide details on potential effects.

Figure 3 – Photo Layout Visualization

It is recognized that climate change is expected to cause a warming of approximately 0.5° Fahrenheit over the next few decades, more intense extreme weather such as droughts and storm events, and a rise in sea level (Walsh et al. 2014). There is potential for these factors to eventually affect spawning and migration times, habitat suitability, and forage resources of Shortnose sturgeon and Atlantic sturgeon. The Project will take place over a period of 18 months and any effects of climate change will not be fully realized until after the construction is complete. The effects of climate change will not be considered further in this BA.

5.1 Direct and Indirect Effects

5.1.1 Hydroacoustic Noise

The greatest potential for underwater noise impacts to Shortnose or Atlantic sturgeon from the Project would be associated with vibratory and impact pile driving during construction of the new wharf. The permanent steel casing for the drilled shaft foundations and the sheet pile wall components would be vibrated in, rather than utilizing an impact hammer. An impact hammer would be used only to seat the steel casing within the first few inches in the top of rock. "Soft start" and cushion blocks will be implemented when impact hammering is required, as applicable. Additionally, the drilled shafts would not occur in the open water which further attenuate noise vibration.

Predrilling activities could result in elevated noise levels, but not at a level that could impact sturgeon behavior. Information from case studies indicates that drills generate noise and vibration when in

operation as a result of friction between the drill bit face and the material it is boring through (Transit Link Consultants 2008), which in turn produces sound waves that travel through the substrate. Unmitigated sound levels from underwater geotechnical drills, for example, have been estimated at 118 to 145 dB re 1µPa at 1-meter, with noise decreasing to 101.5 dB at 150 meters, 97 dB at 250 meters, and 94.1 dB at 350 meters. Analysis by NOAA in Washington State concluded that rotating steel casements for drilled shafts are not prone to elevate underwater sound to a level that is likely to cause injury or noise that would induce adverse changes to fish behavior.

Based on this analysis, it is expected no behavioral or physical effects from pre-drilling for the Project on Atlantic or Shortnose sturgeon in the Action Area when added to the baseline conditions, and effects of underwater noise from pre-drilling are not assessed further. As recommended by NMFS, a vibratory hammer would be used to the extent feasible, and the minimal impact hammering that could be required for the temporary pier piles would be conducted using a cushion block to minimize underwater noise impacts. Pile tapping just prior to cushioned impact hammering would deter fish from the immediate vicinity of pile driving.

The projected noise at the source and distance to relevant thresholds for species in the Action Area was determined based on the NMFS Greater Atlantic Regional Fisheries Office (GARFO) Acoustic Tool spreadsheet (version updated 9/23/2019). The estimated sound levels and distances to species injury and behavioral thresholds associated with the Project are presented in the following tables.

TABLE 5

Proxy Projects for Estimating Underwater Noise

Project Location	Water Depth (m)	Pile Size (inches)	Pile Type	Hammer Type	Attenuation rate (dB/10m)
Not Available	15	24"	AZ Steel Sheet	Impact	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5
Not Available	15	24"	AZ Steel Sheet	Vibratory	5

TABLE 6

Proxy-Based Estimates for Underwater Noise

Type of Pile	Hammer Type	Estimated Peak Noise Level (dB_{Peak})	Estimated Pressure Level (dB_{RMS})	Estimated Single Strike Sound Exposure Level (dB_{sSEL})
24" AZ Steel Sheet	Impact	205	190	180
24" AZ Steel Sheet	Vibratory	175	160	160
24" AZ Steel Sheet	Vibratory	182	165	165

TABLE 7

Estimated Distances to Sturgeon Injury and Behavioral Thresholds

Type of Pile	Hammer Type	Distance (m) to 206dB_{Peak} (injury)	Distance (m) to 150 dB_{sSEL} (surrogate for 187 dBcSEL injury)	Distance (m) to Behavioral Disturbance Threshold (150 dB_{RMS})
24" AZ Steel Sheet	Impact	8.0	70.0	90.0
24" AZ Steel Sheet	Vibratory	NA	30.0	30.0
24" AZ Steel Sheet	Vibratory	NA	40.0	40.0

Exposure to underwater noise levels of 206 dB Peak and 187 dB cSEL can result in injury to sturgeon. In addition to the "peak" exposure criteria which relates to the energy received from a single pile strike, the potential for injury exists for multiple exposures to noise over a period of time; this is accounted for by the cSEL threshold. The cSEL is not an instantaneous maximum noise level but is a measure of the accumulated energy over a specific period of time (e.g., the period of time it takes to install a pile). As calculating the distance to the 187 dB cSEL isopleth is not possible, the 150 dB sSEL isopleth was calculated. The further a fish is away from the pile being driven, the more strikes it must be exposed to in order to accumulate enough energy to result in injury. At some distance from the pile, a fish is far enough away that, regardless of the number of strikes it is exposed to, the energy accumulated is low enough that there is no potential for injury.

