Draft Supplemental Environmental Assessment

Morgan Shoal Revetment Reconstruction
(45th – 51st Street)

Chicago, Illinois

U.S. Army Corps of Engineers
Chicago District

September 2025

DRAFT FINDING OF NO SIGNIFICANT IMPACT (FONSI)

MORGAN SHOAL REVETMENT RECONSTRUCTION (45TH – 51ST Street)

CHICAGO, COOK COUNTY, ILLINOIS

The U.S. Army Corps of Engineers, Chicago District (USACE) has conducted an environmental analysis in accordance with the National Environmental Policy Act of 1969, as amended. The Draft Supplemental Environmental Assessment (SEA) dated September 2025, for the Morgan Shoal Revetment Reconstruction (45th – 51st Street) Project addresses the ongoing shoreline erosion and coastal storm risk management within the City of Chicago, Cook County, Illinois.

The Draft SEA, incorporated herein by reference, supplements the decision-making and impact analyses in the 2020 Chicago Shoreline 45th to 51st Street (Morgan Shoal) Storm Protection Emergency Repair Environmental Assessment (USACE, 2020) and the 1993 Final Feasibility Report and Environmental Assessment for the Illinois Shoreline Erosion Interim III Storm Damage Reduction study (USACE, 1993). The current Draft SEA evaluated alternatives that would address ongoing erosion and coastal storm risk that have affected parkland which threatens the stability of U.S. Highway 41 (DuSable Lake Shore Drive) and risks vehicular safety during storm events, within the City of Chicago. The preferred alternative is the complete replacement of existing failing revetment structures, and includes:

- Removal of existing deteriorating revetment along the Morgan Shoal reach
- Installation of 3,700 linear feet of rubble mound revetment utilizing new and suitable existing materials, placed lakeside of existing deteriorated revetment;
- Installation of 1,000 linear feet of dynamic revetment comprised of cobble, salvaged bird's eye sand, and salvaged existing cobble, approximately 200 feet further into the lake as a new shoreline;
- Installation of salvaged on-site limestone materials as step-stone backing to the dynamic revetment;
- Placement of an underwater breakwater landward of Morgan Shoal; and,
- Installation of 800 linear feet of transitional steel sheet pile and stepped concrete revetment to match the adjacent revetment previously completed.

The preferred alternative also includes the addition of approximately 7 acres of new usable parkland with a new restroom facility. Parkland would include a balance of lawn and native plant areas, improved trails and more extensive lighting.

In addition to the "no action" plan, one action alternative was carried forward for evaluation.

For all proposed alternatives, the potential effects were evaluated, as appropriate. A summary assessment of the potential effects of the preferred alternative are listed in Table 1:

Table 1: Summary of potential effects of the preferred alternative.

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Aesthetics	☒	☐	☐
Air quality	☒	☐	☐
Aquatic resources/wetlands	☒	☐	☐
Invasive species	☐	☐	☒
Fish and wildlife habitat	☒	☐	☐
Threatened/Endangered species/critical habitat	☐	☐	☒
Historic properties	☒	☐	☐
Other cultural resources	☒	☐	☐
Floodplains	☒	☐	☐
Hazardous, toxic & radioactive waste	☐	☐	☒
Hydrology	☒	☐	☐
Land use	☐	☐	☒
Navigation	☐	☐	☒
Noise levels	☒	☐	☐
Public infrastructure	☒	☐	☐
Socioeconomics	☐	☐	☒
Soils	☒	☐	☐
Tribal trust resources	☐	☐	☒
Water quality	☒	☐	☐

All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the preferred alternative. Best management practices would be implemented, as appropriate, to minimize impacts. In order to minimize impacts to state threatened and endangered species, or migratory species work will not be conducted during critical life stages (i.e. breeding or nesting).

No compensatory mitigation is required as part of the preferred alternative.

Public review of the Draft SEA and FONSI will occur for 45 days during September through October 2025 at which time this section of the Draft FONSI will be updated.

Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, USACE determined that the preferred alternative would have “no effect” on the federally listed piping plover, rufa red knot, eastern massasauga, Hine’s emerald dragonfly, monarch butterfly (proposed threatened), eastern prairie fringed orchid, and leafy prairie-clover. Documentation of the analysis for the ‘no effect’ determination is included in Section 3.3.5 of the SEA.

Pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, USACE has completed a preliminary identification of historic properties and the preferred alternative is not anticipated to have an adverse impact on any known archaeological sites or historic properties. Consultation with SHPO and other consulting parties is ongoing, and public comments will be sought and considered in USACE’s final findings and determination.

Pursuant to the Clean Water Act of 1972, as amended, the discharge of dredged or fill material associated with the preferred alternative has been found to be compliant with section 404(b)(1) Guidelines (40 CFR 230). In accordance with Section 401 of the Clean Water Act, USACE and the City of Chicago are jointly seeking Section 401 Water Quality Certification from the State of Illinois. This effort is ongoing.

USACE has sought a determination of consistency with the Illinois Coastal Management Program pursuant to the Coastal Zone Management Act of 1972 from the Illinois Department of Natural Resources in a letter dated April 2, 2024. USACE determined that the preferred alternative is consistent with state Coastal Management Program and will be conducted in a manner consistent with such policies. The Illinois Coastal Management Program concurred with this determination in a letter dated June 5, 2024.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on this report, the reviews by other Federal, State and local agencies, Tribes, input of the public, and the review by my staff, it is my determination that the preferred alternative would not cause significant adverse effects on the quality of the human environment; therefore, preparation of an Environmental Impact Statement is not required.

Date

Kenneth P. Rockwell
Colonel, U.S. Army
Commanding

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ADA	Americans with Disabilities Act	MOA	Memorandum of Agreement
APE	Area of Potential Effects	NAAQS	National Ambient Air Quality Standards
BMP	Best Management Practice	NED	National Economic Development
CDOT	Chicago Department of Transportation	NEPA	National Environmental Policy Act
CERCLA	Comprehensive Environmental Response Compensation, and Liability Act	N	North
CFR	Code of Federal Regulations	NNE	North-Northeast
CPK	Chicago Park District	NRHP	National Register of Historic Properties
CWA	Clean Water Act	OHWM	Ordinary High-Water Mark
CY	Cubic Yard	PBC	Public Building Commission of Chicago
CY/YR	Cubic Yard per Year	PCA	Project Cooperation Agreement
EA	Environmental Assessment	PCBs	Polychlorinated biphenyls
EcoCAT	Ecological Compliance Assessment Tool	PDT	Project Delivery Team
ECOS-IPaC	Environmental Conservation Online System Information for Planning and Consultation	PM	Particulate Matter
EL	Elevation	RCRA	Resource Conservation and Recovery Act
EO	Executive Order	SEA	Supplemental Environmental Assessment
ERDC	Engineer Research and Development Center	SHPO	State Historic Preservation Office
FONSI	Finding of No Significant Impact	SWAN	Simulating Waves Nearshore
GHG	Green House Gas	USACE	U.S. Army Corps of Engineers
HTRW	Hazardous, toxic, and radioactive waste	USEPA	U.S. Environmental Protection Agency
ICMP	Illinois Coastal Management Program	USFWS	U.S. Fish and Wildlife Service
IDOT RR	Illinois Department of Transportation Rip Rap	WIS	Wave Information Studies
IL DNR	Illinois Department of Natural Resources	WOTUS	Waters of the U.S.
IEPA	Illinois Environmental Protection Agency	WRDA	Water Resources Development Act
LWD	Low Water Datum	WQC	Water Quality Certificate
LPP	Locally Preferred Plan		

List of Glossary Terms

Access	One's ability to enter or approach the water's edge of the shoreline.
ADA Accessibility	Ensuring that environments meet the standards of the American with Disabilities Act (ADA) so that those with disabilities have equal access
Agency	The administrative division of the government at the local, state, or federal level
Alternative	Potential solution to address a specific water resources problem or project need
Authorize	The congressional approval of specific water resources projects or action such that the USACE has been granted the legal authority to undertake a project or activity.
Best Management Practice	Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects resulting from project implementation
Dynamic Revetment	Constructed cobble berm that is a nature-based solution for coastal erosion such that individual cobbles move and respond to wave energy while the revetment structure remains stable.
Fill material	Any material used for the primary purpose of replacing an aquatic area with dry land or changing the bottom elevation of a water body.
Headland	Constructed coastal structure that extends into a body of water mimicking the function of natural coastal landforms for coastal stabilization purposes
Littoral transport	A specific type of sediment transport referring to the movement of sand and sediments along a shoreline primarily driven by waves and currents.
Low Water Datum	A surface so low that water level would seldom fall below it that is a standard reference elevation for water depth for each Great Lake from which depths are charted.
Ordinary High-Water Mark	The line of the shore in non-tidal areas established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area.
Pebble beach	The area along the Morgan Shoal shoreline at appropriately 49th street that encompasses the natural salient formation.
Preferred Alternative	The recommended solution to address specific water resource problem or project need.
Revetment	A coastal structure that is a protective layer of material such as stone or concrete, that are placed on a slope of bank to prevent erosion from waves, currents, or other coastal forces.
Rubble mound revetment	A sloping revetment composed of stones designed to protect shorelines from erosion.
Salient	A protruding landform or bulge along a shoreline, formed by the accumulation of sediment behind a structure like a breakwater or natural feature.
Sediment cell	A stretch of coastline where sediment is sources, transported, and deposited in a relatively self-contained system.
Sediment transport	The movement of particles, such as sand, silt, and clay, by water.

Shoreline protection or storm damage protection	Structural or non-structural measures taken to protect coastlines from erosion, flooding, and storm damage
Social setting	The human element within and adjacent to the project area.
Social significance	Resource elements that hold importance to local individuals or to the local community, however, do not fall within the protection of laws.
Storm surge	High winds from storm events blowing across the surface of a lake can generate extreme wave heights and send water toward the shoreline, causing a temporary super elevation of the lake's water level.
USACE standards	Applicable USACE engineering manuals and regulations that guide planning, design, construction, operation, and maintenance of coastal storm damage reduction projects.
Wave overtopping	The amount of water flowing over the crest of a coastal structure such as a revetment, a dike, a breakwater, due to wave action.

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Chapter 1 Purpose & Need

1.1 National Environmental Policy Act (NEPA) and Related Procedures

The National Environmental Policy Act (42 United States Code [USC] 4321 et seq.), Fiscal Responsibility Act (42 USC 4331 et seq.) and the applicable NEPA regulations require that USACE consider the potential environmental effects of a proposed action before making a decision on the proposed action. This Draft Supplemental Environmental Assessment (SEA) incorporates and supplements the Chicago Shoreline 45th to 51st Street (Morgan Shoal) Storm Protection Emergency Repair Environmental Assessment (USACE, 2020) and the Final Feasibility Report and Environmental Assessment for the Illinois Shoreline Erosion Interim III Storm Damage Reduction study (USACE, 1993) assesses the reasonably foreseeable environmental effects of reconstructing the revetment along the Morgan Shoal shoreline of Lake Michigan in Chicago. This Draft SEA provides USACE, other decision makers, and the public with the information needed to make an informed decision about the shoreline protection activities and their impacts on natural and cultural resources.

1.2 Project Location & Authorization

The project area is located within the City of Chicago, approximately 5 miles south of downtown along Lake Michigan in a corridor of shoreline known as Morgan Shoal (Figure 1). The corridor is located between 45th and 51st Street and is named for the bedrock outcrop in the bed of Lake Michigan located approximately 300 feet offshore (Figure 2).

The project is a segment of the Chicago Shoreline Protection Project. Under resolutions adopted by the Committee on Public Works of the U.S. House (dated December 2, 1971 and April 11, 1974), USACE was directed to study shore erosion problems and erosion control measures for the Illinois shore of Lake Michigan. In 1993, USACE completed the Final Feasibility Report and Environmental Assessment for the Illinois Shoreline Erosion Interim III Storm Damage Reduction study, and on April 14, 1994 the Chief of Engineers recommended to Congress authorization to construct a plan to reconstruct 9 miles of the Lake Michigan shoreline.

Section 101(a)(12) of the Water Resources Development Act (WRDA) of 1996 authorized construction of the Chicago Shoreline Project, as amended by Section 318 of WRDA 1999, Section 7003 of the Water Resources Reform and Development Act of 2014, and Section 8336 of WRDA 2022. A project cooperation agreement (PCA) was executed on May 17, 1999, and provided for the non-Federal sponsors (the City of Chicago and the Chicago Park District) to build specific segments of the project.

