

Draft Environmental Assessment

for

North Pier Repairs of the Chicago Lock Chicago, Illinois



**US Army Corps of Engineers
Chicago District**

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Chapter 1 – Purpose & Need

1.1 – National Environmental Policy Act and Related Procedures

The National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.), the Council on Environmental Quality (CEQ) NEPA regulations (40 C.F.R. Parts 1500 to 1508), and the US Army Corps of Engineers' (USACE) NEPA implementing regulations (33 C.F.R. Part 230) require that the USACE consider the potential environmental effects of a proposed action before making a decision on a Federal action. In compliance with these regulations and USACE procedures, this Environmental Assessment (EA) assesses the direct, indirect and cumulative effects of structural integrity repairs to the North Pier of the Chicago Lock. This EA provides the USACE and other decision makers with the information needed to make an informed decision about the proposed repairs. This EA does not directly analyze previous actions and locations already covered under other NEPA documents, but does take into account their outcomes for determining cumulative effects.

1.2 – Project Location

The address for the Chicago Lock is 108 North Streeter Drive, Chicago, Illinois which is at the mouth of the Chicago River, just south of Navy Pier (Figure 1).



Figure 1: Vicinity Map of the Chicago Lock

1.3 – Purpose & Need

The Chicago Harbor Lock, built in 1938, is one of the busiest locks in the country. Originally designed for environmental reasons, the lock provides a navigable passage between the Chicago River and Lake Michigan for 40,000 vessels annually. Most of these vehicles are recreational and commercial passenger vessels. The Chicago Lock's around-the-clock operation also supports the mission of combined Federal, State, and local Marine, Homeland Security, Safety Law Enforcement and fire prevention. The purpose of this project is to keep the lock open, functional and safe at all times of the year by repairing and providing stability to the existing crib structure of the North Pier of the Chicago Lock.

Authorization for the Chicago Harbor and associated structures and facilities were completed under the River and Harbor Acts of 1870, 1880, 1912, 1919, 1962, Public Law 98-63, Section 107 of Public Law 97-88 and WRDA 1988. The Chicago Harbor Lock and its controlling works were designed and constructed by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) in 1938 to control the diversion of water from Lake Michigan and to prevent the backflow of the Chicago River into Lake Michigan. Between 1938 and 1984, the lock and its controlling works were operated and maintained by the MWRDGC. In 1984, the operation and maintenance responsibility for the lock was officially transferred to the USACE.

The existing structure consists of a concrete superstructure built over a timber crib. The timber cribs were constructed from 1868 to 1876 with the concrete tunnel superstructure added in 1906 to 1908. In approximately 1964, a riverside sheet pile wall was added to prevent loss of timber crib fill due to failed timber sheeting. The existing sheet pile wall was anchored approximately 12 feet behind the sheet pile to the existing concrete superstructure, relying on the timber crib for overall stability.

The September 2017 Periodic Inspection Report of the Chicago Lock provided an evaluation and risk rating of the North Pier features. Approximately 13 feet of the sheet pile tie rods were found to be severely corroded on the inside of the North Pier tunnel. Additionally, the current vehicle load analysis of 3000 lbs. per axel for vehicles driving on top of the tunnel is insufficient for current lock operations. The axle load is also limited due to the uncertainties associated with anchoring the existing sheet pile wall into an old rehabilitated timber crib of unknown capacity. There is also a concern that the North Pier tunnel itself has been degrading and is in poor condition.

For this Environmental Assessment, the following two (2) alternatives were considered for repairing the sheet pile anchoring system for the North Pier:

1. No Action – The “No Action” alternative would be to do nothing and let the North Pier sheet pile wall continue to corrode and degrade. The North Pier structure would eventually fail, either slowly or catastrophically. Since the North Pier is one of the structures connected to the Chicago Harbor Lock and controlling works, it is essential for protecting the water quality of Lake Michigan, which supplies the drinking water for the population of Chicago. In addition, the Chicago Harbor Lock and controlling works structures are important for maintaining navigable depths on the Chicago Area Waterway System (CAWS) and compliance with the court decision that limits the diversion of water from the Great Lakes Basin to the Mississippi River Basin.
2. Rehabilitate the North Pier by constructing a new steel sheet pile anchor wall on the Lake Michigan side of the pier. New tie rods will be connected from this new anchor wall to structurally support the existing steel sheet pile wall on the Chicago River side of the pier. Utilities within the existing, degraded tunnel structure are to be relocated and the tunnel structure is to be demolished, but the existing tie rods for the steel sheet pile wall on the Chicago River side are presently corroded and

connected to this tunnel structure. As a consequence, the load on these tie rods must be removed by deploying an alternate means of structural support; either permanently or temporarily during construction. The existing, degraded tunnel structure cannot be demolished until the existing steel sheet pile wall on the Chicago River side is no longer dependent on the existing, corroded tie rods for structural support. After the existing steel sheet pile wall on the Chicago River side is structurally supported by an alternate means, the existing tunnel structure will be demolished. The proposed rehabilitation project will increase the width of the existing North Pier by approximately 25 feet to store stop logs for the Chicago Harbor Lock and enhance vehicle access. A new concrete slab and retaining wall are to be constructed over the existing crib structure for storage of the stop logs, and grouting of the existing crib structure may be performed to fill void space and improve its structural stability. The proposed North Pier rehabilitation will also include the construction of a vehicle access area and 15 foot wide vegetative strip. All practicable steps will be taken to minimize adverse environmental impacts.



Figure 2: Original Timber Crib Cross Sections of North Pier Tunnel Built in 1868 to 1876, Superstructure built 1906 to 1908

The proposed rehabilitation of the existing steel sheet pile anchoring system and degraded tunnel structure is being performed at the present time because the repairs are essential for ensuring the structural stability of the North Pier. Further rehabilitation is not critical at this time, but it is anticipated that additional repairs will be completed as necessary and in accordance with the maintenance and repair strategy, periodic inspections, and the availability of funding. The needed repairs have not been segmented.

1.4 – Related NEPA Documentation

- USACE Chicago, 1993, Environmental Assessment and FONSI for Repairs and Improvements at Chicago Harbor Lock in Chicago, Cook County, Illinois.
- USACE Chicago, 1999, Environmental Assessment and FONSI for Major Rehabilitation of Chicago Harbor Lock at Chicago, Cook County, Illinois.

Chapter 2 – the Preferred Plan / Maintenance & Repair Plan

The preferred alternative is Alternative 2, Rehabilitation of the North Pier.

This project is intended to stabilize the existing crib structure for the North Pier within the work limits shown in Figure 3. The existing sheet pile wall on the Chicago River side of the pier is supported by tie rods that are corroding and connected to a degraded tunnel structure. See Attachment 03 for site details. This repair work would include the following:

- Relocate existing utilities within the existing tunnel structure. The utilities in the existing tunnel include water and sewer lines and power and telecommunication cables.
- Construct a new steel sheet pile anchor wall on the Lake Michigan side of the North Pier, approximately 70 feet north of the existing steel sheet pile wall on the southern, Chicago River side of the pier. Remove and replace stone as needed through the drive line. A portion of the large armor stone that is to be removed from the Lake Michigan side of the North Pier to clear the drive line may be temporarily stored on site or on a barge. The new steel sheet pile anchor wall will extend roughly 450 feet along the North Pier and will extend into the existing parking lot for approximately 150 feet.
- Install new tie rods to connect the newly constructed anchor wall on the Lake Michigan side of the pier to the existing steel sheet pile wall on the Chicago River side of the pier. The new tie rods are to be installed on six (6) foot centers between the existing, corroded tie rods that connect the existing steel sheet pile wall on the Chicago River side of the pier to the existing tunnel structure.
- The existing tunnel structure is to be demolished, but the existing tie rods that structurally support the steel sheet pile wall on the Chicago River side of the pier are corroded and connected to this tunnel structure. As a consequence, the load on these tie rods needs to be removed by deploying an alternate means of structural support; either permanently or temporarily during construction. The tunnel structure will not be demolished until the steel sheet pile wall on the Chicago River side is no longer dependent on the existing, corroded tie rods for structural support and an alternate means for structural support has been deployed.
- The recommended method for structurally supporting the existing wall on the Chicago River side of the pier during construction is to horizontally drill through the materials and permanently connect the new tie rods from the newly installed anchor wall on the Lake Michigan side of the pier to the existing wall on the Chicago River side. However, the contractor will be allowed to propose a different but equivalent method for temporarily bracing/shoring the existing steel sheet pile wall on the Chicago River side of the pier until the new tie rods are installed. The development of a different but equivalent method could potentially be advantageous because portions of the existing concrete slab, backfill, and/or tunnel structure could be removed to facilitate the drilling, installation, and connection of the new tie rods. The contractor may also propose to sequence the work differently and could install the bracing/shoring along the entire length of the pier or perform sections of the work incrementally.
- If the contractor proposes a different but equivalent method for temporarily bracing/shoring the existing steel sheet pile wall on the Chicago River side of the pier, a structural engineer will

review the work plan prior to the start of the construction activities to verify the proposed method is capable of providing adequate structural support and will prevent the failure of the existing steel sheet pile wall on the Chicago River side of the pier during construction.