As described in detail above, for this Project, the distance to the 187 dB cSEL (or 150 dB sSEL) isopleth associated with vibratory or cushioned impact hammering is no greater than 230 feet (70 meters) for sturgeon. In order to be exposed to potentially injurious levels of noise during installation of the piles, a sturgeon would need to be within 230 feet (70 meters) of the pile being driven to be exposed to this noise for any prolonged time period. This would be extremely unlikely to occur as it is expected that sturgeon would modify their behavior at 297 feet (90 meters) from the installed piles and quickly move away from the area before cumulative injury levels are reached, as described above. Given the small distance a sturgeon would need to move to avoid the disturbance levels of noise, any effects will be too small to be

meaningfully measured or detected. Therefore, the effects of noise on sturgeon would be insignificant and not likely to adversely affect.

Behavioral effects, such as avoidance or disruption of foraging activities, may occur in sturgeon exposed to noise above 150 dB RMS. Considering all of the pile-driving activities, it is expected that underwater noise levels would be below 150 dB RMS at distances beyond a maximum of approximately 297 feet (90 meters) from the pile being installed for sturgeon. It is reasonable to assume that a sturgeon, upon detecting underwater noise levels at or above the 150 dB RMS isopleth, would modify its behavior such that it redirects its course of movement away from the ensonified area surrounding the area of the Project. If any movements away from the ensonified area do occur, it is extremely unlikely that these movements would affect essential sturgeon behaviors, as the Hudson River is sufficiently large and wide enough (over 700 feet wide) to allow sturgeon to avoid the ensonified area while continuing to forage and migrate. Therefore, the effect of underwater noise on ESA species would be too small to be meaningfully measured or detected and would be insignificant.

5.1.2 Water Quality

5.1.2.1 Turbidity

The area of the Project is characterized by high turbidity levels and low visibility. The dredging activities and in-water work construction for the new wharf will disturb bottom sediments and may cause a temporary increase in suspended sediment above background levels.

Dredging would be conducted by mechanical means from a barge, using an environmentally friendly clamshell ("closed") bucket to restrict the inflow of water into the bucket during bucket ascension, thereby reducing the loss of material from the bucket due to washout. Total Suspended Sediments (TSS) concentrations associated with mechanical clamshell bucket dredging operations have been shown to range from 105 mg/L in the middle of the water column to 445 mg/L near the bottom (210 mg/L, depth-averaged) (ACOE 2001). Furthermore, a study by Burton (1993) measured TSS concentrations at distances of 500, 1,000, 2,000, and 3,300 feet (152, 305, 610, and 1006 meters) from dredge sites in the Delaware River and were able to detect concentrations between 15 mg/L and 191 mg/L up to 2,000 feet (610 meters) from the dredge site. In support of the New York/New Jersey Harbor Deepening Project, the USACE conducted extensive monitoring of mechanical dredge plumes (ACOE 2015). The dredge sites included Arthur Kill, Kill Van Kull, Newark Bay, and Upper New York Bay. Although briefly addressed in the report, the effect of currents and tides on the dispersal of suspended sediment were not thoroughly examined or documented. Independent of bucket type or size, plumes dissipated to background levels within 600 feet (183 meters) of the source in the upper water column and 2,400 feet (732 meters) in the lower water column. Based on these studies, elevated suspended sediment concentrations at several hundreds of mg/L above background may be present in the immediate vicinity of the bucket, but would settle rapidly within a 2,400- foot (732 meter) radius of the dredge location. The TSS levels expected for mechanical dredging (up to 445.0 mg/L) are below those shown to have adverse effect on fish (typically up to 1,000.0 mg/L; see summary of scientific literature in Burton 1993; Wilber and Clarke 2001).

Using available information collected from the Tappan Zee Bridge Replacement Project (FHWA 2012) over the Hudson River, pile driving activities produce TSS concentrations of approximately 5 to 10 mg/L above background levels within approximately 300 feet (91 meters) of the pile being driven. The small resulting sediment plume is expected to settle out of the water column within a few hours. Studies of the effects of turbid water on fish suggest that concentrations of suspended solids can reach thousands of milligrams per liter before an acute toxic reaction is expected (Burton 1993). The TSS levels expected for pile driving

(5 to 10 mg/L above ambient or background conditions) are below those shown to have adverse effect on fish (typically up to 1,000 mg/L; see summary of scientific literature in Burton 1993; Wilber and Clarke 2001) and benthic communities (390 mg/L (EPA 1986)).

TSS is most likely to affect sturgeon if a plume causes a barrier to normal behaviors. However, the increase in TSS levels expected for pile driving (5 to 10 mg/L above ambient or background conditions) is so minor that any effect of sediment plumes caused by the Proposed Action on sturgeon movements or behavior will be undetectable; we expect sturgeon to either swim through the plume or make small evasive movements to avoid it. Turbidity and TSS will be controlled and minimized with the implementation of a SWPPP, including installation of floating turbidity barriers around in-water work activities. The turbidity curtain will also prevent sturgeon from entering the area and thus, will prevent them from being exposed to the plumes. Based on the best available information, the effects of re-suspended sediment on sturgeon resulting from pile installation when added to baseline conditions will be too small to be meaningfully measured or detected and are, therefore, insignificant.