1.3 Project Delivery Team

The project delivery team (PDT) for the Morgan Shoal Revetment Reconstruction project is comprised of USACE and the non-federal sponsors. The non-federal sponsors are the City of Chicago and the Chicago Park District (CPK). In accordance with Section 318 of WRDA 1999 and the PCA, the non-federal sponsors are performing the design and construction of this reach as work-in-kind. The City of Chicago through the City's Department of Transportation (CDOT) would provide the non-federal cost share funds for construction. On behalf of the City, the Public Building Commission (PBC) has been leading the project management for the City. In order to obtain federal credit or reimbursement for the federal cost share of the non-federal sponsors' work, the final plans must be compliant with applicable federal law, including NEPA, and be approved by USACE. USACE approval requires that the final design adheres to applicable regulatory, environmental, and technical standards. The CPK is providing the easements and access for the project, as the real estate and riparian rights for the project are under their

ownership and control. The Non-Federal Sponsors are responsible for operations and maintenance of all completed projects that are part of the Chicago Shoreline Protection Project as per the PCA.

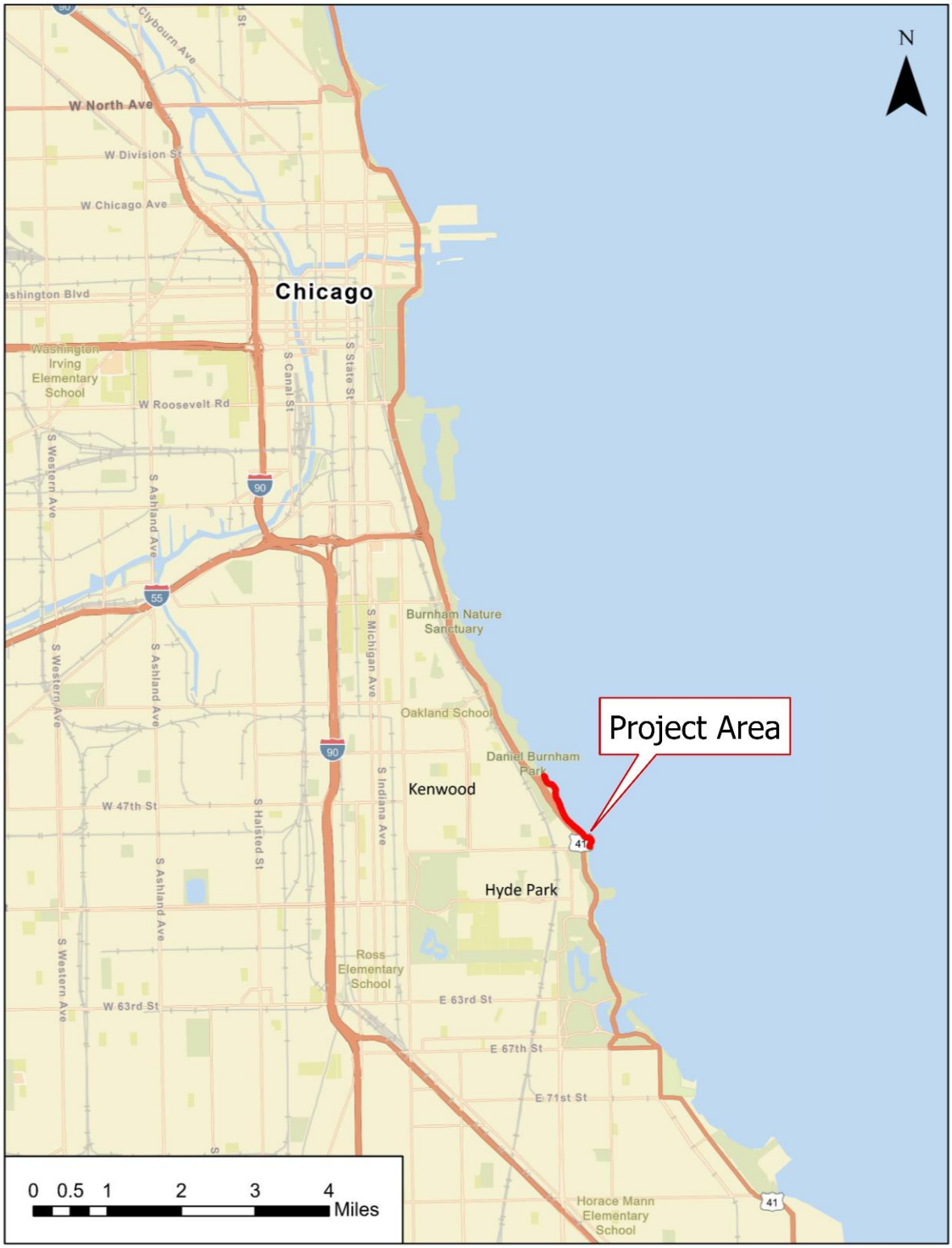

Figure 1: Morgan Shoal Revetment Reconstruction project vicinity map.

Figure 2: Map and aerial view of Project Area

1.4 Purpose & Need

The primary purpose of this federal action is to address ongoing erosion and coastal storm risk that have affected parkland and threaten the stability of U.S. Highway 41 (DuSable Lake Shore Drive) within the City of Chicago by installing new revetments that are designed to manage wave attack and reduce flood risk. Existing shoreline protection in the Morgan Shoal corridor consists of remnants of earlier limestone block and timber crib revetment. The area also includes portions of riprap support, concrete slab, and curb modifications that have been added at various times. The revetment deterioration includes damage to the timber bulkheads, tie-rods, and walers; shifting of the structure; and subsidence of capstones. Temporary emergency repair measures have been performed by CPK over the years, and most recently in 2020, but these areas lack long-term solutions (Figure 3).

Due to the loss of parkland and proximity of DuSable Lake Shore Drive (within 150 feet of the water's edge), a major transportation artery in the City of Chicago, it is necessary to mitigate and perform construction of a long-term solution.

The need is further emphasized due to recent near-record lake levels in 2020, as well as continued deterioration from wave and ice impact and freeze-thaw processes.

Figure 3: Erosion of parkland behind failed timber cribs and displaced limestone blocks

1.5 Related NEPA Documentation, Previous Studies & Projects

This Draft SEA addresses erosion and coastal storm risk management along the Morgan Shoal corridor of Lake Michigan with the implementation of long-term protection measures. It supplements previous environmental assessments to incorporate more detailed design information that had not yet been developed in 1993 or as part of the 2020 emergency repair effort. Previous relevant NEPA documents are:

- USACE Chicago, 1993. Final Feasibility Report and Environmental Assessment for the Illinois Shoreline Erosion Interim III Storm Damage Reduction study.
- USACE Chicago, 2020. Supplemental Environmental Assessment of Chicago Shoreline 45th to 51st Street (Morgan Shoal) Storm Protection Emergency Repair, Chicago, Illinois.

- USACE Chicago, 1999. Environmental Assessment for Shoreline Protection, 51st Street to 54th Street, Chicago, Cook County, Illinois. Chicago Shoreline Storm Damage Reduction Project.
- USACE Chicago, 2002. Environmental Assessment for Shoreline Protection, 37th Street to 40th Street, Chicago, Cook County, Illinois. Chicago Shoreline Storm Damage Reduction Project.
- USACE Chicago, 2005. Environmental Assessment for Shoreline Protection, 40th Street to 41st Street, Chicago Cook County, Illinois. Chicago Shoreline Storm Damage Reduction Project.
- USACE Chicago, 2007. Environmental Assessment for Nearshore Reef attached to proposed shoreline protection on Lake Michigan at 43rd Street to 45th Street, Chicago, Cook County, Illinois. Chicago Shoreline Storm Damage Reduction Project.

Chapter 2 Proposed Alternatives

The list of proposed alternatives presented in this Draft SEA represents a new and more detailed design iteration from what was originally authorized for implementation. The proposed alternatives also include betterments proposed by the non-federal sponsors. The following discusses the history and rationale for the current ongoing design process.

2.1 Alternative History

The original array of plans for the Illinois Shoreline Erosion Interim III Storm Damage Reduction study is discussed in the July 1993 Final Feasibility Report and Environmental Assessment, herein described as the 1993 Report. The 45th to 51st Street project area is discussed as part of Reach 4 in the 1993 Report. The purpose of the 1993 Report was to evaluate flooding and coastal storm risk along the Chicago shoreline, formulate and evaluate alternatives to address the problems, and assess the potential environmental consequences of the alternatives.

The 1993 Report identified Plan I – *Base Plan: Low Berm Revetment* as the National Economic Development (NED) plan, as it is the plan which reasonably maximizes net NED benefits consistent with the federal objective, in this case, coastal storm risk management. This plan was the federally supported plan, had the non-federal sponsor chosen not to pursue a Locally Preferred Plan (LPP). The features of this plan for Reach 4 (which includes Morgan Shoal) included the construction of a wide crest, low berm rubble mound revetment along the shoreline. The non-federal sponsor chose instead to pursue an LPP, agreeing to cover additional costs beyond those identified for the NED plan. Therefore, the NED plan was not authorized for implementation.

The LPP was developed to be a compromise between the least cost plan and more extensive plans. Therefore, Plan IV – *Enhanced Base Plan Steel Sheet Pile/Step Stone Revetment*, was identified as the LPP and was recommended and authorized for implementation. While Plan IV was also formulated for coastal storm risk management, it contained features that would provide additional recreation benefits compared to the NED.

The features of Plan IV for Reach 4 consisted of vertical steel sheet pile walls at the water's edge tied back to H-piles rather than the double-walled timber pile, stone-filled structure previously constructed along the Chicago shoreline. The proposed structure would have a concrete cap, with stepped limestone blocks set back from the walkway to act as a splash apron, much as the remaining existing structures appeared in 1993, with a crest height of 13 feet Low Water Datum (LWD). The revetment would be constructed over and lakeward of the existing, failed revetment.

Plan IV essentially provided for in-kind replacement of the original shore protection structures. However, the design was modified by substituting steel sheet piling for the double-walled timber piling. The steel sheet pile design is less costly than the timber pile design and eliminates the timber rotting problem that contributed to the failure of the original shore protection structures.

Subsequent design iterations of the LPP for reaches that have already been constructed required adherence to Americans with Disabilities Act (ADA) accessibility with the inclusion of concrete ramps to the concrete walkaway at the water's edge. Additionally, the step stone design was constructed with concrete step stone and wave deflectors instead of limestone as presented in the original LPP.

As part of the original consultation process under Section 106 of the National Historic Preservation Act, a Memorandum of Agreement (MOA) between USACE, Illinois SHPO, Advisory Council, City of Chicago, and the Chicago Park District was signed in 1993. Currently, the 1993 MOA needs to be updated to reflect current standards. Therefore, the Advisory Council on Historic Preservation (ACHP), SHPO, and USACE are currently in consultation to amend the 1993 MOA with a Programmatic Agreement (PA) for Promontory Point. The Morgan Shoal segment is not included in the PA. Instead, the Section 106 consultation for the Morgan Shoal segment will adhere to the current Section 106 regulations set forth at 36 CFR Part 800 – Protection of Historic Properties.

2.2 Modified Locally Preferred Plan Rationale

During initial design investigations in the late 1990s and early 2000s for the 45th to 51st Street segment of the Chicago Shoreline, it became apparent that the steel sheet piling, as presented in the original LPP and implemented in previous segments along the shoreline, would be difficult to implement along this reach due to geotechnical concerns with the existing geology. Several borings were drilled from 1997 through 2004 along the Morgan Shoal corridor to describe the existing soil profile and aid in geotechnical considerations for future design. These historical borings logs, along with additional borings conducted in 2022, are presented in Appendix C.

The borings revealed that shallow dolomitic limestone bedrock exists along this reach with variable depths ranging from 21 feet to 61 feet below the surface. Dolomitic limestone is a very dense bedrock into which it is difficult to drive steel sheet pile. As such, it would require atypical expensive driving methods. Generally, the steel sheet piling would need to be driven in approximately 20 to 40 feet depending on conditions. However, existing softer soil materials would require deeper piling depths due to higher instability concerns in the long term.

In addition to the shallow bedrock, the boring profiles revealed that sand and medium to soft clay, were typically present above the bedrock, from the surface to approximately 30 feet deep at varying depths along the majority of the reach. Given these conditions, deeper piling depths would be required for long-term stability. However, the shallow bedrock inhibits deeper pilings depths. Therefore, it was determined that the steel sheet piling revetment of the original LPP would not be feasible to implement along the majority of the reach and a more feasible revetment design would be needed for 45th to 51st Street.