- There are a variety of different but equivalent bracing/shoring methods that might be proposed by the contractor, but one method would be to use the large stone on the Lake Michigan side of the pier. Some of this large stone needs to be removed to clear the drive line for the new anchor wall, so the large stone that is removed could be transported and placed on the Chicago River side of the pier to brace/shore the steel sheet pile wall on that side of the pier. Prior to the end of construction, after the new tie rods have been permanently installed and connected, the majority of the large armor stone may be reused on the Lake Michigan side as backfill or toe stone, with the possible exception of a small amount of residual large stone material that has settled into the sediment on the Chicago River side of the pier. Alternately, the contractor may propose that some or all the large stone may remain in place on the Chicago River side of the pier to provide beneficial habitat. There will be no dredging of the Chicago River sediment. It is expected that the large stone will not retain significant sediment on the surface. Any Chicago River sediment that is accidentally removed would need to be dewatered upland (with no direct return water) and disposed of at an appropriate upland facility.
- If the contractor proposes that some or all of the materials used to temporarily brace/shore the existing wall on the Chicago River side of the pier remain in place, such as the large stone from the Lake Michigan side of the pier, the materials and placement location will be evaluated prior to the start of construction to ensure they will be acceptable and will not degrade and adversely impact the water quality or impede, constrain, or interfere with the navigational (draft) requirements for the Federal channel or the operation of the Chicago Lock. Due to the potential for adverse impacts to navigation, materials that are placed above a depth of 14 feet below Low Water Datum (LWD) will need to be removed prior to the completion of construction. The only materials that will be allowed to permanently remain in place on the Chicago River side of the pier are the materials below a depth of 14 feet below LWD.
- After the utilities from the existing tunnel structure have been relocated and the existing steel sheet pile wall on the Chicago River side of the pier is adequately supported and is no longer dependent on the existing, corroded tie rods, the existing tunnel structure is to be demolished and sections of the concrete slab are to be removed.
- Following the installation of the new tie rods, armor and toe stone previously cleared to install the new steel sheet pile anchor wall will be reused as backfill, toe, or armor stone on the Lake Michigan side of the pier. Additional coarse aggregate (CA1) stone will be used on top to bring up the grade.
- Some of the concrete from demolition of the tunnel structure and demolition of the concrete slab will be reused as backfill between the new steel sheet pile anchor wall and existing wall on the Lake Michigan side of the pier. If any steel reinforcement is observed protruding from the concrete pieces, the reinforcement is to be cut flush with the face of the concrete prior to the reuse and placement of any concrete pieces as backfill.
- Other than the concrete pieces described above, construction debris or any unsuitable soils/sediments and waste materials that are encountered will be taken off-site for disposal.
- A new concrete slab and retaining wall are to be constructed over the existing crib structure for the storage of stop logs for the Chicago Lock. If sufficient funding is available, grouting of the existing crib structure may be performed to fill void space and improve its structural stability. A portion of the pier surface will initially be covered with coarse aggregate (CA6) gravel to improve vehicle access, and the vehicle access area may be paved in the future.
- A new duct bank extension will be installed in the parking lot to route power lines. New water and sewer lines will be installed from the parking lot all the way to the end of the pier, and the water line will be heat traced. A power feed will be provided to connect a power generator (by others).

- A fifteen (15)-foot wide vegetative strip will be constructed on the Lake Michigan side of the North Pier. Plant selection and the landscaping for this area will be accomplished by others, as described in further detail below. Temporary seeding or other erosion controls will be provided until the vegetative strip is permanently stabilized.



Figure 3: Chicago Lock North Pier Work Limits and Staging/Storage

Landscaping – The final stage would be to landscape the North Pier with attractive short stature trees, shrubs, grass tufts and flowers. This work would be accomplished by the City of Chicago. Plant selection would be restricted to native species as required by Federal policies on invasive species and migratory birds (EO 13112 Invasive Species; EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds) and USACE Environmental Operating Principles (EOPs). Species selection would consist of those that are known to do well in landscaping situations while providing small migratory birds and pollinators with additional resting and foraging habitat including but not limited to: Beach Grass (*Ammophila breviligulata*), Sand Reed (*Calamovilfa longifolia*), Common Juniper (*Juniperus communis*), Prickly Pear Cactus (*Opuntia humifusa*), Old Field Golden Rod (*Solidago nemoralis*), Sand Coreopsis (*Coreopsis lanceolata*), Butterfly Weed (*Asclepias tuberosa*), Carolina Rose (*Rosa carolina*), Horse Mint (*Monarda punctata*), Rough Blazing Star (*Liatris aspera*), Little Bluestem (*Schizachyrium scoparium*), Black Oak (*Quercus velutina*), and Inland Juneberry (*Amelanchier interior*).

Chapter 3 – Affected Environment

This Chapter identifies those environmental, cultural and social resources that could potentially be affected by the proposed maintenance repairs of the Chicago Lock's North Pier.

3.1 – Physical Resources

3.1.1 – Geology

The underlying regional bedrock is Silurian-age dolomite, most likely of the Niagaran Series (Willman 1971). This rock resulted from marine deposition when all of northeastern Illinois and much of the neighboring Great Lakes region was the floor of a tropical sea from about 440 to 410 million years ago. Depth to bedrock in the study area is relatively shallow. In the recent past (~200yrs), lacustrine littoral processes deposited sands and clays over this bedrock system, and the Chicago River would discharge sands, silts, clays and detritus as well. The current surficial materials on the lake side are sands and intermingled silts. There is also a rubble mound of dolomitic limestone and granite riprap that sits on top of the lacustrine and old riverine sediments. The current surficial material on the river side is mostly silts and detritus intermingled with sands and other materials derived from an urbanized watershed.

3.1.2 – Sediment Quality

The large rock materials that will be cleared prior to driving the steel sheet pile wall consists of the armor stone and rock backfill material previously placed along the Lake Michigan side of the North Pier. The characteristics of the rock backfill material beneath the large armor stone are somewhat unknown, but, based on historical design drawings, the material is believed to be large rock or a mixture of large and small rock backfill placed on the native littoral sands and silts. Since the steel sheet piles can typically be driven through small rock, gravel, sand, and finer-grained material, it would not be necessary to remove or move such materials to clear the drive line. Nevertheless, smaller-sized rock, gravel, sand, or finer-grained sediments may have been deposited or could have accumulated on or within the pore spaces of the larger stone materials. These lake sediments may be removed, disturbed, or suspended when larger rock materials are cleared from the drive line for the sheet piles. There are no recent sediment quality data in the project vicinity, but it is anticipated that the rock backfill (stone) is underlain by native sands/silts typical of the Illinois shoreline.

Sediment in the Chicago River is assumed to be of poor chemical quality, due to historic anthropogenic impacts. River sediment will not be dredged, and every effort will be made to minimize disturbances during construction. The temporary placement of stone or other bracing materials would not require excavation or dredging of the sediment; any bracing materials will be placed on top of the sediment. The removal of bracing materials will not include the removal of the sediment below. It is assumed that any river sediment incidentally removed would be of a quality that requires confined disposal such as at a landfill.

3.1.3 – Water Quality

The Illinois Environmental Protection Agency periodically prepares a Water Quality Report of the State's water resources. The most recent report (2016) does not specifically list Chicago Harbor, but it does list Lake Michigan Nearshore waters. These waters are described as fully supporting aquatic life, public and food processing water supplies, and primary (e.g., swimming, water skiing) and secondary (e.g., boating, fishing) contact, but they are not supporting of fish consumption or aesthetic quality. The causes for the

fish consumption and aesthetic quality impairments are mercury, polychlorinated biphenyls, and total phosphorus, and these causes are attributed to atmospheric deposition – toxics and unknown sources.

The quality of the water on the Chicago River side of the North Pier is considerably lower than the water on the Lake Michigan side of the North Pier. The Illinois Environmental Protection Agency Water Quality Report (2016) did not assess the Chicago River water for secondary contact or aesthetic quality, but it does report that the water is not supporting of aquatic life, fish consumption, or primary contact. The causes listed for these impairments are dissolved oxygen, pH, total phosphorus, mercury, polychlorinated biphenyls, fecal coliform, changes in stream depth and velocity patterns, loss of instream cover, and other flow regime alterations. These causes are attributed to atmospheric deposition – toxics, channelization, combined sewer overflows, impacts from hydrostructure flow regulation/modification, municipal point source discharges, loss of riparian habitat, other recreational pollution sources, and unknown sources.

3.1.4 – Air Quality

The study area, Cook County, Illinois is within a non-attainment area for lead and ozone.

Congress established the basic structure of the Clean Air Act (CAA) in 1970, and then made major revisions in 1977 and 1990. It is a comprehensive law that regulates emissions from stationary and mobile sources of air pollution. One of the key provisions concerns the control of common, widespread air pollutants, known as “criteria” pollutants, and the CAA directs the USEPA to set and revise the national ambient air quality standards (NAAQS) for these pollutants. Presently, there are NAAQS for the following six criteria pollutants: sulfur dioxide, carbon monoxide, particulate matter (PM), nitrogen dioxide (one of a group of highly reactive gasses known as “nitrogen oxides (NO_x)”, ozone, and lead. The USEPA also has the authority to add additional pollutants.