5.1.2.2 Contaminants

Findings from the sediment sampling and analysis (**Appendix C**) indicated varying levels PCBs and other elements. Based on the information collected during the subsurface investigation in cores C-1 through C-15, it appears the detected concentrations of pesticides and PCB in several of the cores would warrant dredging management option Class B and C pursuant to the NYSDEC Division of Water Technical & Operational Guidance Document Series (TOGS) 5.1.9. Class B management option suggests the use of a closed bucket or other method to meet environmental objectives during dredging activity, whereas Class C notes that a closed bucket or other method minimizing loss of resuspended sediment is ordinarily required.

(BMPs for Contaminated Material Resuspension Control will include but are not limited to the following:

- The Contractor shall place dredged material deliberately in the barge to prevent spillage of material overboard.
- The closed clamshell environmental bucket shall be lifted slowly through the water, at a rate of 2 feet per second or less.
- The discharge (i.e., overflow) of water from the barge/scow into which dredged material is placed is prohibited.
- The Contractor shall not cause or allow any unreasonable interference with the free flow of regulated water by placing or dumping any materials, equipment, or structures within or adjacent to the channel while the regulated activity(ies) is being undertaken. Upon completion of the regulated activity(ies), the Contractor shall remove and dispose of in a lawful manner, all excess materials, debris and equipment from all regulated areas.
- The Contractor shall control the “bite” of the bucket to: (a) minimize the total number of passes needed to dredge the required sediment volume; and (b) minimize the loss of sediment due to extrusion through the bucket’s vents openings or hinge area.
- The dredge shall control the rate of descent of the bucket to maximize the vertical cut of the clamshell bucket while not penetrating the sediment beyond the vertical dimension of the open bucket (i.e., overfilling the bucket). This will reduce the amount of free water in the dredged material, will avoid overfilling the bucket, and minimize the number of dredge bucket cycles

needed to complete the dredging contract. The dredging contractor shall use appropriate software and sensors on the dredging equipment to ensure consistent compliance with this condition during the entire dredging season.

- The independent dredging inspector shall monitor the operation of the software and sensors during the inspections as specified in the below conditions. Any malfunction of the software and sensors on the dredge at any time shall be immediately reported to the independent dredging inspector and the permittee by the dredging contractor and shall be immediately repaired to working order.
- The Contractor shall not drag the dredge bucket along the sediment surface.

The dredged material would be loaded into dredge scows or barges, towed by tugboats, and offloaded into the designated and authorized site utilizing a hydraulic or mechanical unloader, or other similar equipment. Class B and Class C sediments indicate the possible need to segregate from Class A materials; consideration would be given to amending impacted sediment with Portland cement or other approved material prior to placement in an approved Confined Disposal Facility (CDF). Dewatering water would be managed as per NYSDEC regulatory thresholds and permit conditions.

Various options are being considered for the upland disposal of the dredged material at authorized facilities and in relatively close proximity to the Project site. Potential CDFs preliminarily identified for sediments with contamination rates less than 50 mg/kg include:

- Casella – Ontario County Landfill, 1879 NY-5, Stanley, NY 14561
- Seneca Meadows Landfill, 1786 Salcman Rd, Waterloo, NY 13165

Other potential landfill sites include but are not limited to:

- Fairless Landfill, 1000 Bordentown Road, Morrisville, PA 19067
- Clean Earth, Carteret, NJ, 0700/8

Alternate disposal site, if accepted by the USACE, is the upland placement in the federally owned Houghtaling Island Dredge Material Placement Site (DMPS) located downstream, at approximately 12 miles from the Project.

5.1.3 Capture/Entrapment During Dredging

Entrapment of sturgeon during the temporary performance of dredging operations is considered extremely unlikely. For involuntary or incidental entrapment to occur, an individual sturgeon would have to be present (without moving) directly below the dredge bucket at the time of operation. Based on past interactions between mechanical dredges and sturgeon, the greatest risk of capture is when dredging occurs in areas where sturgeon species are densely aggregated such as when they experience sedentary behavior in overwintering areas. However, as given the NMFS and NYSDEC recommended in-water work window (September 1 – January 31, or ice-in, whichever comes first) to be followed, the area to be dredged is not likely to be an overwintering area and only migrating and opportunistically foraging adult, subadult, young-of-the-year, or juvenile sturgeon would potentially be present. Any such individuals would likely use adjacent open water areas in the waterway that provide for sufficient safe passage to avoid the work area during construction as a behavioral response to acoustical impacts. Also, a turbidity barrier surrounding the dredge site will prevent sturgeon from entering the area and will prevent them

from being exposed to the dredge. Therefore, the effects of dredge entrapment are extremely unlikely and are discountable.