The 1993 Report discussed the infeasibility of timber cribs for long-term use due to timber rot causing the loss of structural integrity of the original limestone step revetment, as seen along this reach and historically along other segments of the shoreline. For more information on the current condition of the historical limestone step revetment, refer to Appendix K. Given that timber cribs and driving steel sheet piling along the majority of this reach are not feasible, a

limestone step stone revetment as originally constructed or presented in the original LPP would not have adequate structural support.

The 1999 Burnham Park Framework Plan incorporated input from community leaders and residents and established a vision for future usage and design of the entire park, with specific recommendations for the 47th to 51st Street area. Recommendations for this area included constructing a new cove and creating a more naturalistic lakefront edge, and providing an overlook with signage, seating, and lighting.

In 2003 - 2004, a preliminary design was developed by the Non-Federal Sponsors, based on the input from several public meetings. The resulting preliminary design included dozens of acres of fill and new parkland in Lake Michigan, but the preliminary design concept was not further developed due to adverse impacts to Morgan Shoal and cost.

The Chicago Park District initiated the formation of the Morgan Shoal Framework plan, which was developed in 2014-2015 with extensive input from community members, CPK and engineering studies aimed at protecting the shoreline while enhancing its recreation and ecological value. Community involvement generated input that provided guidance for the design ideas aimed at preserving the shoal, creating a more passive park experience, and providing viewing areas along the lakeshore.

The features of the Morgan Shoal Framework Plan included the installation of sloped rubble mound revetment, composed of large, quarried stone, from 45th Street to approximately 49th Street. From there, the shoreline would transition to a dynamic revetment composed of a pebbled zone at the water's edge with a stepped stone revetment at the backshore. The area would help dissipate wave energy while enhancing public use. South of the dynamic revetment would be additional sloped rubble mound revetment until 51st Street. The final several hundred feet of the shoreline would be stepped concrete revetment with ADA accessibility, with steel sheet piling, which would transition into, and match, the existing stepped concrete revetment south of the project area. The shoreline protection features would be designed to meet coastal protection standards established by USACE. Appendix D shows the 2015 Morgan Shoal Framework Plan for reference. The 2015 Morgan Shoal Framework Plan was considered in evaluating alternatives for the preferred alternative as discussed further below.

Congress modified the project authorization in the Water Resources Development Act (WRDA) of 2022, which directed USACE to provide 65% of the cost of the LPP for Morgan Shoal reach as set forth from the 1994 report. Currently, the LPP is in the design and engineering phase which includes coastal modeling and community engagement opportunities. USACE considered the public input from prior non-federal sponsor engagements in the development of this SEA. In addition, there will be a public review and comment period as part of the NEPA process that will be considered and incorporated into the final SEA document. Public input from the non-federal sponsor's prior engagements 2024 design phase efforts is included in Appendix E. Public coordination as part of the NEPA process is in Appendix A.

2.3 List of Alternatives

This Draft SEA provides a detailed impacts analysis for the No-Action and the Preferred Alternative for the Chicago Shoreline storm damage reduction project along the Morgan Shoal corridor (45th to 51st Street) of Lake Michigan and their impacts to natural and cultural resources. Previously, numerous alternatives were considered to address coastal storm risks and flooding at the 45th to 51st Street segment of the Chicago Shoreline Project. Table 1 in Appendix B sets forth the previously considered alternative elements, the screening rationale applied to that

element, and which document or phase the consideration occurred. Appendix B also includes the rationale for which alternatives were chosen to be included for the impacts analysis in this NEPA document.

In this SEA, there are two alternatives considered to address erosion and coastal storm risk along the Chicago shoreline between 45th and 51st Street.

1. **No Action Plan:** Under the no action alternative, no reconstruction of the Chicago shoreline along the Morgan Shoal corridor would occur. The existing revetment and the temporary storm damage protection features that were installed during the 2020 emergency repairs would continue to experience erosion and further deterioration from coastal storms. Continued temporary repairs would likely need to occur approximately every 5 to 10 years or after severe storms or as needed. The existing shoreline protection features would be inadequate in the long-term with continued deterioration and erosion along the shoreline.

2. **Preferred Alternative – Morgan Shoal Revetment Reconstruction (45th – 51st Street):** The preferred alternative is an evolved iteration of the 2015 Morgan Shoal Framework plan, influenced by physical and computational coastal engineering modeling, community engagement input, and agency coordination. Appendix E shows the June 2024 Morgan Shoal Community Update which highlights design evolution from the original 2015 Framework Plan to the current design iteration.

   The Morgan Shoal Revetment Reconstruction alternative proposes a complete replacement of existing failing revetment structures along the Morgan Shoal reach. The new revetment would consist of approximately 3,700 linear feet of rubble mound revetment, 1,000 linear feet of dynamic revetment with an underwater breakwater, and 800 linear feet of steel sheet pile and stepped concrete revetment. The steel sheet pile and stepped concrete revetment, would only be used around the peninsula at 51st Street as a transition from the existing similar revetment to provide ADA accessibility at the location. Suitable existing stone, pebbles, and other materials would be salvaged to be included in the revetment throughout the reach.

   The project would modify the shoreline and fill approximately 7 acres of the lake to create usable parkland with headlands and land extension with approximately 320,000 cubic yards of clean fill below the Ordinary High-Water Mark (OHWM). The reconstruction of the revetment would provide a more stable and durable shoreline to withstand the coastal forces of Lake Michigan. Work would be conducted on land with heavy machinery and by barge on the lake.

   The modern standard for protecting Chicago's Lake Michigan shoreline is a stepped concrete revetment structure, which requires steel sheet pile to be driven deep into the ground. Along the Morgan Shoal corridor, however, bedrock is near the surface which limits the feasibility of driving sheet pile to the necessary depth to support that type of construction. Therefore, a stepped concrete revetment with steel sheet pile is technically not feasible along the majority of the Morgan Shoal corridor and is not the preferred shoreline protection structure where bedrock is close to the surface. The steel sheet pile and stepped concrete revetment is feasible around 51st Street peninsula.

   The preferred shoreline structure for the majority of the Morgan Shoal corridor is a sloped rubble mound revetment constructed of armor stone with a dynamic revetment. This design is feasible to implement regardless of bedrock conditions and is a proven effective shoreline

protection structure.

2.4 Preferred Alternative (Proposed Action)

Morgan Shoal Revetment Reconstruction is the preferred alternative and Proposed Action. The shoreline protection includes a complete replacement of existing failing revetment structures. The new revetment would consist of approximately 3,700 linear feet of rubble mound revetment, 1,000 linear feet of dynamic revetment with underwater breakwater, and 800 linear feet of steel sheet pile and stepped concrete revetment (Figure 4).

The intent of this proposed design is to meet or exceed the minimum requirements set forth by USACE for shoreline protection, to incorporate public engagement and input into the design process, and to provide enhanced public shoreline recreational opportunities. The new revetments are designed to manage wave attack and flooding potential, while the upland areas would be reshaped and refined to provide flood control and management of wave overtopping.

The project would add approximately 7 acres of new usable parkland by providing more width to the narrowest parts of the park, as well as new elevated viewpoints (peninsula) at 47th Street, 49th Street, and 51st Street, and a new restroom facility. The new parkland would be a balance of lawn and areas planted with native species to increase biodiversity and upland habitat. The new and modified lands would provide a buffer from Lake Michigan wave action, raise the elevation of parkland, increase recreation opportunities for users, improve safety for park users with improved trails and more extensive lighting, and reduce erosion and flooding.

The project would include the following features, from north to south:

- Starting at the northern end of the project, approximately 2,800 linear feet of new rubble mound revetment would be constructed lakeside of the existing deteriorated revetment (Figure 4; North Red). The new revetment would consist of IDOT RR3 core stone, 0.5 - 1 ton filter stone, and 6 - 10 ton armor stone would be placed in Lake Michigan up to a crest elevation of +15.0 Low Water Datum (LWD). Due to lakebed conditions in this segment, a toe trench approximately 15 feet wide and 5 feet deep would be excavated and filled with clean core stone to provide a solid foundation for the armor stone. Suitable existing stone materials on site, including repurposed armor stone and limestone blocks, would be salvaged, processed and reused within the project site. Parkland behind the new revetment would be graded to integrate with the new revetment and control stormwater and overtopping runoff.

- Approximately 1,000 linear feet of new dynamic revetment (AKA expanded pebble beach), comprised of various sizes of cobble material, would be constructed to provide protection in the area most sheltered from wave action by the shoal (Figure 4; Green). The dynamic revetment would be a cobble shore protection structure with a crest elevation of +10.0 ft LWD and a minimum crest width of 60 feet. Clean core stone and larger diameter 9-inch cobble would be topped with three feet of 3-inch diameter rounded cobble mixed with salvaged birds' eye sand. Additional cobble salvaged from the existing area would supplement coverage as part of the new dynamic revetment. The backshore of the dynamic revetment would include the reconstruction of a step stone revetment, similar to the original stair step (or 'step stone') design using intact salvaged original limestone blocks from the 1920s to prevent migration of cobble into the park and onto the Lakefront Trails. The rows

of salvaged limestone blocks would offer seating opportunities along the feature, which would be an additional 100 feet lakeward from DuSable Lake Shore Drive than the current shoreline. Concrete blocks and birds' eye sand from recent temporary protection measures would be salvaged and incorporated into the dynamic revetment. A new restroom facility, plaza, dune area with native plantings would also be incorporated into this segment.

- The dynamic revetment design includes a detached offshore underwater rubble mound breakwater to assist with stabilizing the dynamic revetment (Figure 4; Green). A core of 450 - 650 lbs. filter stone would be topped with 2 - 4 ton armor stone. The breakwater would be located between the two small headlands that border the dynamic revetment.

- South of the dynamic revetment would be approximately 900 linear feet of new rubble mound revetment (Figure 4; South Red). The new revetment would consist of IDOT RR3 core stone, 0.5 – 1 ton filter stone, and 4 – 6.5 ton armor stone with a crest elevation of +13.0 LWD. This segment of rubble mound revetment uses a smaller armor stone and a lower crest height due to the wave protection provided by the shoal. Due to lakebed conditions in this segment, a toe trench would not be required. Suitable existing materials on site would be processed and reused within the project site. Parkland behind the new revetment would be graded to meet the new revetment and control stormwater and overtopping runoff.

- The southern 800 linear feet of project shoreline around the 51st Street Peninsula would be protected with a new steel sheet pile and stepped concrete revetment, similar to what has been installed in many other sections of the Chicago Shoreline Project (Figure 4; Blue). The proposed revetment would provide a smooth universal access (ADA) transition out of the completed 51st – 54th Street shoreline segment that currently dead-ends near 51st Street. The new concrete revetment profile would match those of the 51st to 54th Street segment. Crushed stone or processed clean fill would be used within the revetment structure. The toe of the sheet pile would be protected from scour with a layer of filter stone topped with armor stone.

- The project would include the filling of approximately 7 acres of the lake. The project would include approximately 320,000 cubic yards of clean fill below the OHWM of 581.5 (ILGD 85), which is +4.0 LWD.

2.4.1 Temporary Structures During Construction

The preferred alternative may require the construction of temporary shoreline and upland structures. The exact type and location of temporary structures and/or construction materials cannot be determined at this time, as they would be subject to the contractor's preferred means and methods for the work being performed. However, temporary structures may include work and storage areas, barge mooring facility, aggregate platform, access roads, barricades, and office facilities. Temporary structures would be at USACE-approved locations within project boundaries or rights-of-way; outside of any wetlands, areas containing federal or state protected species or their critical habitat; and sited so as not to affect properties listed on or eligible for listing on the National Register of Historic Places or state listed properties. Temporary activities would include appropriate precautionary measures to prevent erosion and sedimentation or other undesirable environmental impacts. These construction aids would be removed when no

Figure 4: Proposed project rendering. Colors correspond to major feature descriptions in text.

longer needed and their sites would be restored to pre-project conditions upon project completion.

All construction activities would be carried out in accordance with federal and state laws, regulations, and local ordinances. Some variation in design details may occur as plans are finalized. However, any variations that result in a significant change to the project design or environmental impacts would be further evaluated under a supplemental NEPA analysis.

Chapter 3 Affected Environment and Environmental Consequences

This chapter discusses the existing conditions by resource category and any potential environmental impacts associated with the no action alternative as well as with implementation of the preferred alternative.

Resources analyzed in this document include physical resources; biological resources; cultural and social resources; traffic and transportation; and hazardous, toxic & radioactive wastes (HTRW); climate, limnology, land use, and social setting and socioeconomic resources.