Implementing the air quality standards is a joint responsibility of the states and USEPA. States are responsible for the development of state implementation plans (SIPs), and the USEPA assists the states by providing technical and policy guidance. The CAA has minimum requirements for SIPs to achieve the NAAQS, and the states are required to develop and manage the SIPs to improve areas with poor air quality and protect clean air from degradation. The USEPA issues national emission standards for new stationary sources and reviews the SIPs to ensure compliance. Geographical areas that do not meet the NAAQS are designated as “nonattainment areas,” and, conversely, areas that meet the NAAQS are called “attainment areas.”

There are National Ambient Air Quality Standards (NAAQS) for six principal or “criteria” pollutants; particulate matter (PM₁₀ and PM_{2.5}), ozone, sulfur oxides, nitrogen oxides, carbon monoxide, and lead. According to the USEPA Green Book, as of June 17, 2016, Chicago was listed as a non-attainment area for lead (2008 standard). Furthermore, the Green Book listed the Chicago-Naperville area in Illinois, Indiana, and Wisconsin as a non-attainment area for 8-hour ozone (2008) (classification – moderate). Ozone is a secondary pollutant formed primarily by chemical reactions from emissions of oxides of nitrogen (NO_x) and volatile organic compounds (VOCs) that occur in the presence of sunlight, and NO_x and VOCs are referred to as precursors of ozone.

Although the trends overall show improvement over the last 10 years, individual measurements and monitoring stations still have measurements that exceed the national standards. The existing air quality should be considered marginal, but gradually improving over time.

3.1.5 – Hazardous, Toxic & Radioactive Wastes (HTRW)

The location for the North Pier Repair Project is in Chicago Harbor, Lake Michigan, to the north of the existing structure and the Chicago Harbor Lock and controlling works. However, a small portion of the project will include the parking area for the Chicago Harbor Lock, which is part of a large thorium monitoring area that is associated with past contamination from the Lindsay Light Site. More information on the Lindsay Light Site is available at <https://www.epa.gov/lindsay-light>. Due to the potential for thorium, excavation of soil in the parking lot area requires a permit from the City of Chicago, which is part of an agreement with the U.S. Environmental Protection Agency. Although it has not been detected above the action level during previous excavation work in the parking area, all future excavation work within the parking lot area requires a permit and will need to be monitored for thorium since it is within the thorium monitoring area.

Issues have also been identified with asbestos and lead paint on the Chicago Harbor Lock property. A limited asbestos-containing material survey performed in November 2013 included a visual examination of five (5) buildings, seven (7) manholes, and one (1) utility tunnel, as well as the collection of 168 bulk samples from observed suspect asbestos-containing materials. Based upon this survey, it was recommended that the identified and assumed asbestos-containing materials be managed in-place under an Asbestos Operations and Maintenance Program. A separate investigation identified lead-based paint in one of the buildings, but the lead-based paint will also be managed in-place as part of operations and maintenance. Despite the issues with asbestos-containing materials and lead-based paint in adjacent portions of the Chicago Harbor Lock property, the construction of the new steel sheet pile anchor wall will mainly be to the north of the existing structures in Lake Michigan, with the exception of the tunnel on the North Pier. Prior to demolition, the tunnel will be inspected for asbestos by a licensed inspector. If asbestos-containing materials are identified, the licensed inspector will develop a removal and disposal plan to ensure no asbestos-containing materials are released and the materials are removed and disposed of properly.

3.2 – Ecological Resources

3.2.1 – Great Lakes Wetland Habitat

The Chicago Lock is located along the shoreline of Lake Michigan and the Chicago River. Before the area was settled and developed the mouth of the Chicago River at the shoreline was most likely an interaction of riverine processes intermingled with lacustrine processes that created a highly diverse Riverine/Open/Drown River Mouth system (Albert et al 2005). This natural wetland ecosystem most likely consisted of shifting sands and organic sediments, hemi-marsh and meadow, braided sloughs discharging into Lake Michigan, and with enough sand bar formation to attenuate wave attack. This natural condition no longer exists, and the current habitat is considered man-made that resembles a Lacustrine/Open/Shoreline system (Albert et al 2005). Existing habitat surrounding the Chicago Lock primarily consists of manmade rock/riprap piles that sit on sand and lean against hardened shoreline structures such as sheet pile and concrete walls.

3.2.2 – Chicago River Navigable Channel

The Chicago River has been extensively modified through dredging and armoring throughout its history and the flow was fully reversed with the completion of the Chicago Sanitary and Ship Canal in 1900. The USACE currently maintains the navigable channel to a depth of 21 feet with a minimal depth of 14 feet. The flow of lake water through the mouth of the river has been highly regulated with the construction of Chicago Harbor Lock in 1938 and as a result the flow in the river is primarily the product of wastewater treatment plant effluent, stormwater runoff, and, to a lesser degree, controlled flows and leakage through the lakefront structure. The bottom of the river is highly uniform and predominantly comprised of sand

and silt input. The banks of the river have all been highly modified and is made of vertical sheet pile walls.

3.2.3 – Native Plant Communities

Existing plant communities on the Chicago Lock structures consist of non-native ornamental landscaping trees and plants derived from commercial nurseries. There are no aquatic plants present within the work limits in Lake Michigan or in the Chicago River.

3.2.4 – Macroinvertebrates

Macroinvertebrate surveys have not been conducted in the waters surrounding the Chicago Lock; however, several studies in Southern Lake Michigan have been done. Garza and Whitman (2004) of the United States Geological Survey investigated macroinvertebrate assemblages of Southern Lake Michigan and observed macroinvertebrates from forty taxa. Approximately 81% of the observed taxa consisted of *Chaetogaster diastrophus* and Nematoda. Nalepa et al (1998) also conducted surveys throughout Southern Lake Michigan that encompasses areas adjacent to the City of Chicago. Their study identified three main groups of macroinvertebrates including Diporeia (Amphipoda), Oligochaeta (worms), and Sphaeriidae (bivalves). It is likely that water around Chicago Lock will have low to moderately abundant populations of macroinvertebrates similar to the composition described in the aforementioned studies.

3.2.5 – Fishes

Robust fish surveys have been conducted around Chicago Harbor for several decades, with less intense sampling since the late 1880s. Twenty-six (26) native species and nine (9) non-native species have been identified from the area surrounding the North Pier (Tables 1 & 2). Important, rare and sensitive species include the Silver Lamprey (*Ichthyomyzon unicuspis*), Longnose Sucker (*Catostomus catostomus*), Trout Perch (*Percopsis omiscomaycus*) and Mottled Sculpin (*Cottus baridii*). The Spoonhead Sculpin (*Cottus ricei*) is a rare record from 1909 (before Lock was built); this species typically occupies deep, offshore waters. Important native game fishes include smallmouth bass (*Micropterus dolomieu*), Largemouth Bass (*Micropterus salmoides*), Rockbass (*Ambloplites rupestris*), and Yellow Perch (*Perca flavescens*). Non-native, introduced game fish include the Pacific Salmonids (*Oncorhynchus* spp.) and European Brown Trout (*Salmo trutta*). Non-native invasive species include Common Carp (*Cyprinus carpio*), Grass Carp (*Ctenopharyngodon idella*), Goldfish (*Carassius auratus*), Alewife (*Alosa pseudoharengus*) and Round Goby (*Neogobius melanostomus*).

Table 1: Chicago River Fish Collections along North Pier 1909 - 1990

Species	Common Name	Status
<i>Ctenopharyngodon idella</i>	Grass Carp	non-native; Asiatic
<i>Notemigonus crysoleucas</i>	Golden Shiner	common
<i>Notropis volucellus</i>	Mimic Shiner	rare
<i>Pimephales notatus</i>	Bluntnose Minnow	common
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	non-native; Pacific Rim
<i>Pungitius pungitius</i>	Three Spine Stickleback	common
<i>Cottus ricei</i>	Spoonhead Sculpin	rare, deepwater fish (1909)
<i>Ambloplites rupestris</i>	Rockbass	common
<i>Micropterus salmoides</i>	Largemouth Bass	common
<i>Pomoxis nigromaculatus</i>	Black Crappie	common
<i>Lepomis cyanellus</i>	Green Sunfish	common

<i>Lepomis gibbosus</i>	Pumpkinseed	common
<i>Lepomis macrochirus</i>	Bluegill	common

Table 2: Lake Michigan Fish Collections along North Pier and Chicago Harbor Breakwaters 1900 - 2000