5.1.4 Vessels

Sturgeon may be injured or killed as a result of being struck by boat hulls or propellers. The factors relevant to determining the risk to these species from vessel strikes vary but may be related to the size and speed of the vessels, navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating, and the behavior of individuals in the area (e.g., foraging, migrating, overwintering, etc.). The baseline risk of a large commercial vessel strike within Hudson River is unknown, however expected to be low as these operate at very low speed and maintain course near the center of the navigation channel. Additionally, review of vessel strike data on the Hudson River, obtained from NYSDEC, very few vessel strikes occurred north of Poughkeepsie and of those strikes, the majority were located near recreational boating areas.

Since the Project has a new wharf there will be vessel traffic traveling to and from the new wharf, however, the number of projected vessels is not expected to exceed the maximum number of vessels (290) previously recorded by APDC in a single year (2014) on the Hudson River, and apart of other vessel traffic traveling to and from other wharfs or ports along the Hudson. In addition, the turning basin for the Hudson is located just north of the new wharf and therefore all vessel traffic must travel past the new wharf to turn around and return to the ocean.

Based on the current projections it is anticipated that the total vessel traffic from the project will be approximately 142 vessels annually plus the 2021 traffic of 62 vessels, equals 204 total vessels to the Port of Albany accounting for the 2021 traffic. As a result, while Project will add a new marine terminal it is not expected so significantly increase maritime traffic when compared to previous years.

The Project will not draw any larger sized vessels than currently utilize the Hudson River or call to the Port of Albany. Maritime vessel size remains limited by the air draft at the Castleton Bridge and therefore transport of cargo produced at the project will utilize vessels at or below the size of vessels currently in use. It is anticipated that the new wharf will see primarily barge traffic, at or below 400 feet in length and at a much lower draft than vessels. Barges are motorized via tug boats. The diameter of tug propellers varies based on size, horsepower, and general arrangement of the tug propulsion system; however, typically tug propeller diameters range between 4 and 6 feet. Virtually all modern tugboats use ducted azimuthing drive units with either fixed or variable pitched propellers. The drive units have the ability to rotate 360 degrees to provide for tug maneuverability. All tugs will have a ducting (shield) that helps focus propulsion force, and also helps to prevent/shield the propeller edge from inadvertently contacting external items (e.g., debris, fish, shoals). Also, please note that barge draft will vary between approximately 6 feet (light) to 20 feet (loaded). Draft of tugboats will typically be in the 6 to 10 foot range.

During construction phase, one (1) dredging barge is anticipated. However, the number of scows and tugboats to support the short term dredging activities is unknown at this moment. For the operational phase, the current concept of operation indicates that a maximum of three (3) barges could be loaded per week, which means each barge would be at berth for approximately two (2) days each.

Any associated increase in risk of a vessel strike (including dredging activities) would be too small to be detected or measured and effects are therefore less than significant. The addition of project vessels will also be intermittent, temporary, and restricted to a small portion of the overall Action Area on any given day. As such, any increased risk of a vessel strike caused by the project would be too small to be meaningfully measured or detected. The expected traffic and number of vessels as result of the Project is not expected to exceed the highest number of vessels recorded by the APDC, traveling to and from the Port of Albany based upon historic data and all other wharf locations along the Hudson River. In addition, the Project is located south of the existing turning basin for the Hudson River; therefore, this area is currently subject to maritime traffic and port activities where all cargo vessels in this area currently navigates and pass the location of the new wharf to turn around and return to the ocean.

The dredging itself will provide adequate draft to vessels at the proposed wharf and maintain navigation in this section of the Hudson River. As a result, it is expected to enable vessels to travel safely in the area and cleanup of the Hudson River by removing approximately 78,768 cubic yards of sediments containing concentrations of pesticides and PCBs. Allowing safe passage in the navigation channel is not expected to change the number of vessels that use the Action Area; thus, preserving the status quo with regard to vessel routes and vessel numbers will not change the risk of a vessel strike. Any slight increase in risk from altered patterns of use would be too small to be detected or measured, and effects are, therefore, less than significant.

5.1.5 Habitat Alteration

The proposed in-water work activities (e.g., wharf and dredging) would occur along the western bank of the Hudson River in an area of approximately 740 feet in length by 167 feet in width. The general layout of the proposed wharf places the riverside face of structure coincident with the face of the existing timber revetment, so much of the land disturbance would be landward. The proposed wharf consists of a deep foundation-supported concrete-framed open-type wharf structure that provides overall dimensions of approximately 500 feet in length by 93 feet in width. The total area of the wharf is approximately 45,500 SF. The general layout of the proposed wharf places the riverside face of structure coincident with the face of the existing timber revetment, so much if the land disturbance would be landward. The area of the wharf provided over water (outboard of the sheet pile cutoff wall), where shade will occur, is approximately 27,500 SF. Shade would vary and subject to time of the day and season of the year. The existing width of the Hudson River at this location is over 700 feet. Dredging of approximately 78,768 cubic yards of sediments in 2.72 acres is required for the construction and operations of the new wharf.