3.1 Level of Environmental Impact Significance

USACE evaluated the potentially affected environment and the effects of the two alternatives, respectively, to determine whether alternative impacts are significant. In considering the potentially affected environment, USACE considered the affected area and its resources. USACE defined effects or impacts to mean changes to the human environment from the no action and preferred alternative that are reasonably foreseeable. In considering the degree of the effects, USACE considered short- and long-term effects; beneficial and adverse effects; any effects to public health and safety; and whether the action threatens to violate federal, state, or local laws established for the protection of the human and natural environment. USACE considered the severity of an environmental impact as follows:

- None/negligible – No measurable impacts are expected to occur.

- Minor – A measurable and adverse effect to a resource. A slight impact that may not be readily obvious and is within accepted levels for permitting, continued resource sustainability, or human use. Impacts should be avoided and minimized if possible but should not result in a mitigation requirement.

- Significant – A measurable and adverse effect to a resource. A major impact that is readily obvious and is not within accepted levels for permitting, continued resource sustainability, or human use. Impacts likely result in the need for mitigation.

- Adverse – A measurable and negative effect to a resource. May be minor to major, resulting in reduced conditions, sustainability, or viability of the resource.

- Beneficial – A measurable and positive effect to a resource. May be minor to major, resulting in improved conditions, sustainability, or viability of the resource.

- Short-Term – Temporary in nature and does not result in a permanent long-term beneficial or adverse effect to a resource. For example, temporary construction-related effects (such as, an increase in dust, noise, traffic congestion) that no longer occur once construction is complete. May be minor, significant, adverse, or beneficial in nature.

- Long-Term – Permanent (or for most of the project life) beneficial or adverse effects

to a resource. For example, permanent conversion of a wetland to a parking lot. May be minor, significant, adverse, or beneficial in nature.

USACE used quantitative and qualitative analyses, as appropriate, to determine the level of potential impact from proposed alternatives. USACE analyzed ecological, aesthetic, historic, cultural, economic, social, and health effects, as applicable. Based on the results of the analyses, this Draft SEA identifies whether a particular potential impact would be adverse or beneficial, and to what extent.

3.2 Physical Resources

3.2.1 Climate

Existing Condition

Climate conditions of the study area are discussed in the 2020 EA in which weather data utilized was from 1981 through 2010. Currently, the National Oceanic and Atmospheric Administration's (NOAA) Online Weather Data utilizes data from 1991 – 2020 for the Chicago Area. Upon review of the data, there was no significant numerical change between the climate conditions that were presented in the 2020 EA and what was queried for current Chicago Area conditions.

Preferred Alternative Impact

The preferred alternative would not have an impact on climate. Construction of the preferred alternative would not have any short-term or long-term impacts to climate. Additional fossil fuels would be needed during the placement of the protection features for the operation of associated construction vehicles. However, there would be no measurable impact on climate, even though there may be localized increases in greenhouse gas emissions during construction. Once construction is complete, additional fossil fuels would not be needed for operation.

No Action Alternative Impact

The No Action Alternative would not have an impact on climate.

3.2.2 Geology & Soils

Existing Condition

Geologic and soil characteristics of the project area are described in the 2020 EA and conditions have not changed; historical boring logs are presented in Appendix C. However, the nearshore geologic feature, Morgan Shoal, was not previously described and is thus described below.

Morgan Shoal is a bedrock reef formation located in Lake Michigan in the immediate vicinity of the project area (Figure 2). The majority of the Lake Michigan bed consists of sand and glacial till with few rocky outcroppings, making Morgan Shoal a unique geologic feature. The shoal is located east of the project area, within 300 feet of the current shoreline and extends approximately 2,900 feet into Lake Michigan, covering approximately 32 acres (Willink, 2016). Depending on water levels, the shoal's depth ranges from 4 – 20 feet, creating a shallow region in the nearshore.

The modern reef was once an ancient coral reef formed approximately 425 million years ago during the Silurian Period when the Chicago region resided in shallow seas near the equator. Over time, the coral reefs were converted into Niagaran dolomitic limestone through sedimentation and compression as it formed part of the region's bedrock (Wiggers, 1997).

Fossil imprints from corals and trilobites are present within the dolomitic bedrock, however they are difficult to find on the modern reef due to erosion of the bedrock surface. Glaciation in the region scraped younger geologic deposits and bedrock down to expose the older Silurian dolomitic bedrock. Subsequent glacial melt, shoreline erosion, and changing lake levels resurfaced Morgan Shoal amongst surrounding sand and glacial till.

Today, Morgan Shoal provides unique aquatic habitat for various aquatic organisms, including fish, macroinvertebrates, sponges, algae, and mussels. Organisms utilize the fractured crevices in the bedrock and the eroded cobble for refuge, foraging, and reproductive activities (Figure 5).

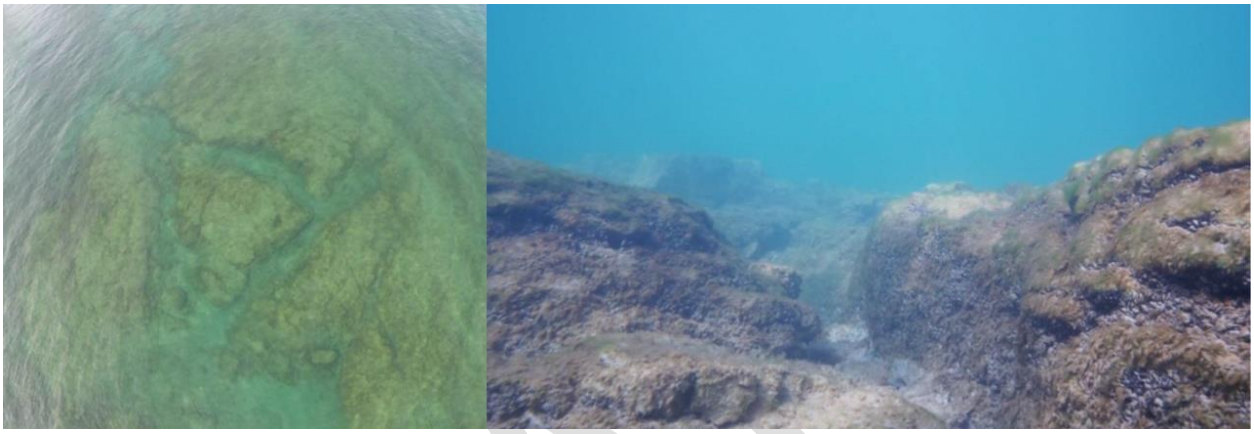

Figure 5: Aerial of Morgan Shoal crevices (left) and underwater view of bedrock crevices (right). Photo credit S. Cejtin (Willink 2016).

Preferred Alternative Impact

Construction of the preferred alternative includes activities that would impact soils along the shoreline. The preferred alternative includes the excavation of a toe trench (approximately 15 feet wide and 5 feet deep) within the lakebed along the northern reach of the shoreline as a foundation for the rubble mound revetment. The reach requiring the toe trench is approximately 2,800 linear feet and would need this foundation due to the existing soft clay in the lakebed posing stability concerns. This approximately one-acre excavation and foundation fill would be a long-term impact on the lakebed. However, the effect would be minor due to the relatively small scale of activities compared to the size of the lakebed. Additionally, revetment reconstruction activities would result in impacts to terrestrial soils in parkland areas through regrading during construction. The existing soils are largely urban fill from historic shoreline construction and are not unique. Therefore, these effects would be short-term and minor.

The placement of fill to create the headlands and the submerged breakwater are in the immediate vicinity of the Morgan Shoal geologic formation. Morgan Shoal would not be physically disturbed as there would be no placement of fill on top of the exposed bedrock (Figure 6). Therefore, there would be no long-term adverse effect to Morgan Shoal. Best management practices (BMPs) appropriate for the coastal environment would be used during construction to avoid and minimize any such effects on Morgan Shoal. Altered near shore wave currents during high water level conditions along the northern headland may periodically deposit low volumes of sand onto the shoal with short residency times. This would be a short-term negligible impact due to the small area impacted on the shoal. Discussion of the hydraulics influencing this impact are found in Section 3.2.4.
Overall, there would be both short-term and long-term minor adverse impacts to soil resources, and short-term negligible impacts to geologic resources.

No Action Alternative Impact

The no action alternative would result in long-term adverse impacts to soils from continued erosion of the Lake Michigan shoreline and loss of urban fill soils used during construction of the shoreline in the area. No measurable impacts are expected to occur to Morgan Shoal under the no action alternative.

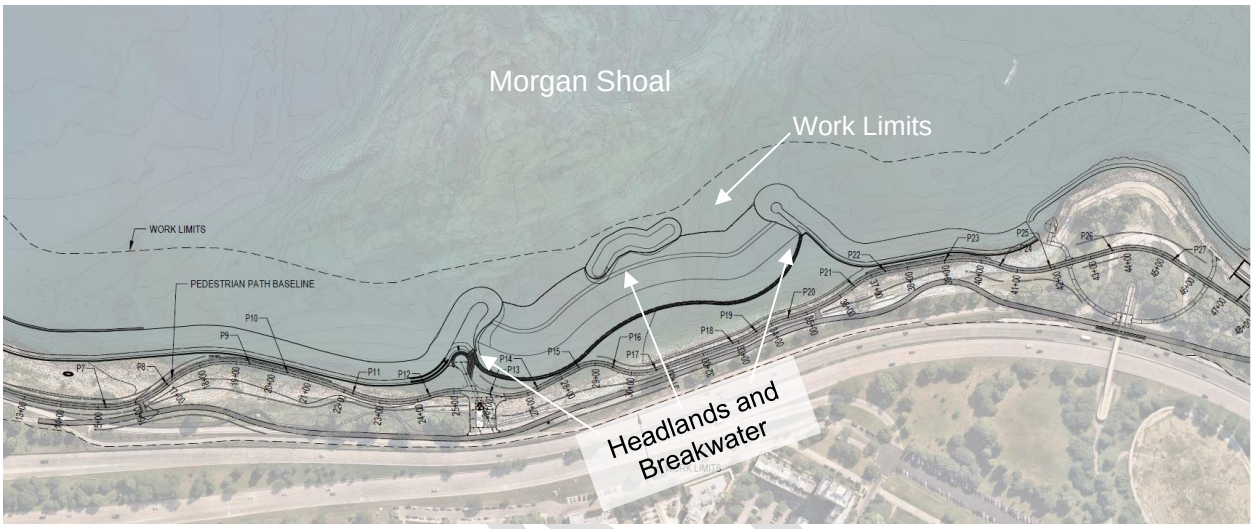

Figure 6: Proposed project features and work limits in relation to Morgan Shoal

3.2.3 Limnology

Existing Condition

Lake Michigan's limnology conditions are described in the 2020 EA and conditions have not changed.

Preferred Alternative Impact

As limnology refers to the macro scale of the entire Lake Michigan system, such as lake-wide levels, systems and processes, there would be no impact on Lake Michigan's limnology due to the small scale of the project.

No Action Alternative Impact

The no action alternative would have no impact on Lake Michigan's limnology.

3.2.4 Coastal Resources and Processes

Existing Condition

Shoreline Morphology

Prior to the settlement and urbanization of Chicago in the 19th century, the Lake Michigan shoreline was a dynamic coastal environment that consisted of natural beaches, dunes, swales, marshes, and wetlands. As the population and urbanization of the area increased, the desire for more land and shoreline infrastructure led to extensive modifications that permanently altered the shoreline. By the late 19th and early 20th centuries, artificial beaches, parklands, groins, retaining walls, revetments, and other armoring structures were implemented to reduce shoreline erosion which essentially froze what was once an active and changing shoreline.

In the 1920s and early 30s, a large shoreline protection project along the Morgan Shoal corridor extended the land out into Lake Michigan. Land was filled behind timber wood cribs and step stone revetments that reshaped the shoreline morphology to that of what is largely seen today (Figure 7). The original step-stone revetment design included timber wood cribs filled with rock that was then capped with large limestone blocks and limestone step stones at the backshore (Figure 8). Short segments of grouted cap stones that formed a 'paved beach' were also part of the original design.