Species	Common Name	Status
<i>Ichthyomyzon unicuspis</i>	Silver Lamprey	possibly extirpated
<i>Alosa pseudoharengus</i>	Alewife	non-native, Atlantic Slope
<i>Dorosoma cepedianum</i>	Gizzard Shad	common
<i>Cyprinus carpio</i>	Common Carp	non-native, Asiatic
<i>Carassius auratus</i>	Goldfish	non-native, Asiatic
<i>Notemigonus crysoleucas</i>	Golden Shiner	common
<i>Notropis hudsonius</i>	Spottail Shiner	common
<i>Pimephales notatus</i>	Bluntnose Minnow	common
<i>Catostomus commersonii</i>	White Sucker	common
<i>Catostomus catostomus</i>	Longnose Sucker	State Threatened
<i>Ameiurus melas</i>	Black Bullhead	common
<i>Ictalurus punctatus</i>	Channel Catfish	common
<i>Oncorhynchus kisutch</i>	Coho Salmon	non-native; Pacific Rim
<i>Oncorhynchus mykiss</i>	Steelhead Salmon	non-native; Pacific Rim
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	non-native; Pacific Rim
<i>Salmo trutta</i>	Brown Trout	non-native; Europe
<i>Esox americanus</i>	Grass Pickerel	common
<i>Percopsis omiscomaycus</i>	Trout Perch	rare, of concern
<i>Pungitius pungitius</i>	Nine-Spine Stickleback	common
<i>Gasterosteus aculeatus</i>	Three-Spine Stickleback	common
<i>Cottus bairdii</i>	Mottled Sculpin	possibly extirpated
<i>Ambloplites rupestris</i>	Rockbass	common
<i>Pomoxis nigromaculatus</i>	Black Crappie	common
<i>Micropterus dolomieu</i>	Smallmouth Bass	common
<i>Micropterus salmoides</i>	Largemouth Bass	common
<i>Lepomis cyanellus</i>	Green Sunfish	common
<i>Lepomis gibbosus</i>	Pumpkinseed	common
<i>Lepomis gulosus</i>	Warmouth	low abundance
<i>Lepomis humilis</i>	Orangespotted Sunfish	common in river
<i>Lepomis macrochirus</i>	Bluegill	common
<i>Perca flavescens</i>	Yellow Perch	common
<i>Etheostoma nigrum</i>	Johnny Darter	rare occurrence for lake
<i>Neogobius melanostomus</i>	Round Goby	non-native; Ponto-Caspian

3.2.6 – Amphibians & Reptiles

Reptiles and amphibians that may be present in the area include those that are adaptable to manmade structures and are strictly aquatic, as there is no terrestrial habitat available on the Chicago Lock. These include but are not limited to Painted Turtle (*Chrysemys picta*), Red Ear Slider (*Pseudemys scripta*) and the Garter Snake (*Thamnophis sirtalis*). The lock structure and chamber itself supports a population of a State Threatened salamander known as the Mudpuppy (*Necturus maculosus*). These salamanders spend

their entire life underwater, foraging rocky shoals for crayfish and other prey items. They prefer cold water and only migrate into the near shore area during the winter months.

3.2.7 – Birds

The North Pier repair area resides within a band of important state natural areas and parks that span Lake/Cook County, Illinois. These natural areas serve as a requisite foraging and breeding grounds along the Lake Michigan flyway, which is a globally significant migration route for literally millions of birds including waterfowl and an estimated 5,000,000 migrant songbirds. The coast of Lake Michigan provides a visual north-south sight line, which the birds have evolved to follow as they undergo migration. During the migration periods, March to May and September to mid-October, song birds and water fowl predominantly traverse this flyway route.

Nearly 300 species of resident and migratory birds have been observed in the Chicagoland area. Approximately 253 species of birds have been observed at adjacent bird sanctuaries to the Chicago Harbor (i.e. Northerly Island, McCormick Bird Sanctuary). Of the 253 species, 187 species are classified as migrants and 57 are residents. The remaining nine species were identified to genus or were classified as hybrids. Habitat for birds around the Chicago Lock structures is primarily open water, used only by water birds such as Mergansers and other divers. Terrestrial habitat is very minimal, consisting of concrete pads, a gravel parking lot and a strip of non-native ornamental landscaping trees and plants.

3.2.8 – Threatened & Endangered Species

Federally-listed Threatened, Endangered, Proposed and Candidate Species were reviewed for the project area by the Chicago District. The following federally listed species and their critical habitats are identified by the USFWS as occurring within Cook County:

- Piping Plover (*Charadrius melodus*) – Endangered – Wide, open, sandy beaches with very little grass or other vegetation
- Eastern Massasauga (*Sistrurus catenatus*) – Candidate – Graminoid dominated plant communities (fens, sedge meadows, peat lands, wet prairies, open woodlands, and shrublands)
- Hine’s Emerald Dragonfly (*Somatochlora hineana*) – Endangered – Spring fed wetlands, wet meadows and marshes
- Eastern Prairie Fringed Orchid (*Platanthaera leucophaea*) – Threatened – Moderate to high quality wetlands, sedge meadow, marsh, and mesic to wet prairie.
- Leafy-prairie Clover (*Dalea foliosa*) – Endangered – Prairie remnants on thin soil over limestone
- Mead’s Milkweed (*Asclepias meadii*) – Threatened – Late successional tallgrass prairie, tallgrass prairie converted to hay meadow, and glades or barrens with thin soil
- Prairie Bush Clover (*Lespedeza leptostachya*) – Threatened – Dry to mesic prairies with gravelly soil
- Northern Long-eared Bat (*Myotis septentrionalis*) – Threatened – Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests and woods.

- Rufa Red Knot (*Calidris canutus rufa*) – Threatened – Only actions that occur along coastal areas or large wetland complexes during migratory window of May 1 - September 30
- Rattlesnake-master Borer Moth (*Papaipema eryngii*) – Candidate – Undisturbed prairie and woodland openings that contain their only food plant, rattlesnake-master (*Eryngium yuccifolium*).
- Rusty Patched Bumble Bee (*Bombus affinis*) – Endangered – Grasslands with flowering plants from April through October, underground and abandoned rodent cavities or clumps of grasses above ground as nesting sites, and undisturbed soil for hibernating queens to overwinter.

The Chicago Lock's North Pier is a man-made structure built in early 1900s. There is no critical habitat within the immediate study area of the structure. It has been determined that this repair project would have "no effect" on listed species or proposed or designated critical habitat.

State listed species identified by the ILDNR in a letter dated 03 January 2018 within the Chicago Harbor area are the Longnose Sucker (*Catostomus catostomus*), Banded Killifish (*Fundulus diaphanus*) and the Mudpuppy (*Necturus maculosus*). Based on surveys performed by USACE ichthyologists, the Longnose Sucker does not occupy the nearshore around the North Pier, but occupies the gaps in the detached breakwaters where there are currents. The Banded Killifish is becoming ubiquitous within the Chicago Area and is highly abundant along the shorelines of Lake Michigan; however, there are no records for this species within the vicinity of the North Pier. The Mudpuppy is known to occupy all of the structures at the Chicago Lock in the winter months, and in particular, the lock chamber itself.

3.3 – Cultural & Social Resources

3.3.1 – Archaeological & Cultural Properties

The North Pier of the Chicago Lock is not considered to be of historical significance by the Illinois Historic Protection Agency (IHPA). The State Historic Preservation Officer (SHPO) provided a response to the scoping letter dated 28 December 2018 indicating they have no objections to the proposed repair work.

Letters were received from the Miami Tribe of Oklahoma (08 January 2018) and the Forest County Potawatomi (17 January 2018) indicating no presence of Cultural Resources within the work limits.

3.3.2 – Social Properties

Chicago is located in northeastern Illinois near the southwestern tip of Lake Michigan. It straddles the basin divide between the Great Lakes and Mississippi River watersheds. Chicago is the third most populous city in the United States with an ethnically and racially diverse population of approximately 2.8 million people. Median household income for the City of Chicago is \$43,650 (2010), and the median home cost is \$238,567 (2010). Surrounding communities include Evanston, Oak Park, Cicero, and Evergreen Park.

Chapter 4 – Effects Determination

4.1 – Physical Resources

4.1.1 – Geology

The Preferred Plan would not come in contact with or disturb sub-surficial bedrock or surficial glacial geologic processes, members or features. It is anticipated that the Preferred Plan would have no effects to geologic resources.

4.1.2 – Sediment Quality

After the drive line for the steel sheet pile has been cleared, and the new steel sheet pile anchor wall has been installed, the armor stone and large stone materials will be reused and placed as backfill adjacent to the new steel sheet pile anchor wall.

Since the same material that presently exists along the North Pier will be reused, the placement of the rock materials is unlikely to result in degradation of the placement site. Any debris or unsuitable materials that are observed that cannot be reused will be properly disposed of off-site at a landfill.

Title 40 of the Code of Federal Regulations (C.F.R.), § 230.60 (a), notes that “Dredged or fill material is most likely to be free from chemical, biological, or other pollutants where it is composed primarily of sand, gravel, or other naturally occurring inert material.”

The large armor stone and rock backfill materials that constitute the existing backfill are anticipated to be composed of coarse and inert materials that generally do not carry contamination.

It is also relevant to note that Title 40 of the C.F.R., Paragraph § 230.60 (c) says the following:

“Where the discharge site is adjacent to the extraction site and subject to the same sources of contaminants, and materials at the two sites are substantially similar, the fact that the material to be discharged may be a carrier of contaminants is not likely to result in degradation of the disposal site. In such circumstances, when dissolved material and suspended particulates can be controlled to prevent carrying pollutants to less contaminated areas, testing will not be required.”

It is anticipated that the Preferred Plan would have not have any long-term effects on the sediment quality.