The area of the Project would be temporarily unavailable for foraging in the substrate during construction of the new wharf and dredging activities. The footprint of the Project is not expected to result in a substantial reduction in foraging opportunities for sturgeon. According to the results from Sediment Sampling Analysis, substrate subject to dredging consists of silty clay, sand and some trace of gravel. Foraging habitat would continue to be available within the Action Area, and foraging habitat would be reinstated when the wharf and dredging is complete. Aquatic organisms are expected to quickly recolonize such areas, as similar habitat is present in the surrounding area that would be unaffected or minimally affected by the project activities and would serve as the source of colonizing invertebrates.

According to the *Acoustic Telemetry and Benthic Habitat Mapping Informs the Spatial Ecology of Shortnose Sturgeon in the Hudson River, NY, USA* (NYSDEC, 2018)[3], spawning activity or congregation of

[3]https://www.researchgate.net/publication/327344844_Acoustic_telemetry_and_benthic_habitat_mapping_informs_the_spat

sturgeon species were not detected in the Project Area. The following figure shows the spatial ecology and seasonal distribution and movement of the Shortnose sturgeon.

Figure 4: Spatial Ecology of the Sturgeon

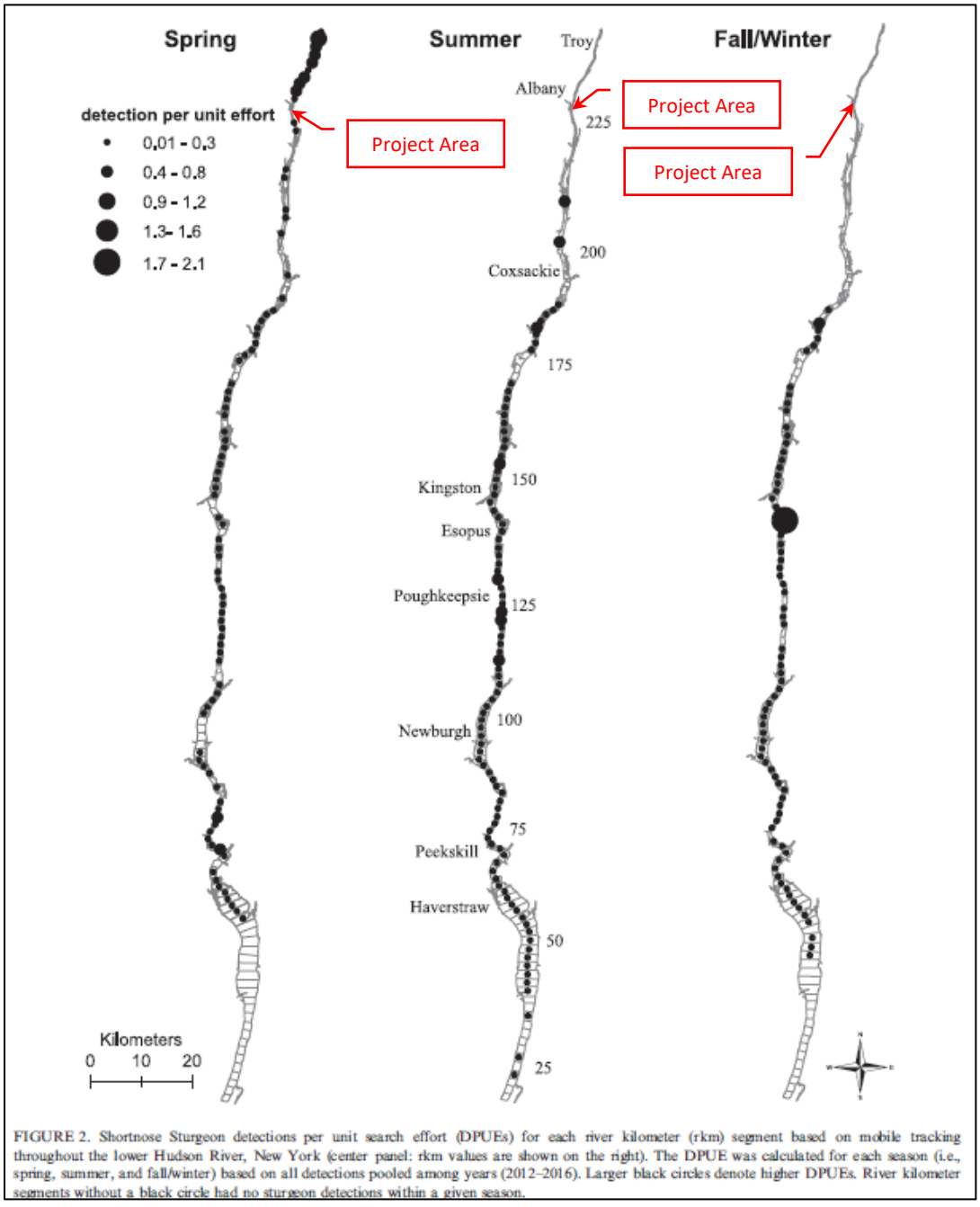


FIGURE 2. Shortnose Sturgeon detections per unit search effort (DPUEs) for each river kilometer (rkm) segment based on mobile tracking throughout the lower Hudson River, New York (center panel: rkm values are shown on the right). The DPUE was calculated for each season (i.e., spring, summer, and fall/winter) based on all detections pooled among years (2012–2016). Larger black circles denote higher DPUEs. River kilometer segments without a black circle had no sturgeon detections within a given season.