Several partial rehabilitation efforts and enhancements have occurred along this corridor since its construction (Figure 9). Drawings from 1938 indicate that stone blocks placed on bulkheads required resetting. Later, short segments of rubble mound revetment were added on top of deteriorated revetment near the south end of the project site by 51st Street. Wood pilings began collapsing in the 1950s, leaving the structures and parkland subject to erosion. All-time low water levels in the 1960s exposed the wood pilings, leading to rotting and further increasing erosion. In the 1960s, the Chicago Park District added stone north of 47th Street to buttress the revetment and drove steel H-piles to help hold the stone in place. Concrete slabs were also placed over displaced limestone blocks during the 1960s and into the 1970s. Additional limestone was added as temporary protection at 45th street in 2012. Most recently, during record high Lake Michigan water levels experienced in 2019 – 2021, the City of Chicago and the CPK deployed emergency and temporary measures such as TrapBags, concrete blocks, rip rap, and jersey barriers, to reduce the rate of erosion and to protect DuSable Lake Shore Drive and other infrastructure from storm damage.

Figure 7: Historical shoreline morphology pre and post shoreline protection project.

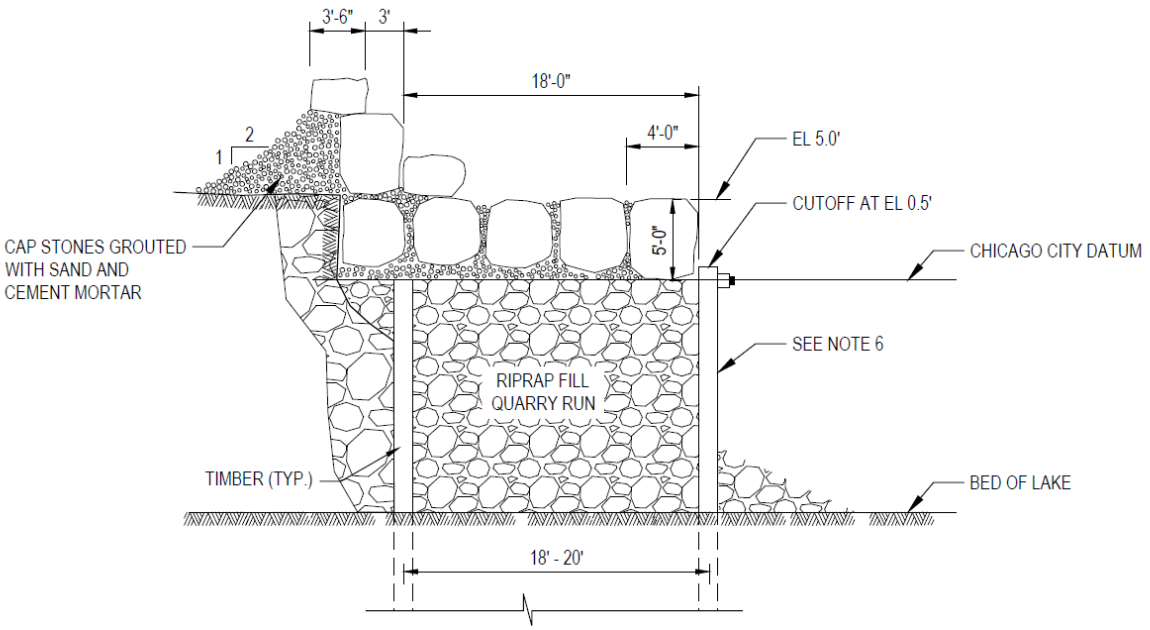

Figure 8: Original step stone revetment deign cross section

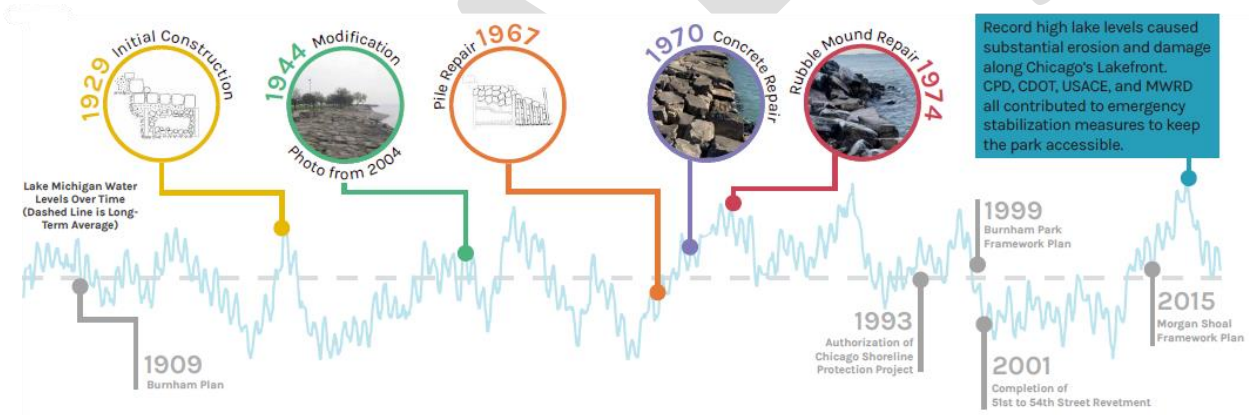

Figure 9: Shoreline History along Morgan Shoal corridor.

Over the decades, the shoreline would succumb to the forces of the lake with the continued deterioration of the revetment. The once vertical walls of the step stone revetment collapsed as the timber cribs rotted and the rock fill inside washed out, causing further erosion and instability of the cap stones. In the 1993 Final Feasibility Report and Environmental Assessment for the Illinois Shoreline Erosion Interim III study, it was noted that the shoreline protection structures within this reach were rapidly approaching functional failure, as the revetment already had experienced structural failure prior to the 1990s. While structural failure can offer a degree of protection, the structure is no longer supported as intended in the original structural system as seen by the deteriorated timber piling, loss of retained crib fill material, large voids under concrete and limestone blocks, and displaced capstones. At the time of functional failure, and thereafter, the existing land mass would be subjected to unimpeded storm damage and erosion. It was anticipated that at the time that the revetment's useful life would not exceed 11 years or 2003. During recent high-water events, there was a high rate of revetment deterioration in which structurally failed sections quickly deteriorated to a state of functional failure.

This functional failure was noted to have started in 1986 and has continued to occur along the shoreline, as indicated by the heterogenous rocky slope composed of rubble stones, eroded timbers and an actively eroding backshore (Figure 10 and Figure 12). Currently, approximately 53% of the shoreline in this reach has experienced functional failure (Figure 12). The majority of the remainder of the shoreline revetment is in a state of structural failure (approximately 38%) as seen in Figure 11 and Figure 12 with eroded timbers, displaced and eroded limestone capstone blocks. Approximately 9% of the shoreline reach is considered intact, in which the structure remains structurally sound without significant displacement or settlement. These areas are restricted to the armor stone placed at the northern end of the reach in 2012, and the rubble mound stone and concrete slabs placed around the 51st street peninsula in the 1970s (Appendix F). Approximately 1,674 linear feet of shoreline are temporarily intact and were part of the 2020 emergency repairs with a 5- to 10-year lifespan. The temporarily intact shoreline condition overlaps with structurally and functionally failed sections of the shoreline on the map (Figure 12) as an attempt to show the temporary nature of these sections. It is anticipated that when the emergency repairs outlive their designed lifespan, these sections would return to their previously failed condition.

Lastly, a small pebble beach, composed of fill stones from the timber crib and natural glacial till, has formed leeward of Morgan Shoal at approximately 49th Street. This pebble beach is a dynamic salient that recedes and reforms based on lake levels and wave action, adding to the now heterogenous and eroded shoreline (Figure 13).

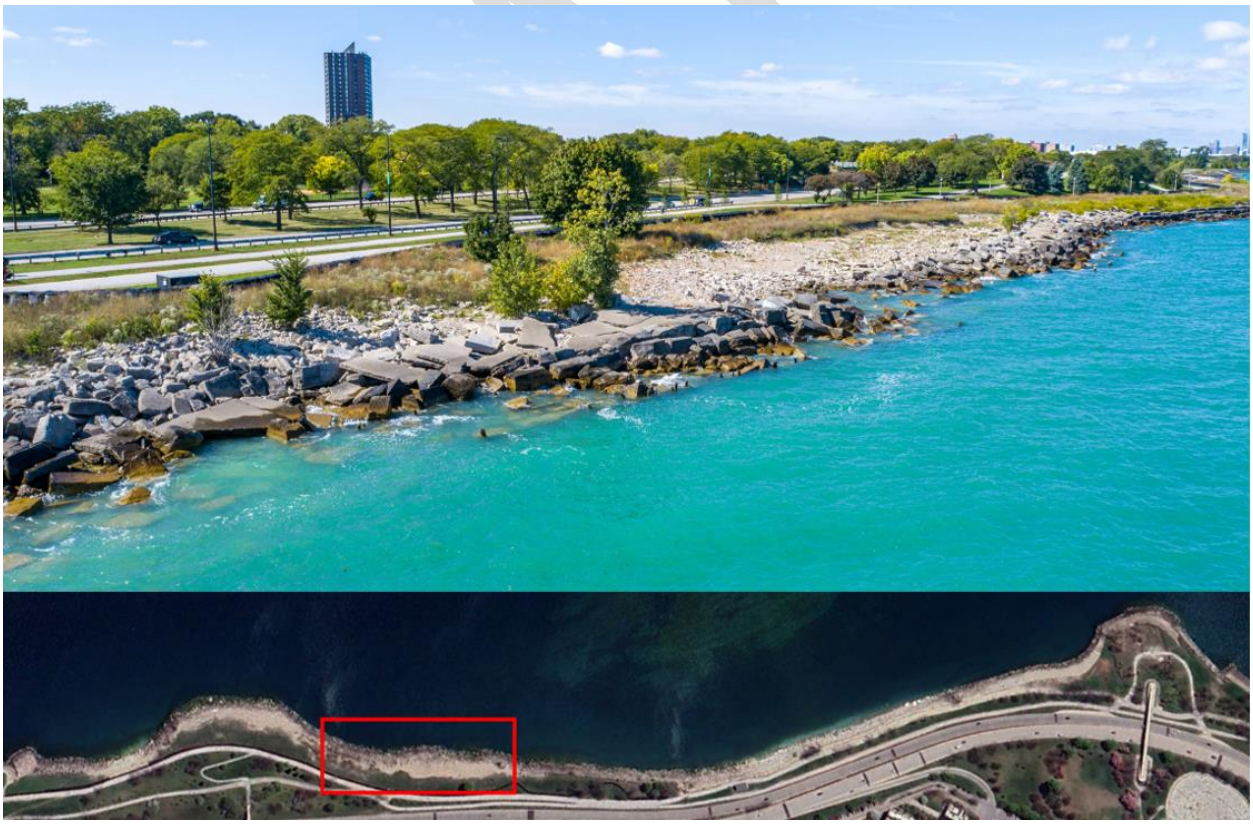

Figure 10: View of central portion of project site, looking north (Top) (September 2022). Much of this area is no longer recognizable as having an engineered shore protection system as it has experienced functional failure. All of the capstones are displaced, and the area is undergoing active erosion. Reference box (red) indicating location of photo (bottom).

Figure 11: Deteriorating pedestrian promenade and revetment with exposed deteriorated timber cribs along the Morgan Shoal reach which has experienced structural failure, looking north (March 2023). Reference box (red) indicating location of photo (bottom).

Figure 12: Coastal shoreline structure conditions indicating functional failure (2642 linear feet), structural failure (1888 linear feet) , and intact (424 linear feet) coastal protection structures. The coastal shoreline condition assessment was conducted based upon multiple site visits from 2019 – 2025, CDOT/CPK shoreline assessment reports, 2022 drone footage, Google Earth imagery, and utilizing ESRI ArcGIS mapping. (Appendix F).

Figure 13: Various pebble sizes that form the dynamic salient at approximately 49th Street (July 2025).

Wave Conditions

Deep water wave conditions are characterized using hindcast data made available through the Wave Information Studies (WIS) Station 94014, administered through the Coastal and Hydraulics Laboratory at USACE's Engineer Research and Development Center (ERDC). The WIS period of record spans from 1979 through 2019, and the WIS station is located roughly 6.0 miles north-northeast of the project site at a water depth of 42.3 ft. The most dominant wave direction is north (N) to north northeast (NNE) for the project site. These waves are predominantly experienced in the fall and winter months and through to the spring during storm events (Figure 14). The significant wave height experienced ranges from 7.6 feet to 8.5 feet for a 1-year wave, meaning that there is a near 100% chance that waves originating from the north would exceed the significant wave height of 7.6 feet in a given year, and waves from the north northeast would exceed 8.5 feet (Figure 15). The 100-year waves (or a 1% chance of a wave exceeding a certain height) for the N and NNE are 16 feet and 19 feet, respectively. Figure 15 shows the wave rose for the project vicinity, indicating the N and NNE prominent wave direction and provides a visual summary of the wave conditions for the various directions.