4.1.3 – Water Quality

The materials that will be used during the repairs are commercially available coarse aggregate (CA-1) and the armor stone and rock backfill that are currently in the water adjacent to the existing steel sheet pile cut-off wall. These materials are generally inert and coarse, and they are not expected to be a source of contamination. Moreover, since the armor stone and the rock backfill that will be placed adjacent to the new steel sheet pile anchor wall are the same materials that currently exist along the existing steel sheet pile cut-off wall, the reuse of these materials is not anticipated to result in any degradation or long-term effects on, or changes to, the water chemistry or quality.

A portion of the large armor stone that is to be removed from the Lake Michigan side of the North Pier to clear the drive line may be temporarily transported and placed along the Chicago River side of the North

Pier to temporarily brace/shore the existing steel sheet pile on that side of the pier during construction. This large armor stone will mainly consist of discrete boulders that will be individually placed/stacked into position along the existing steel sheet pile wall on the Chicago River side of the pier.

After the installation of the new tie rods, if large armor stone was temporarily used to brace/shore the Chicago River side of the pier, the majority of this stone may be removed prior to the end of construction, with the exception of a small amount of residual large stone material that has settled into the sediment on the Chicago River side of the pier. The majority of the large armor stone material could then be reused on the Lake Michigan side of the pier as backfill or toe stone. Alternately, the contractor may propose that some or all the large stone may remain in place on the Chicago River side of the pier to provide beneficial habitat. There will be no dredging of the Chicago River sediment, and sediment transport to the Lake Michigan side of the pier will be minimized. It is expected that the large stone will not retain significant sediment on the surface. Any Chicago River sediment that is accidentally removed would need to be dewatered upland (with no direct return water) and disposed of at an appropriate upland facility.

Short-term effects on the water quality are expected due to temporary and minor increases in the concentration of suspended solids and turbidity that will likely result when the armor stone and rock backfill materials are removed from the water, placed back into the water, or moved within the water. The armor stone and rock backfill materials need to be removed from the water, or moved within the water, to clear the drive line for the new steel sheet pile anchor wall. Then, after the new steel sheet pile anchor wall has been installed, the armor stone and rock backfill materials will be reused and placed back into the water, or moved within the water, adjacent to the new wall.

Smaller-sized rock, gravel, sand, or finer-grained materials may have been deposited or could have accumulated on or within the pore spaces of the larger stone materials, and this smaller-sized material may be removed, disturbed, or suspended while clearing the larger rock materials from the drive line for the sheet piles. As a consequence, there will likely be temporary, minor increases of suspended solids and turbidity in the local work area when removing the armor stone and rock backfill materials from the water, placing these materials back into the water, or when moving these materials within the water.

Title 40 of the C.F.R., Paragraph § 230.21 (b), discusses potential adverse environmental impacts due to elevated levels of suspended solids and turbidity. These impacts include the reduction of light penetration and the lowering of the rate of photosynthesis and the primary productivity of an aquatic area if the elevated levels last long enough. Moreover the biological and the chemical content of the suspended material may react with the dissolved oxygen in the water, which can result in oxygen depletion, and metals and organics, pathogens, and viruses absorbed or adsorbed to fine-grained particulates in the material may become biologically available to organisms either in the water column or on the substrate. High suspended particulate levels create visible turbid plumes that are aesthetically displeasing.

In order to prevent adverse water quality impacts, a silt curtain will be properly deployed around the work area whenever any armor stone, rock backfill materials, or coarse aggregate backfill will be removed from the water, placed back into the water, or moved within the water. Once the new steel sheet pile anchor wall has been completely installed or the area has been properly sealed off from the open water, the silt curtain will not be necessary for the placement of backfill in the space between the new steel sheet pile anchor wall and the existing North Pier or above the water line if there will be no effluent or return water released to Lake Michigan.

The increased levels of suspended solids and turbidity are expected to have an effect on the water quality and chemistry in the immediate construction area, but the deployment of a silt curtain around the work area should help control and minimize the movement of suspended solids from the construction area.

The steel sheet piles can be driven through fine-grained sediments, so there should be no need to intentionally remove fine-grained materials from the water, place fine-grained materials back into the water, or move fine-grained sediments within the water column. As discussed above, a small quantity of fine-grained sediments will likely be associated with the larger rock materials due to the deposition of fine-grained sediments on the larger rocks or the accumulation of fine-grained material in the pore spaces, but such a small quantity of fine-grained sediment should not cause persistently elevated suspended solids, turbidity, or nutrient levels.

The National Oceanic and Atmospheric Administration Coast Survey charts indicate that the closest water intake cribs for the water treatment plants that serve the City of Chicago are located over two (2) miles away from the project site, so the construction activities at the North Pier are not expected to cause any adverse impacts to the public water supply system, such as reduced water clarity, color changes, unpleasant odors, or other effects.

Overall, there are no expected long term impacts to water quality in either Lake Michigan or the Chicago River resulting from the Preferred Plan.

4.1.4 – Air Quality

The local air quality in Chicago and Cook County is considered ‘non-attainment’ under the Clean Air Act for ozone, and lead. The project is within the non-attainment zone. Due to the small scale and short duration of this project, the main sources of emissions would be vehicle emissions and dust associated with the construction activities. The project does not include any stationary sources of air emissions, and a General Conformity Analysis was not completed. The temporary mobile source emissions from this project are *de minimis* in terms of the National Ambient Air Quality Standards and the State Implementation Plan. The completed project is not expected to be a significant source of Green House Gas emissions since the pier (including the sheetpile wall and stone anchoring) does not contain any combustion, fermentation, or gas producing processes. All construction vehicles will comply with federal vehicle emission standards. USACE and its Contractors comply with all Federal vehicle emissions requirements. USACE follows EM 385-1-1 for worker health and safety, and requires all construction activities to be completed in compliance with Federal health and safety requirements.

4.1.5 – Hazardous, Toxic & Radioactive Wastes (HTRW)

Most of the area that would be impacted by the Preferred Plan is located north of the existing North Pier structure of the Chicago Harbor Lock and controlling works in Lake Michigan. However, the Preferred Plan would include a small portion the parking area for the Chicago Harbor Lock and controlling works, which is known to be within the thorium monitoring area associated with past contamination from the Lindsay Light Site. A permit would therefore be required from the City of Chicago and monitoring would be performed for any excavation in the parking area. Previous excavation in this area has not detected thorium above the action level, so it is anticipated that the Preferred Plan would not cause a considerable release of thorium.

Issues were also identified with asbestos and lead-based paint on the Chicago Harbor Lock Property. Asbestos-containing materials are managed in place under an Asbestos Operations and Maintenance Program, and lead-based paint was identified in one of the buildings. The Preferred Plan will not impact the buildings or manholes, but the project will include the demolition of the utility tunnel on the North Pier. Prior to demolition, the tunnel will be inspected for asbestos by a licensed inspector. If asbestos-containing materials are identified, the licensed inspector will develop a removal and disposal plan to ensure no asbestos-containing materials are released and the materials are removed and disposed of

properly. Overall, the construction activities associated with the Preferred Plan are not expected to have any significant effects on HTRW.

4.2 – Ecological Resources

4.2.1 – Great Lakes Wetland Habitat

The Preferred Plan would not come in contact with or disturb any naturally existing wetlands and/or habitats within Lake Michigan surrounding the Chicago Lock. It is anticipated that the Preferred Plan would have no effects to existing lacustrine wetlands and associated habitat resources.

4.2.2 - Chicago River Navigable Channel

The Preferred Plan allows for possible temporary bracing/shoring methods to be proposed, a potential method would be to temporarily use the large armor stone on the Lake Michigan side of the pier. Some of this stone needs to be removed to clear the drive line for the new anchor wall, and, since a portion of this large stone needs to be removed, it could be transported and placed on the Chicago River side of the pier to temporarily brace/shore the steel sheet pile wall on the Chicago River side of the pier. This may also temporarily interfere with the navigable depth in the vicinity of the work site, but will not impact the main channel. Prior to the end of construction, the majority of the large armor stone may be reused on the Lake Michigan side as backfill or toe stone, with the possible exception of a small amount of residual large stone material that has settled into the sediment on the Chicago River side of the pier. There will be no dredging of the Chicago River sediment. It is expected that the large stone will not retain significant sediment on the surface. Any Chicago River sediment that is accidentally removed would need to be dewatered upland (with no direct return water) and disposed of at an appropriate upland facility.

Alternately, the contractor may propose that some or all the large stone may remain in place on the Chicago River side of the pier to provide beneficial habitat. If some or all of the materials used to temporarily brace/shore the existing wall on the Chicago River side of the pier are to remain in place, such as the large stone from the Lake Michigan side of the pier, the materials and placement location will be evaluated prior to the start of construction to ensure they will be acceptable and will not degrade and adversely impact the water quality or impede, constrain, or interfere with the navigational (draft) requirements for the Federal channel or the operation of the Chicago Lock. Due to the potential for adverse impacts to navigation, materials that are temporarily placed above a depth of 14 feet below LWD will need to be removed prior to the completion of construction. The only materials that will be allowed to permanently remain in place on the Chicago River side of the pier are the materials below a depth of 14 feet below LWD. If large stone material is temporarily placed or remains in place on the Chicago River side of the North Pier, no negative impacts to the aquatic community and associated habitat resources are anticipated.