The area affected by the Project is small in comparison to the surrounding habitat that would continue to be available to sturgeon, including spawning Shortnose sturgeon and Atlantic sturgeon within the Action Area. Additionally, similar substrates are present upstream and downstream of the Action Area, likely with more suitable conditions and more favorable habitat for Shortnose and Atlantic sturgeon. The

ial_ecology_of_Shortnose_Sturgeon_in_the_Hudson_River_NY_USA

Project would not create a physical barrier in the navigational channel of the Hudson River that could impeded movement of Atlantic sturgeon and Shortnose sturgeon during their life stages. Additionally, the Project is not expected to change water flow, dissolved oxygen levels, salinity, or water temperature. Therefore, the effect of habitat modification on sturgeon would be too small to be meaningfully measured or detected and would be insignificant.

5.1.6 Effects on Atlantic Sturgeon Critical Habitat

The proposed in water work activities (e.g., wharf and dredging) would occur along the western bank of the Hudson River. The total area of the wharf is approximately 45,500 SF. The area of the wharf provided over water (outboard of the sheet pile cutoff wall) is approximately 27,500 SF. Dredging of approximately 78,768 cubic yards of sediments in 2.72 acres is required for the construction and operations of the new wharf. The existing width of the Hudson River at this location is over 700 feet. The habitat to be affected is small compared to the available habitat within the Action Area. As discussed in **Section 2**(Physical and Biological Features), the area of the Project contains limited physical and biological features identified under PBFs 1, 3, and 4, when compared to available habitat along the Action Area. Therefore, the effect to critical habitat is expected to be too small to be meaningfully measured or detected and are insignificant.

- **PBF 1:** The Project Area contains physical and biological features identified under PBF 1. The Hudson River in the vicinity of the Project area consists of silty clay, sand and some trace of gravel. The substrate assumptions for this evaluation are currently based on the Sediment Sampling, SAV Surveys and Fresh Water Survey performed for the Project. Other section of the Hudson River within the Action Area is characterized by sand and gravelly sand substrates in its deeper waters. The Project would not result in changes to water flow, dissolved oxygen levels, salinity, or water temperature, but would result in modification of the river bottom. Based on the available data, the Project would have limited impacts on spawning habitat for Shortnose and Atlantic sturgeon associated with modification of the river bottom. This bottom habitat would be unavailable for spawning during the construction and dredging period. However, the Project area would be small in comparison to the similar habitat that would continue to be available within the Action Area. The Project area would be isolated with turbidity curtain to minimize the impacts of resuspended sediment on surrounding habitat. Given that further upstream in the Action Area there is more favorable spawning habitat (e.g., sandy gravel) according to the Sediment Type - Hudson River Estuary - 2004[4] (Bell, et al. 2006, and NYSDEC – Hudson River Action Plan), and that there would only be limited alteration of the bottom habitat, the effects of this activity on the value of PBF 1 for conservation are too small to be meaningfully measured or detected and would be insignificant.
- **PBF 3:** No portion of the Action Area is dammed, and the movement of Shortnose and Atlantic sturgeon is unimpeded to and from spawning sites; therefore, PBF 3 is present within the Action Area. The Proposed Action would not create a physical barrier to the aquatic life movements in the Hudson River. The Project would result in temporary resuspension of sediments that are not expected to adversely affect the Shortnose and Atlantic sturgeon. As previously discussed, (**Section 5.1**), the TSS concentrations expected for pile driving or dredging does not exceed thresholds for adverse effects on fish, and the small resulting sediment plume is expected to settle out of the water column within a few hours. The deployment of turbidity curtains around the

[4] https://cugir.library.cornell.edu/catalog/cugir-007884

Project area would temporarily exclude subject species from the areas within the curtains. Turbidity curtains would never extend the full width of the river or Normans Kill. Further, the use of turbidity curtains would prevent resuspended sediments from entering the water column outside the immediate area of sediment disturbing activity, thereby minimizing the potential impacts of increased turbidity on Shortnose and Atlantic sturgeon. Sturgeon would be able to move upriver and downriver around the turbidity curtains at all times during project activities. The turbidity curtains would also prevent sturgeon from entering the area and thus would prevent them from being exposed to the highest levels of resuspended sediment and turbidity plumes.