Local wave conditions vary at the project site, largely due to the influence of Morgan Shoal, which acts as a break, lowering the wave height and energy at and leeward of the shoal. The Simulating Waves Nearshore (SWAN) model was utilized to characterize the nearshore wave climate. Figure 16 shows the output from the SWAN model for a NNE 100-year condition, clearly showing the effect of Morgan Shoal on the nearshore wave environment with reduced wave heights leeward of the shoal. The breaking of waves over the shoal is often observed during fall and winter storms (Figure 17).

Figure 14: Inundation of the restroom building and pedestrian/bike lakefront trail at 49th Street during the January 11, 2020 storm event.

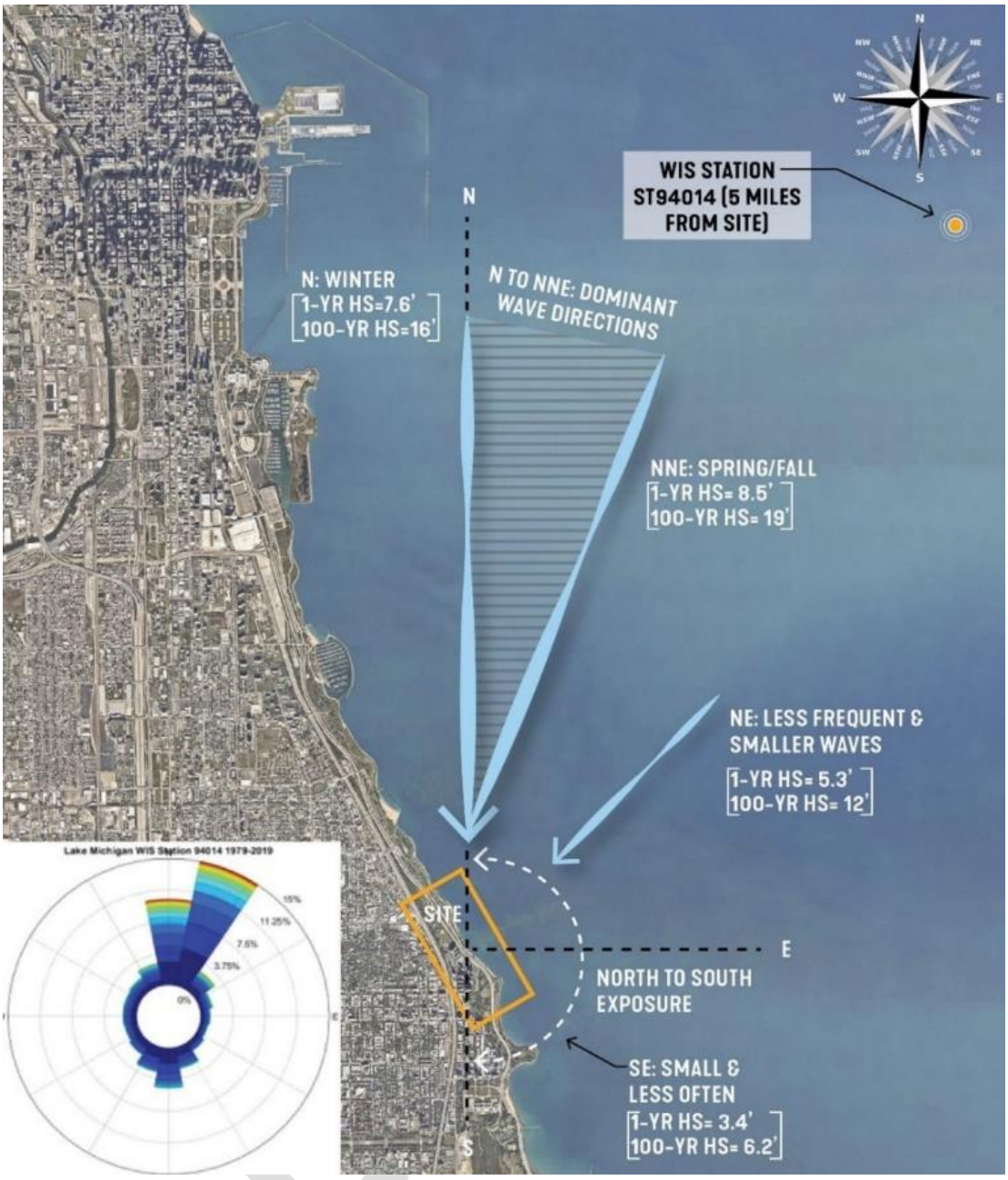

Figure 15: Summary of offshore wave conditions for various directions (SmithGroup).

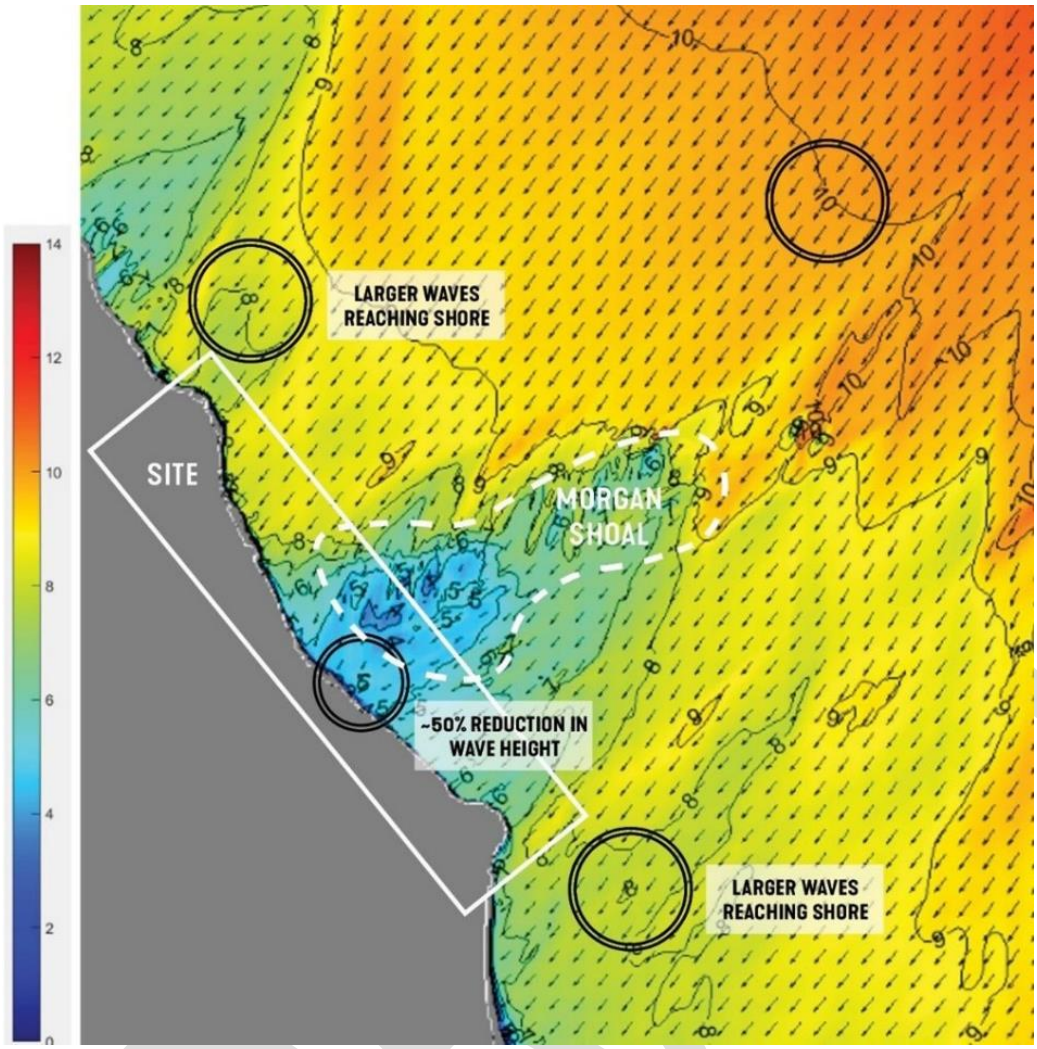

Figure 16: Model of NNE 100-yr wave conditions at project site. Red indicates higher wave height. Blue indicates lower wave height.

Figure 17: Winter waves breaking over Morgan Shoal (red arrows).

Current patterns, circulation, and sediment transport

The primary nearshore currents run north to south, consistent with the direction of net littoral transport in which sand and sediments are carried (Foster and Folger 1994, Chrzastowski et al. 1994, Nimz et al. 2014). However, southern Lake Michigan is generally considered sediment starved because the natural littoral hydraulic process has been completely altered from the natural state over the last century. This process of coastal modification is especially evident along the Chicago shoreline. The presence of numerous large in-lake structures (e.g. harbors, jetties, detached breakwaters) has created significant littoral barriers. Specifically, the presence of Navy Pier, the Jardine Water Purification Plant and the associated structures and breakwaters that compose the Chicago Harbor essentially created a total sediment barrier that prevents sediments from moving downdrift south of downtown. This starves the downdrift littoral system of sand and sediment.

Sand is now transported and trapped at different points, creating sediment cells that are relatively self-contained systems due to the numerous structures along the whole southern basin of Lake Michigan. Furthermore, there are negligible sediment inputs from the hardened shoreline into the nearshore sediment transport system. The Morgan Shoal project area resides within a sediment cell bounded by the 41st Street Oakwood Beach groin to the north, extending south towards the Promontory Point headland at 55th Street. The main sediment inputs for this sediment cell largely come from the 45th Street to approximately 49th Street shoreline within the project reach, in which this section is actively eroding. This erosion introduces sediments into the active nearshore sediment transport system, such as stones from the failed timber cribs, as well as sediments and sand from the urban fill originally placed during the 1920s shoreline fill project. Annual winter storms bring in deep water sand and glacial fill, which are then introduced into the active nearshore sediment transport system.

The potential sediment transport was estimated for the project area (Appendix G). Generally, sediment moves from the north to south along the project area shoreline with an accumulation zone leeward of Morgan Shoal and then continues to erode southward (Figure 18). Sediment transport rates vary along the project shoreline and are influenced by lake levels. At the northern end of the project area, the potential sediment transport rate is approximately 6,000 cubic yards per year (cy/yr) where the shoreline is not sheltered by the shoal. Meaning that roughly 6,000 cy of sediment erodes from the north and moves southward each year. At the southern end of the project area, the transport rates are estimated to be 200 cy/yr during low water levels and 1,500 cy/yr during high water levels. The wave energy leeward of Morgan Shoal is reduced, which reverses the predominant transport direction during low water levels and creates a protected area that allows a natural salient formation (locally known as “pebble beach”) to occur as highlighted in Figure 18. This salient is mainly composed of small stones that were likely the original fill for the timber cribs along the shoreline before their deterioration as well as glacial till material (Figure 13). During high lake levels, larger waves and induced currents increase erosion at the salient location.

At Morgan Shoal, waves experience refraction and diffraction, changing their angle of approach to the shoreline. Depending on the water level, these waves break, dissipating their energy. These wave transformation processes are sensitive to water levels. During low water levels, waves break at the shoal and dissipate energy which generates currents offshore. During high water levels, larger waves still reach the shoreline and generate nearshore currents. This is illustrated in Figure 19, showing low water level induce currents (left) and stronger north to south wave induced currents nearshore that occur during high water levels (right).