4.2.3 – Native Plant Communities

There are no existing native submerged or emergent native plant beds within the work limits in Lake Michigan or in the Chicago River. The existing terrestrial plant community along the North Pier consists of non-native, ornamental landscaping trees and plants. The Preferred Plan would remove these and replace landscaping with native Lake Michigan shoreline trees, shrubs and flowers that also do well as ornamental landscaping plants. In addition, these native plant species would provide small migratory birds and pollinators with a resting and foraging area. It is anticipated that the Preferred Plan would have no effects to existing native plant communities.

4.2.4 – Macroinvertebrates

The Preferred Plan would move riprap stone out of the sheet pile drive line in order to drive a new sheet pile wall on the Lake Michigan side. This disturbance could remove some of the tolerant macroinvertebrates, but is considered a temporary condition. It is anticipated as soon as the riprap stone is replaced, the existing tolerant macroinvertebrate groups would recolonize quickly. It is anticipated that the Preferred Plan would have no long term effects to existing macroinvertebrate communities on the lake side.

The large stone that may remain in place on the river side of the project would not negatively impact the existing macroinvertebrate community permanently. This disturbance could remove some tolerant macroinvertebrate, but would likely improve the community in the area long-term. It is anticipated that placement of stone would be recolonized quickly by existing macroinvertebrate groups and would provide them beneficial habitat in the area.

4.2.5 – Fishes

The Preferred Plan would not permanently disturb, remove or degrade native fish habitat within the work limits on Lake Michigan and/or the Chicago River. The Preferred Plan would drive sheet pile and move stone around beneath the water's surface, which would most likely cause an auditory disturbance. The timing and short duration of this activity make this a temporary and short term effect, with minimum to negligible effects on fish behavior. It is anticipated that the Preferred Plan would have no effects to existing native fish communities on the lake side.

The stone that may be left on the river side of the project would be unlikely to have a negative impact on the native or resident fish communities. Any stone in the area would likely provide much needed feeding or breeding habitat for any native fish species in the area. Movement and placement of stones within the area would cause a temporary increase in suspended particulates and turbidity. The temporarily increased turbidity will be managed through the use of silt curtains and those effects are anticipated to remain isolated within the project area, quickly dissipating when the in-water work is completed.

4.2.6– Amphibians & Reptiles

Reptile and amphibian communities have no significant presence within the Chicago Lock area with the exception of Red Ear Slider and Painted Turtle, which are considered highly abundant within the region due to spread through the pet trade. The only Amphibian of concern is the State Threatened Mudpuppy, which is addressed under Threatened and Endangered Species Section 4.2.7. It is anticipated that the Preferred Plan would have no long term effects to existing reptile and amphibian communities.

4.2.7 – Birds

The Preferred Plan would not physically effect open water habitat surrounding the Chicago Lock, which does support water birds such as ducks and divers. Noise from driving sheet pile and moving stone around could cause disturbance to migrating birds and cause them to fly off to the next area. This effect is considered short term and temporary, and can mostly be avoided by completing sheet pile and stone moving during non-migratory periods.

The Preferred Plan would physically remove landscaping plants to accomplish North Pier repairs. These plants may or may not provide resting habitat, but do not provide foraging or nesting habitat for migratory birds. The landscaping plants would then be replaced after the repair work is complete with native tree,

shrub and flower species that would benefit small migratory birds by providing resting and foraging habitat.

The Preferred Plan repair work would be limited to only non-migratory periods and provide native plants that serve as the ornamental native landscaping. It is anticipated that the Preferred Plan would have minor positive effects to migratory and residential bird communities.

4.2.8– Threatened & Endangered Species

The Mudpuppy (*Necturus maculosus*) salamander is the only state listed species that could be present within the work limits. This species is known to occupy the lock chamber during the colder winter months of December thru February. Lock and breakwater operations and repairs seem to have no effect on this species, as they have been known to be present for over 30 years. In fact, this species has taken advantage of man-made rock structures throughout the Great Lakes, in which maintenance and repairs have not deterred them from its use. The only task that could directly affect the Mudpuppy would be moving stones out of the sheet pile drive line. Since the sheet pile driving and stone moving would be a short duration that would occur when Mudpuppy are offshore, it is unlikely the activity would adversely affect local populations. It is anticipated that the Preferred Plan would have no effects to existing Mudpuppy individuals, populations and or their required habitats.

4.3 – Cultural & Social Resources

4.3.1 – Archaeological & Cultural Properties

The North Pier of the Chicago Lock is not considered to be of historical significance by the Illinois Historic Protection Agency (IHPA). The State Historic Preservation Officer (SHPO) provided a response to the scoping letter dated 28 December 2018 indicating they have no objections to the proposed repair work. It is anticipated that the Preferred Plan would have no effects to Archaeological or Historic Properties.

Letters were received from the Miami Tribe of Oklahoma (08 January 2018) and the Forest County Potawatomi (17 January 2018) indicating no presence of Cultural Resources within the work limits. It is anticipated that the Preferred Plan would have no effects to Archaeological or Historic Properties.

4.3.2 – Social Properties

It is anticipated that the Preferred Plan would have no effects to Archaeological or Historic Properties.

4.3.3 – 17 Points of Environmental Quality

The 17 points are defined in Section 122 of the Rivers, Harbors and Flood Control Act of 1970 (P.L. 91-611). Effects to these points are discussed as follows:

Noise – The proposed repair work would cause minor and temporary increases in noise levels beyond the current conditions. The effects would stem from machinery utilized to remove, move and place materials and drive steel sheet piles. The rock moving/removal and sheet pile driving has the potential to create a lot of noise; however, the work area is well removed from residences and would primarily be noticed by vessel passengers and to a lesser degree people on Navy Pier. Based on the congestion of the area, the high volumes of traffic and Navy Pier construction activities, it will be difficult to notice a persistent change from the existing condition.

Displacement of People – The proposed repair work will not displace any people.

Aesthetic Values – The proposed repair work would enhance the visual aesthetics of the North Pier with new native landscaping.

Community Cohesion – The proposed repair work would not disrupt community cohesion.

Desirable Community Growth – The proposed repair work would not affect community growth.

Desirable Regional Growth – The proposed repair work would not affect regional growth.

Tax Revenues – The proposed repair work would not adversely or beneficially affect tax revenues.

Property Values – The proposed repair work would not affect property values.

Public Facilities – The proposed repair work would not affect public facilities.

Public Services – The proposed repair would allow public services to continue, including public safety and economic activities.

Employment – The proposed repair work would not adversely affect employment and would temporarily support employment during construction activities.

Business and Industrial Activity – The proposed repair work would support local businesses and industries that utilize the lock.

Displacement of Farms – There are no farms within the study area.

Man-made Resources – The proposed repair work would repair man-made resources.

Natural Resources – The proposed repair work would not affect existing natural resources of the study area.

Air Quality – The proposed repair work would be *de minimis* in terms of CAA compliance. During project construction, the heavy construction and marine equipment, vessels, and vehicles will cause minor and temporary adverse air quality impacts, but all equipment will be in compliance with current air quality control requirements for diesel exhaust, fuels, and similar requirements. A general conformity analysis was not conducted due to the short and temporary nature of any air quality impacts. Beyond the minor and temporary emissions from the construction equipment, vehicles, and vessels, the project is not expected to contribute to greenhouse gas emissions.

Water Quality – The proposed North Pier Repair Project will cause minor, short-term, and localized increases of suspended solids and turbidity, but it will not have an adverse effect on long-term water quality. Further details regarding the project's water quality impacts have been discussed previously (see Section 4.1.3 – Water Quality) and are included in Attachment 02.

4.5 Cumulative Effects

Consideration of cumulative effects requires a broader perspective than examining just the direct and indirect effects of a proposed action. It requires that reasonably foreseeable future impacts be assessed in the context of past and present effects to important resources. Often it requires consideration of a larger

geographic area than just the immediate “project” area. One of the most important aspects of cumulative effects assessment is that it requires consideration of how actions by others (including those actions completely unrelated to the proposed action) have and will affect the same resources. In assessing cumulative effects, the key determinant of importance or significance is whether the incremental effect of the proposed action will alter the sustainability of resources when added to other present and reasonably foreseeable future actions. Cumulative environmental effects for the proposed lock structure repair work were assessed in accordance with guidance provided by the Council on Environmental Quality (CEQ) and the U.S. Environmental Protection Agency (USEPA 315-R-99-002).

4.5.1 Scope of Cumulative Effects Analysis

Through this environmental assessment, the cumulative effects issues and assessment goals are established, the spatial and temporal boundaries are determined, and the reasonably foreseeable future actions are identified. Cumulative effects are assessed to determine if the sustainability of any of the resources is adversely affected with the goal of determining the incremental impact to key resources that would occur should the proposed work be implemented. The spatial boundary being considered is normally in the general area of the proposed activity; however, the area may be expanded on a case-by-case basis if some particular resource condition necessitates broadening the boundary. The analysis will only include the immediate area since the proposed activity is a highly localized repair to an existing man made structure.