Based on the evaluation of underwater noise using the NMFS-GARFO Acoustic Tool spreadsheet, pile installation could act as a temporary and limited barrier to the sturgeon. However, it is not expected behavioral or physical effects from pre-drilling for the Project on Atlantic or Shortnose sturgeon in the Action Area when added to the baseline conditions. As previously discussed (**Section 5.1**), the distance to the 187 dB cSEL (or 150 dB sSEL) isopleth associated with vibratory or cushioned impact hammering is no greater than 230 feet (70 meters) for sturgeon. In order to be exposed to potentially injurious levels of noise during installation of the piles, a sturgeon would need to be within 230 feet (70 meters) of the pile being driven to be exposed to this noise for any prolonged time period. This would be extremely unlikely to occur as it is expected that sturgeon would modify their behavior at 297 feet (90 meters) from the installed piles and quickly move away from the area before cumulative injury levels are reached, as described above. Given the small distance a sturgeon would need to move to avoid the disturbance levels of noise and considering the Hudson River is sufficiently large and wide enough (over 700 feet wide), any effects will not be able to be meaningfully measured or detected.

In terms of behavioral effects, such as avoidance or disruption of foraging activities, may occur in sturgeon exposed to noise above 150 dB RMS. Considering all of the pile-driving activities, it is expected that underwater noise levels would be below 150 dB RMS at distances beyond a maximum of approximately 297 feet (90 meters) from the pile being installed for sturgeon. It is reasonable to assume that a sturgeon, upon detecting underwater noise levels at or above the 150 dB RMS isopleth, would modify its behavior such that it redirects its course of movement away from the ensonified area surrounding the area of the Project. If any movements away from the ensonified area do occur, it is extremely unlikely that these movements would affect essential sturgeon behaviors, as the Hudson River is sufficiently large and wide enough (over 700 feet wide) to allow sturgeon to avoid the ensonified area while continuing to forage and migrate. Therefore, the effect of underwater noise on ESA species would be too small to be meaningfully measured or detected. Therefore, effects on the value of PBF 3 for conservation would be too small to be meaningfully measured or detected and would be insignificant.

- **PBF 4:** Temperature, salinity, and oxygen levels in the Action Area provide conditions that could support spawning, annual and interannual adult, subadult, and larval survival; and larval and subadult growth, development, and recruitment. However, the salinity levels in the Action Area are not optimal for juvenile growth or development. The Proposed Action will only intermittently produce temporary and short term increase (above background levels) of turbidity levels that will be highly localized to the active dredging location. All in-water work areas for both dredging and wharf construction will be completed within the confines of a weighted turbidity curtain, which will isolate work areas from other areas of the river. The turbidity curtain is also anticipated to serve as a barrier that excludes potential entry of fish and other marine species into the work area during the time it is deployed. Given the location and limited area of Project and the extension of the Hudson River, the Proposed Action is not expected to significantly affect water flow,

dissolved oxygen, salinity, temperature, or the ability for sturgeon to migrate through the area. Therefore, the effects of the Proposed Action on the conservation function of PBF 4 would be too small to be meaningfully measured or detected and are insignificant.

5.1.6.1 Summary

While the Action Area is located within the critical habitat designated for Atlantic sturgeon, all effects to the PBFs present in the Action Area are considered to be less than significant , as documented above. Multiple coordination and meetings have been held among APDC, NYSDEC, USACE and NMFS (as available) to refine project direct impacts to sturgeon species and identify a mitigation strategy to offset foreseeable impacts. Virtual meetings were held on January 5, 2022, January 19, 2022, and February 8, 2022, and for the purposed of the impact analysis seven (7) evaluation zones below the MHHW line were delineated within the Hudson River. The following table presents a breakdown of the zones within the project area and type of impacts. See **Appendix B** – Permit Sketches (sheets **S-101** and **S-103)** for evaluated zones in connection to the proposed wharf and dredging area.