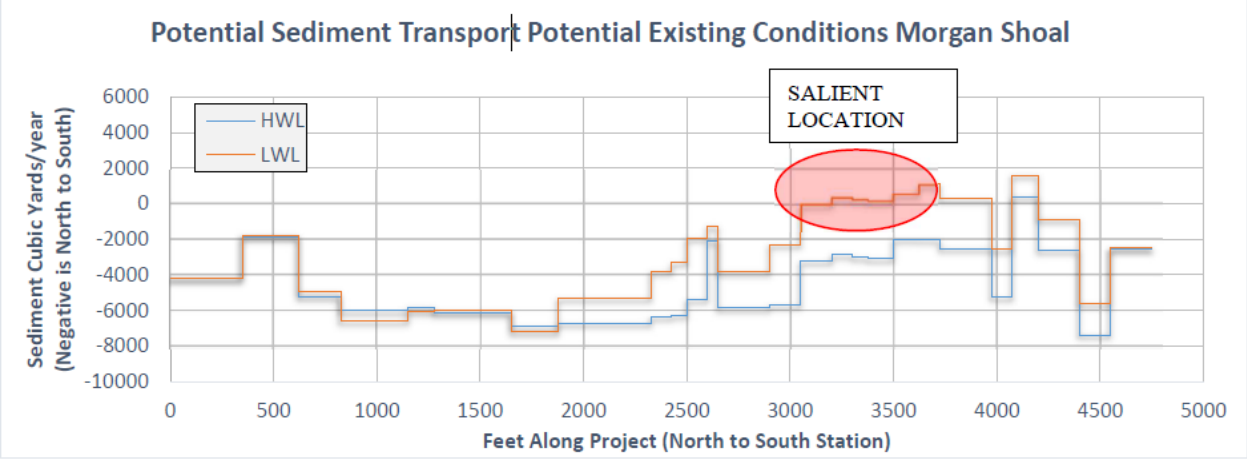

Figure 18: Sediment transport potential along project area shoreline. High water level (Blue) and Low water level (Red) sediment potential shown. Values below zero indicate sediment erosion, values above zero indicate sediment accumulation.

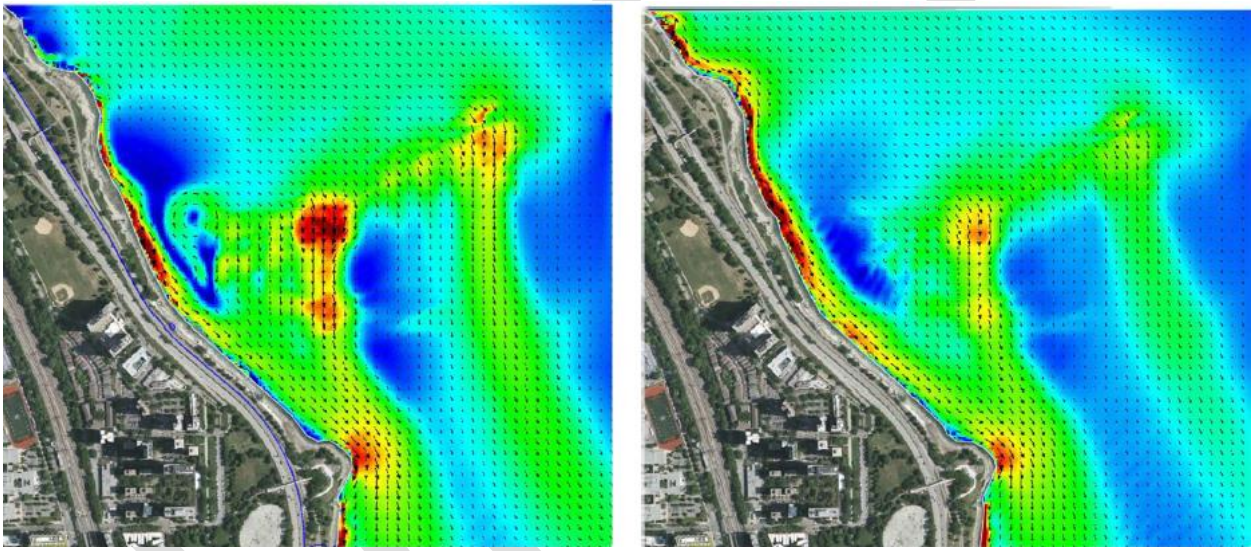

Figure 19: Wave induced currents. Left: low water level; Right: high water level. Arrow direction indicates current direction.

Bathymetry

The bathymetry along southern Lake Michigan is relatively shallow. Within the Morgan Shoal corridor, the bathymetry ranges from flatter to steeper slopes with the Morgan Shoal complex protruding out of the lakebed. In the immediate project area nearshore, the slope is relatively steep throughout the majority of the reach with the shoreline quickly plunging to depths of 10 to 20 feet (approximately elevation of 570 to 560 feet IGLD85) (Figure 20). The only notable flatter portion along the shoreline is the region known as “pebble beach” that is situated landward of Morgan Shoal. A through channel exists lakeward of the pebble beach between the north and south headlands with the channel extending to Morgan Shoal. Further out from the shoreline, the most prominent bathymetric feature is Morgan Shoal, which creates an approximately 32-acre shallow region that ranges in depth from 4 – 20 feet. Aside from this prominent outcropping, the remainder of lakebed has a gradual slope with depths of 20 – 35 feet.

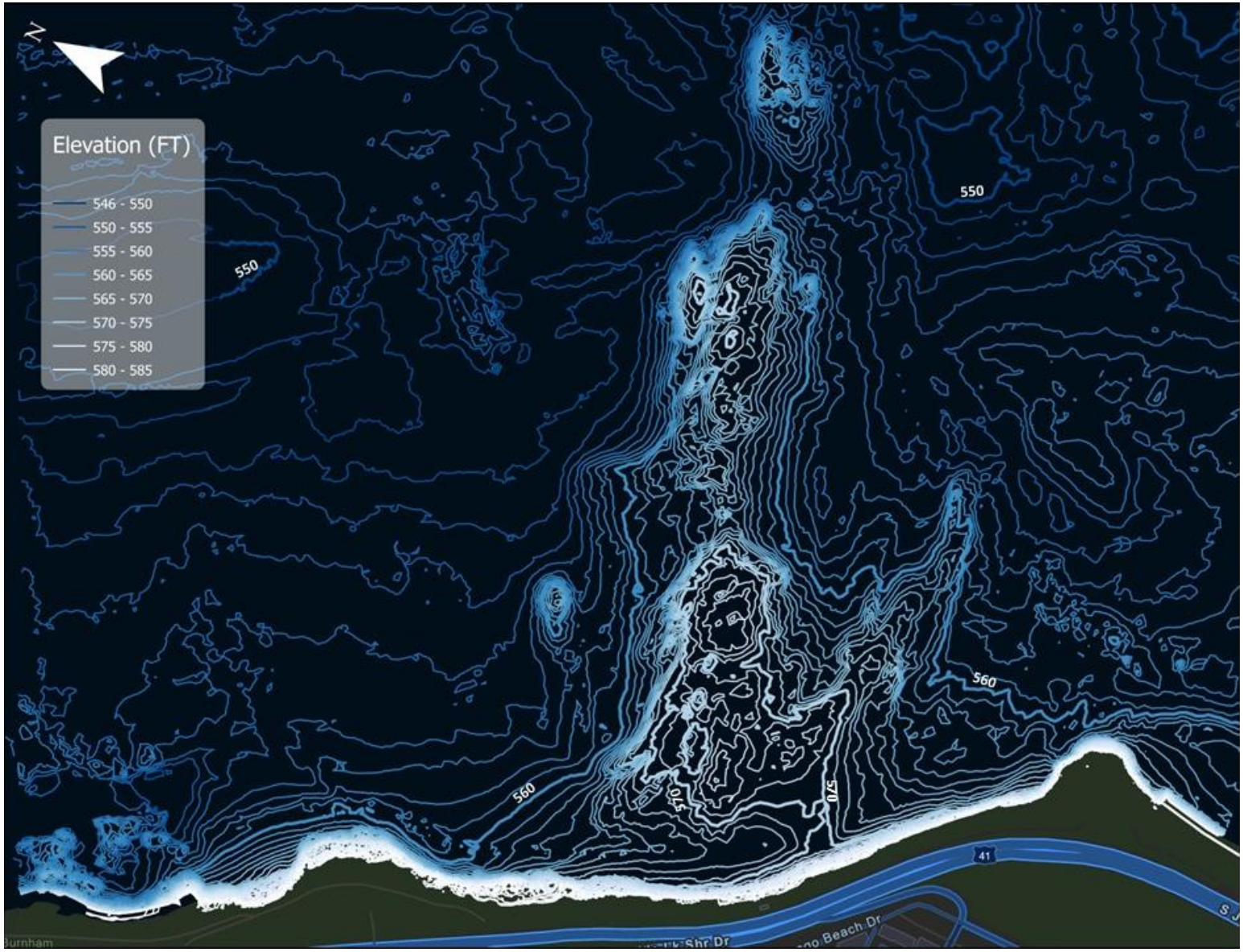

Figure 20: Lake Michigan bathymetry for project area.

The regional bathymetry around the project area is relatively stable with no major yearly changes to elevation (shoaling), largely due to the bedrock nature of Morgan Shoal and the sediment starved nature of the southern Lake Michigan basin moving less sediment. At a finer scale, the bathymetry within the project area experiences yearly changes due to the sediment transport from north to south and the shoreline being subjected to erosional forces. 2012 USACE LIDAR bathymetry was compared with the 2022 survey during higher water levels. The comparison (Figure 21) shows the differences in elevation between these two surveys. Overall, the nearshore bathymetry leeward of Morgan Shoal deepened between 2012 and 2022 with an estimated 32,000 cubic yards of sediment that eroded from this zone. It is estimated that most of the erosion occurred during the high lake level years between 2016 and 2022.The salient area, known as 'pebble beach,' experienced the highest erosion with elevation changes of 3 to 8 feet (Figure 21; purple).

Preferred Alternative Impact

Construction of the preferred alternative would include the placement of protection features that would interact with coastal resources and processes with potential for negligible to minor impacts at the local scale. The revetment reconstruction would include the filling of approximately 7 acres of Lake Michigan with approximately 320,000 cy of clean fill, as detailed in Section 2.4, below the OHWM, specifically through the creation of new backshore parkland, small headlands, in-water breakwater, and a dynamic revetment leeward of Morgan Shoal that would reshape the local shoreline for the long-term. The most notable area with fill out into the lake resides from 49th Street to approximately 50th Street as this area currently is the narrowest slice of land between Lake Michigan and DuSable Lake Shore Drive. The additional fill along this section would meet USACE standards for shoreline protection. Figure 22 shows the proposed shoreline with the new extent and morphology.

The proposed protection features are being designed to provide shoreline protection and were modeled with numerical and physical models to promote the long-term stability of the dynamic revetment segment and minimize the need for maintenance following storm events. These models provide insight to the interactions between the shoreline revetment and waves, circulation, sediment transport, and bathymetry.

The dynamic revetment has a 60' wide crest at +10ft elevation and a 6:1 lakeward slope that would align the shoreline perpendicular to the wave directions (Figure 23 and Figure 24). The dynamic revetment would be composed of new 3-inch cobble and salvaged stones from the existing pebble beach. The size of the new rounded cobble stones is based upon modeling outputs showing that the selected size cobble would stay within the dynamic revetment system. A detached underwater breakwater located in the middle of the dynamic revetment at the base, adds stability and protection by reducing wave energy during high lake levels, thereby reducing the movement of dynamic revetment cobble. The installation of the north and south headlands and the detached underwater breakwater would alter the wave induced currents, such that the nearshore currents that contribute to the shoreline erosion would be disrupted The north end of the dynamic revetment has a hook-shaped headland, deflecting incoming wave-induced currents from the north and providing a small wave protected area that stabilizes the north section (Figure 25). The south end of the dynamic revetment has another headland that is aligned with the incoming wave direction, generating a mild northward current, even at high water levels. Figure 26 presents an example output from the numerical modeling showing the reduced wave energy conditions with the proposed shoreline protection features in place. The reduced wave energy is an intentional local beneficial impact on wave conditions from the offshore detached breakwater to promote the long-term stability of the shoreline.