Three temporal boundaries were considered:

- Past – Pre-1830s because this is the approximate time that the landscape developed for agricultural and industrial use and the build-out of Chicago
- 1938 the Chicago Lock was built, in which the natural system Riverine/Open/Drown River Mouth was permanently altered to a manmade Lacustrine/Open/Shoreline.
- Present – 2018 when the decision is being made on repair work.
- Future – 2043, the year used for determining repair life (~25 years)

Projecting the reasonably foreseeable future actions can be difficult. The proposed action, pier repair, is reasonably foreseeable; however, the actions by others that may affect the same resources are not as clear. Projections of those actions must rely on judgment as to what are reasonable based on existing trends and where available, projections from qualified sources. Reasonably foreseeable does not include unfounded or speculative projections. Some future projections were taken from watershed and specific studies generated for the general project area. In this case, reasonably foreseeable future actions include:

- Continued use of the Chicago Lock as a valuable public resource
- Continued use of the Chicago Lock to protect Lake Michigan water quality
- Continued use of the Chicago Lock as a valuable national and local security point
- Continued maintenance of all the lock structures to keep its operation performance high
- Continued use of the Chicago Harbor as a highly valued recreational resource
- Continued improvements in water quality and habitats of Lake Michigan and the Chicago River system

4.5.2 Cumulative Effects on Resources

The proposed repair is quite simplistic and localized to the degree that cumulative effects would not occur or are considered negligible. The physical and ecological/biological effects imparted to the site occurred over 100 years ago with the development of the Chicago shoreline and subsequent manmade structures to support human activities. The proposed work would only repair a minor portion of one of these structures,

which would maintain the existing condition of the surrounding environment. Any effects to the habitat created within the project site are likely to be local and will not adversely impact resident aquatic communities and resources significantly. Implementation of the repair works would avoid cumulative economic and social effects from having lock closures as a result of a failed supporting structure.

Chapter 5 – Conclusions & Compliance

5.1 – Compliance with Environmental Statutes

The proposed repair work is in compliance with appropriate statutes, executive orders, memoranda and USACE regulations including the Natural Historic Preservation Act of 1966; the Endangered Species Act of 1973; the Fish and Wildlife Coordination Act; EO 12898 (environmental justice); EO 11990 (protection of wetlands); EO 11988 (floodplain management); and the Rivers and Harbors Act of 1899. The potential project is in compliance with the Clean Air Act; the Clean Water Act, and the National Environmental Policy Act of 1969. There were no adverse environmental effects identified which cannot be avoided should the proposal be implemented (42 U.S.C. § 4332(2)(c)(ii); 40 C.F.R. 1502.16). The proposed repair work does not have local and short-term effects to uses of the environment or Lake Michigan's coastal zone (42 U.S.C. § 4332(2)(c)(iv); 40 C.F.R. 1502.16). There have been no irreversible and irretrievable commitments of resources identified resulting from the proposed action should it be implemented (42 U.S.C. § 4332(2)(c)(v); 40 C.F.R. 1502.16).

5.1.1 – Environmental Justice

EO 12898 (environmental justice) requires that, to the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands. The proposed repair work would not treat different groups of people differently, since the results of the project, allowing the passage of boats between the Chicago River and Lake Michigan, would be able to be enjoyed by the entire City of Chicago. The project area is federally owned and due to safety policies and federal security standards, the public is permanently restricted from accessing the site.

5.1.2 – Clean Air Act

The local air quality in Chicago and Cook County are considered 'non-attainment' under the Clean Air Act for ozone, and lead. The project is within the non-attainment zone. Due to the small scale and short duration of this project, the main sources of emissions would be vehicle emissions and dust associated with the construction activities. The project does not include any stationary sources of air emissions, and a General Conformity Analysis was not completed. The temporary mobile source emissions from this project are *de minimis* in terms of the National Ambient Air Quality Standards and the State Implementation Plan. All construction vehicles will comply with federal vehicle emission standards. USACE and its Contractors comply with all Federal vehicle emissions requirements. USACE follows EM 385-1-1 for worker health and safety, and requires all construction activities to be completed in compliance with Federal health and safety requirements.

5.1.3 – Section 401 / 404 of the Clean Water Act

Attachment 02 provides the 404(b)(1) Analysis. The application for Section 401 Water Quality Certification is currently in progress. The Preferred Plan would deploy a silt curtain to minimize adverse impacts to the aquatic ecosystem, and the inclusion of the silt curtain is expected to ensure the Preferred Plan would be in compliance with the requirements of the Federal guidelines. It is anticipated that the

Preferred Plan would not degrade the waters or have any long-term effects on human health and welfare, aquatic organisms or the aquatic ecosystem, or recreational, aesthetic, and economic values.

5.1.4 – USFWS Coordination

Coordination with the USFWS commenced with a project scoping letter dated 12 December 2017. Coordination under the Fish & Wildlife Coordination Act (FWCA) of the Preferred Plan will be completed during the Agency and public review period as requested by USFWS in an email dated 13 December 2017. This EA identified the Preferred Plan to have “no effects” on federally endangered species or their habitats as determined by following the protocol and guidelines provided by Region 3 Fish & Wildlife Service (<http://www.fws.gov/midwest/endangered/section7/index.html>); which precludes the need for further consultation under Section 7. The USACE specifically requests the USFWS to determine if a “no work” window is warranted during the spring and fall bird migrations since the Preferred Plan repair work is considered a minor operation and maintenance action.

5.1.5 – State of Illinois Natural Resources Coordination

Coordination with the ILDNR commenced with a project scoping letter dated 12 December 2017.

The Office of Water Resources provided response 05 January 2018 indicating the need to apply for a Federal Consistency Determination under the Illinois Coastal Zone Program. This EA was provided to the ILDNR with a letter identifying that "The proposed activity complies with Illinois' approved coastal management program and will be conducted in a manner consistent with such policies".

The Impact Assessment Section provided response 03 January 2018 on potentially existing State listed species within the North Pier repair work limits. This EA address those species and their habitats, which has determined “no effects” to State listed species.

5.1.6 – State of Illinois Historic Preservation Act

Coordination with the Illinois Historic Preservation Agency (IHPA) commenced with a project scoping letter dated 12 December 2017. Section 106 consultations for this project with the (IHPA indicated "no historic properties effected". IHPA has concurred with this determination in a letter dated 28 December 2017.

5.1.7 – EO 13112 Invasive Species

This executive order calls for actions “to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause...” This EO utilizes the laws of the United States of America, including the National Environmental Policy Act of 1969, as amended (42 U.S.C. § 4321 et seq.), Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended (16 U.S.C. § 4701 et seq.), Lacey Act, as amended (18 U.S.C. § 42), Plant Protection Act of 2000 (P.L. 106-224, Title IV), Endangered Species Act of 1973, as amended (16 U.S.C. § 1531 et seq.), and other pertinent statutes. Completed in 2001, the National Invasive Species Management Plan, served as a comprehensive “blueprint” for federal action on invasive species, as well as NISC’s primary coordination tool. The 2008 Plan identified prevention as the first line of defense, and calls for preventing the introduction and establishment of invasive species to reduce their impact on the environment, the economy, and health of the United States. EO 13112 also includes specific duties for federal agencies in regard to invasive or nuisance aquatic species. Excerpts from the order relating to federal agencies are contained in the following paragraphs:

(a) Each Federal agency whose actions may affect the status of invasive species shall, to the extent practicable and permitted by law,

(1) identify such actions;

(2) subject to the availability of appropriations, and within Administration budgetary limits, use relevant programs and authorities to: (i) prevent the introduction of invasive species; (ii) detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner; (iii) monitor invasive species populations accurately and reliably; (iv) provide for restoration of native species and habitat conditions in ecosystems that have been invaded; (v) conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control of invasive species; and (vi) promote public education on invasive species and the means to address them....

This repair work would be in compliance via removing non-native ornamental landscaping plants and replace with native species known to be beneficial to migratory birds and pollinators.

5.1.8 – EO 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds

Federal agencies shall restore or enhance the habitat of migratory birds and prevent or abate pollution or detrimental alteration of the environment for migratory birds. This project lies within a significant portion of the Mississippi Flyway along the western shoreline of Lake Michigan that particularly favors both ecological and economically valuable species including neo-tropic migrants and waterfowl. This repair work would be in compliance via removing non-native ornamental landscaping plants and replacing with native species known to be beneficial to migratory birds and pollinators.

5.2 – Draft Finding of No Significant Impact (FONSI)

This Draft Environmental Assessment was completed for the Preferred Plan. The Draft Environmental Assessment has found that there would be no long term, significant effects resulting from implementation of the Preferred Plan. A 30-day Agency and Public Review period was held from ___ to ____. All pertinent comments received will be incorporated into the document. The Final Environmental Assessment document and supporting appendices will be placed on the Chicago District's Civil Works webpage for maximum distribution. The Draft FONSI will be updated with accurate dates and Agency responses after the 30-day Agency and Public Review and finalized.