Table 8: Wharf and Dredging Impact Analsysi

Zones	Existing Habitat	Existing Elevations (Feet)	Proposed Elevations (Feet)	Zone Area			TYPE IMPACTS / HABITAT CONVERSION (ACRES)			Sturgeon Impacts Permanent	Impacts / Mitigation Considerations
				Acres	Volume (CY)	Dredging Volume Percentage	Dredging (Total Area)	Shading (within Dredged Area)	Rip-Rap (Slope Protection within Dredged Area)	(Acres)	
1	Intertidal zones and shore structures (existing timber revetment)	**MHHW to 0**	Varies	0.25	13,408	17%	0.25	0.06	0.25	0.00	Area to be permanently converted; however, excluded from permanent / temporary Sturgeon impacts as is not available for foraging activities due to existing timber revetment, dry and exposed for long period of time. Area is unundadated during MHHW and MHW. Area lacking of SAV bottom, deep pools or soft substrate. Wharf is constructed landward, meaning upland area will be converted into new open water area.
2	SAV Bed # 3	-2 to -5	-33 ft	0.21	6,923	9%	0.21	0.00	0.05	0.21	Shallow habitat of concern with low density / sparse vegetated bottom. SAV to be permanently converted and impacted.
3	Natural River Bottom (Unvegetated, Silt Clay, Sand and Some Trace Of Gravel)	0 to -5	-33 ft	0.34	25,831	33%	0.34	0.00	0.12	0.31	Subaqueous zone / shallow habitat to be be permanently converted. Elevation 0 ft to -2ft excluded from permanent impacts (not always accesible to fish due to tide fluctuation). Slight area to be permanently converted (rip-rap). SAV impacts shown under Zone 2 (0.21 acre).
4	Natural River Bottom (Unvegetated, Silt Clay, Sand and Some Trace Of Gravel)	-5 to -10	-33 ft	0.24	9,148	12%	0.24	0.00	0.00	0.24	Subaqueous zones / shallow habitat to be be permanently converted. No gravel or vegetated bottom.
5	Natural River Bottom (Unvegetated, Silt Clay, Sand and Some Trace Of Gravel)	-10 to -15	-33 ft	0.24	7,554	10%	0.24	0.00	0.00	0.00	Subaqueous zones to be be permanently converted. No gravel or vegetated bottom. No gravel / vegetated bottom
6	Natural River Bottom (Unvegetated, Silt Clay, Sand and Some Trace Of Gravel)	-15 to -28	-33 ft	0.79	13,628	17%	0.79	0.00	0.00	0.00	Area to be periodically / temporarily impacted by dredging activities. No gravel / vegetated bottom
7	Natural River Bottom (Unvegetated, Silt Clay, Sand and Some Trace Of Gravel)	-28 to -33	-33 ft	0.65	2,276	3%	0.65	0.00	0.00	0.00	Area to be periodically / temporarily impacted by dredging activities. No gravel / vegetated bottom
			Total	2.72	78,768	100%	2.72	0.06	0.42	0.76	

Compensatory mitigation for habitat modification would be satisfied via a Net Conservation Benefit Project ("Restoration Project") and an implementation agreement between the APDC and NYSDEC. The Restoration Project would create one (1) acre of benthic habitat at Schodack Island State Park by converting habitat that is currently upland into habitat that can be used by sturgeon species. Therefore, the Project is not likely to adversely affect any of the PBFs associated with, and will not adversely modify or destroy, the existence of critical habitat for Atlantic sturgeon.

6.0 Effect Determinations

6.1 Effect Determination for Listed Species

The wharf construction is proposed along 500 linear feet of western bank of the Hudson River. Approximately, 78,768 cubic yards in 2.72 acres of the Hudson River would be dredged. There are various conditions that the aforementioned listed species may be subject during the Project's in-water work activities (i.e., wharf construction and dredging). These are mainly an increase in turbidity during the maintenance dredge operation, underwater noise, habitat modification, the risk of an incidental involuntary strikes and entrapment with dredging equipment to an individual of a protected species during in-water work activities. However, this is a short-term / temporary in-water work construction within a well define and limited area.

The following table summarizes the effects analysis for each species that may be present at the site.

TABLE 8: Summary of Potential Effects

Species	Potential Effects	Summary of Key Conservation Measures	Determination of Effects
• Shortnose sturgeon • Atlantic sturgeon	• Vessels movements and involuntary Vessel strikes • Involuntary pinning between dredging bucket and riverbed; entrapment or capture in mechanical dredging • Turbidity and resuspension of sediments • Underwater noise due to pile driving • Habitat modification • Effects on critical habitat	• Implement slow speed approach for project vessels • No dredging or pile driving (hammering) in the Hudson River channel outside the authorized work window by NMFS and NYSDEC • Closed clamshell environmental bucket would be lifted slowly through the water, at a rate of approximately two (2) feet per second • Turbidity control with floating turbidity barriers, SWPPP and utilization of clamshell bucket in dredging Mitigation by creating one (1) acre of benthic habitat at Schodack Island State Park by converting habitat that is currently upland into habitat that can be used by sturgeon species	• May affect, but not likely to adversely affect

Species	Potential Effects	Summary of Key Conservation Measures	Determination of Effects
		• Implementation of noise attenuation tools, as needed • Monitoring and installation of signs and educational material	

According to the information presented and the implementation of the proposed conservation measures, all effects of the Proposed Action when added to the baseline would be insignificant and/or discountable. **Therefore, it is determined that the Project may affect, but not likely to adversely affect species under NOAA Fisheries' jurisdiction**. We certify that we have used the best scientific and commercial data available to complete this analysis. We request your concurrence with this determination.

6.2 Effect Determination for Critical Habitat

Compensatory mitigation for habitat modification would be satisfied via a Net Conservation Benefit Project ("Restoration Project") and an implementation agreement between the APDC and NYSDEC. The Restoration Project would create one (1) acre of benthic habitat at Schodack Island State Park by converting habitat that is currently upland into habitat that can be used by sturgeon species. Therefore,

Based on this analysis, it has been determined that all effects, when added to baseline conditions, are insignificant or discountable, and **not likely to adversely affect critical habitat for Atlantic sturgeon**.

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