DRAFT FINDING OF NO SIGNIFICANT IMPACT

NORTH PIER REPAIRS OF THE CHICAGO LOCK, CHICAGO, COOK COUNTY, ILLINOIS

PURPOSE

The purpose of the project is to repair and provide stability to the existing crib structure of the North Pier of the Chicago Lock. The rehabilitation is needed to keep the Chicago Lock open and functional. A September 2017 Periodic Inspection Report of the Chicago Lock provided an evaluation and rating of the North Pier features. Approximately 13 feet of the sheet pile tie rods were found to be severely corroded on the inside of the North Pier tunnel. Additionally the current vehicle load analysis of 3000 lbs. per axel

for vehicles driving on top of the tunnel is insufficient for current lock operations. The axle load is also a concern due to the uncertainties associated with anchoring the existing sheet pile wall into an old rehabilitated timber crib structure of unknown capacity. There is also a concern that the North Pier tunnel itself has been degrading and is in poor condition.

AUTHORITY

Authorization for the Chicago Harbor and associated structures and facilities were completed under the River and Harbor Acts of 1870, 1880, 1912, 1919, 1962, Public Law 98-63, Section 107 of Public Law 97-88, and WRDA 1988. The Chicago Harbor Lock and its controlling works were designed and constructed by the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC) in 1938 to control the diversion of water from Lake Michigan and to prevent the backflow of the Chicago River into Lake Michigan. Between 1938 and 1984, the lock and its controlling works were operated and maintained by the MWRDGC. In 1984, the operational and maintenance responsibility for the lock was officially transferred to the USACE.

PROJECT AREA

The address for the Chicago Lock is 108 North Streeter Drive, Chicago, Illinois which is at the mouth of the Chicago River, just south of Navy Pier and North of Monroe Harbor.

PREFERRED PLAN / MAINTENANCE REPAIR WORK

This project is intended to provide stability to the existing crib structure for the North Pier within the work limits. The current sheet pile wall on the Chicago River side is supported by tie rods that are corroding and connected to a degraded tunnel structure. This repair work would include the following:

- Relocate existing utilities within the existing tunnel structure. The utilities in the existing tunnel include water and sewer lines and power and telecommunication cables.
- Construct a new steel sheet pile anchor wall on the Lake Michigan side of the North Pier, approximately 70 feet north of the existing steel sheet pile wall on the southern, Chicago River side of the pier. Remove and replace stone as needed through the drive line. A portion of the large armor stone that is to be removed from the Lake Michigan side of the North Pier to clear the drive line may be temporarily stored on site or on a barge. The new steel sheet pile anchor wall will extend roughly 450 feet along the North Pier and will extend into the existing parking lot for approximately 150 feet.
- Install new tie rods to connect the newly constructed anchor wall on the Lake Michigan side of the pier to the existing steel sheet pile wall on the Chicago River side of the pier. The new tie rods are to be installed on six (6) foot centers between the existing, corroded tie rods that connect the existing steel sheet pile wall on the Chicago River side of the pier to the existing tunnel structure.
- The existing tunnel structure is to be demolished, but the existing tie rods that structurally support the steel sheet pile wall on the Chicago River side of the pier are corroded and connected to this tunnel structure. As a consequence, the load on these tie rods needs to be removed by deploying an alternate means of structural support; either permanently or temporarily during construction. The tunnel structure will not be demolished until the steel sheet pile wall on the Chicago River side is no longer dependent on the existing, corroded tie rods for structural support and an alternate means for structural support has been deployed.
- The recommended method for structurally supporting the existing wall on the Chicago River side of the pier during construction is to horizontally drill through the materials and permanently connect the new tie rods from the newly installed anchor wall on the Lake Michigan side of the pier to the existing wall on the Chicago River side. However, the contractor will be allowed to

propose a different but equivalent method for temporarily bracing/shoring the existing steel sheet pile wall on the Chicago River side of the pier until the new tie rods are installed. The development of a different but equivalent method could potentially be advantageous because portions of the existing concrete slab, backfill, and/or tunnel structure could be removed to facilitate the drilling, installation, and connection of the new tie rods. The contractor may also propose to sequence the work differently and could install the bracing/shoring along the entire length of the pier or perform sections of the work incrementally.

- If the contractor proposes a different but equivalent method for temporarily bracing/shoring the existing steel sheet pile wall on the Chicago River side of the pier, a structural engineer will review the work plan prior to the start of the construction activities to verify the proposed method is capable of providing adequate structural support and will prevent the failure of the existing steel sheet pile wall on the Chicago River side of the pier during construction.
- There are a variety of different but equivalent bracing/shoring methods that might be proposed by the contractor, but one method would be to use the large stone on the Lake Michigan side of the pier. Some of this large stone needs to be removed to clear the drive line for the new anchor wall, so the large stone that is removed could be transported and placed on the Chicago River side of the pier to brace/shore the steel sheet pile wall on that side of the pier. Prior to the end of construction, after the new tie rods have been permanently installed and connected, the majority of the large armor stone may be reused on the Lake Michigan side as backfill or toe stone, with the possible exception of a small amount of residual large stone material that has settled into the sediment on the Chicago River side of the pier. Alternately, the contractor may propose that some or all the large stone may remain in place on the Chicago River side of the pier to provide beneficial habitat. There will be no dredging of the Chicago River sediment. It is expected that the large stone will not retain significant sediment on the surface. Any Chicago River sediment that is accidentally removed would need to be dewatered upland (with no direct return water) and disposed of at an appropriate upland facility.
- If the contractor proposes that some or all of the materials used to temporarily brace/shore the existing wall on the Chicago River side of the pier remain in place, such as the large stone from the Lake Michigan side of the pier, the materials and placement location will be evaluated prior to the start of construction to ensure they will be acceptable and will not degrade and adversely impact the water quality or impede, constrain, or interfere with the navigational (draft) requirements for the Federal channel or the operation of the Chicago Lock. Due to the potential for adverse impacts to navigation, materials that are placed above a depth of 14 feet below Low Water Datum (LWD) will need to be removed prior to the completion of construction. The only materials that will be allowed to permanently remain in place on the Chicago River side of the pier are the materials below a depth of 14 feet below LWD.
- After the utilities from the existing tunnel structure have been relocated and the existing steel sheet pile wall on the Chicago River side of the pier is adequately supported and is no longer dependent on the existing, corroded tie rods, the existing tunnel structure is to be demolished and sections of the concrete slab are to be removed.
- Following the installation of the new tie rods, armor and toe stone previously cleared to install the new steel sheet pile anchor wall will be reused as backfill, toe, or armor stone on the Lake Michigan side of the pier. Additional coarse aggregate (CA1) stone will be used on top to bring up the grade.
- Some of the concrete from demolition of the tunnel structure and demolition of the concrete slab will be reused as backfill between the new steel sheet pile anchor wall and existing wall on the Lake Michigan side of the pier. If any steel reinforcement is observed protruding from the concrete pieces, the reinforcement is to be cut flush with the face of the concrete prior to the reuse and placement of any concrete pieces as backfill.
- Other than the concrete pieces described above, construction debris or any unsuitable soils/sediments and waste materials that are encountered will be taken off-site for disposal.

- A new concrete slab and retaining wall are to be constructed over the existing crib structure for the storage of stop logs for the Chicago Lock. If sufficient funding is available, grouting of the existing crib structure may be performed to fill void space and improve its structural stability. A portion of the pier surface will initially be covered with coarse aggregate (CA6) gravel to improve vehicle access, and the vehicle access area may be paved in the future.
- A new duct bank extension will be installed in the parking lot to route power lines. New water and sewer lines will be installed from the parking lot all the way to the end of the pier, and the water line will be heat traced. A power feed will be provided to connect a power generator (by others).
- A fifteen (15)-foot wide vegetative strip will be constructed on the Lake Michigan side of the North Pier. Plant selection and the landscaping for this area will be accomplished by others, as described in further detail below. Temporary seeding or other erosion controls will be provided until the vegetative strip is permanently stabilized.

ENVIRONMENTAL COMPLIANCE

An Environmental Assessment (EA) was completed for the proposed repair work. A 30-day Public Review period for the EA was held from MONTH DAY, YEAR to MONTH DAY, YEAR. The proposed project is in full compliance with appropriate statutes and executive orders including the National Environmental Policy Act, as amended, the Endangered Species Act, as amended, the Fish and Wildlife Coordination Act, the National Historic Preservation Act, as amended, the Clean Air Act, as amended, Executive Order 12898 (Environmental Justice), Sections 401 and 404 of the Clean Water Act, as amended and the Corps of Engineers Operational and Management regulations (33 C.F.R. 335-338).

Along with direct and indirect effects, cumulative effects were assessed following the guidance provided by the Presidents' Council on Environmental Quality. The increment of effect from the proposed repair work, when compared to cumulative effects of past, present and reasonably foreseeable future actions is considered to be negligible.

CONCLUSION

In accordance with the National Environmental Policy Act of 1969 and Section 122 of the Rivers and Harbors and Flood Control Act of 1970, the U. S. Army Corps of Engineers, Chicago District, has assessed the environmental impacts associated with the proposed repair work to the North Pier of the Chicago Lock. The assessment process indicates that this project would not cause any significant effects on the quality of the human environment. Therefore, I have determined that an Environmental Impact Statement is not required.

Date: _____

Aaron W. Reisinger
Colonel, U.S. Army
District Commander

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