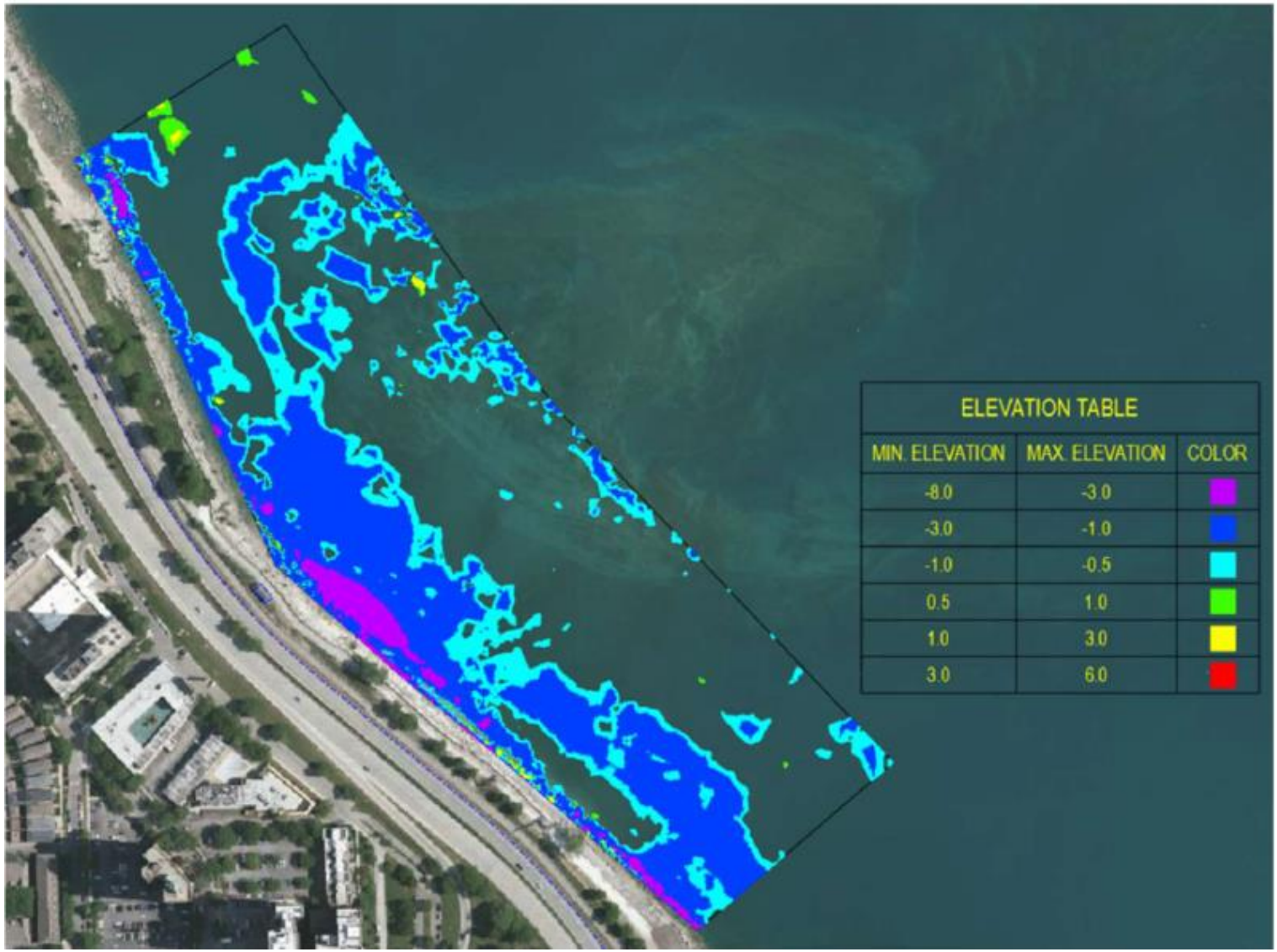

Figure 21: Comparison between 2012 LIDAR and 2022 Survey Surfaces showing the change in bathymetry. Negative values (colors: cyan, blue, purple) indicate erosion and positive values (colors: green, yellow, red) indicate deposition

Figure 22: Rendering of proposed shoreline protection features with existing shoreline extent and morphology shown in red.

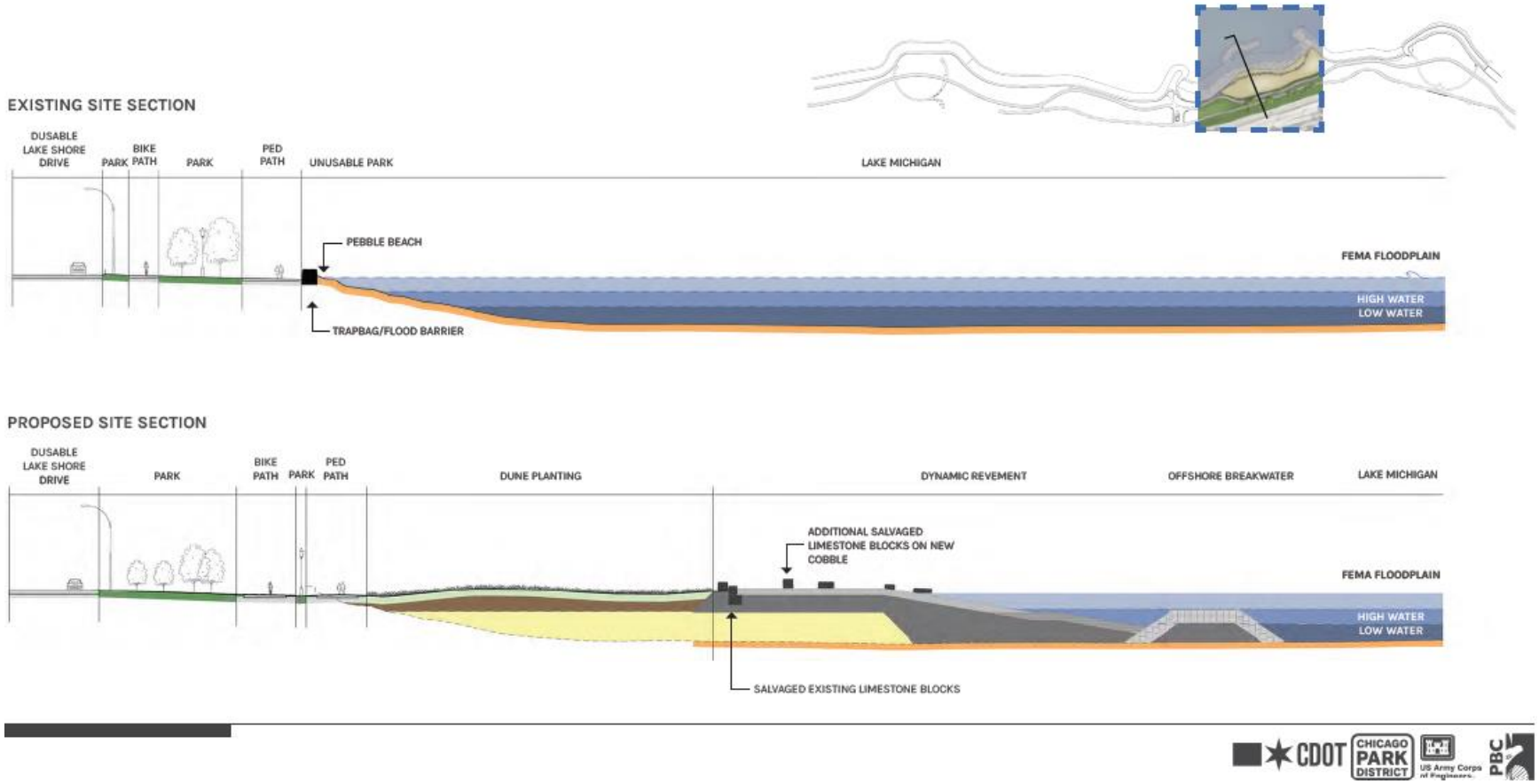

Figure 23: Cross section rendering of proposed dynamic revetment showing lake fill with new slope and bathymetry. Additional shoreline renderings found in Appendix E – 2024 Community Involvement in Design Phase.

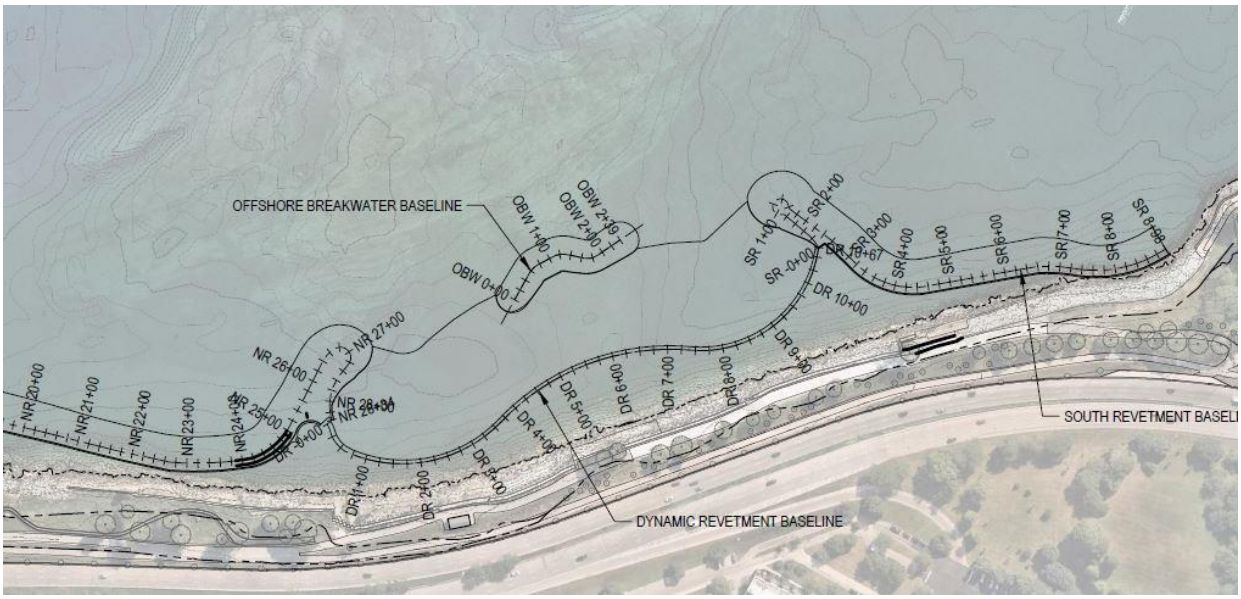

Figure 24: Proposed dynamic revetment, headlands, and detached breakwater overlaid existing bathymetry

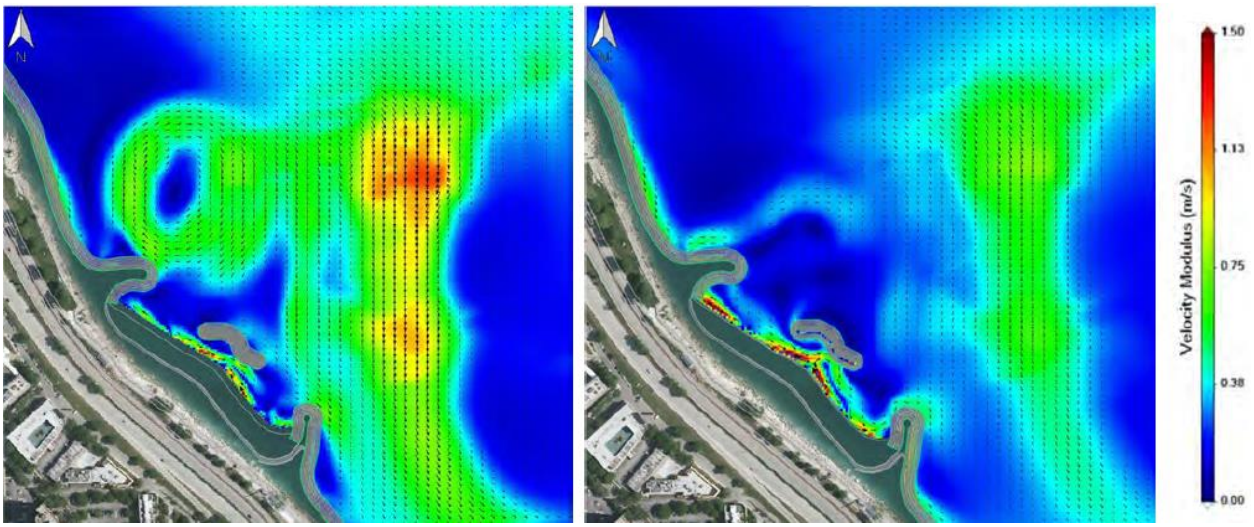

Figure 25: Wave induced currents with the proposed dynamic revetment. Left: low water level; Right: high water level. Arrow direction indicates current direction.

Approximately 100 ft of the detached underwater breakwater would have a raised crest elevation near the mean high-water elevation of +4 feet and would be visible most of the time. The remaining approximately 100 ft of the detached underwater breakwater crest elevation would be at +2 feet elevation. These elevations allow for some wave transmission and prevent a full tombolo formation during the more energetic storms at high water levels. Rather, a salient would be maintained leeward of the breakwater. The placement of the breakwater prevents the lakeward movement of prefilled cobbles onto Morgan Shoal by shortening the depth of closure and permanently solidifying the boundary between the active nearshore and offshore zones. Additionally, the placement of the south headland would prevent the downdrift movement of prefilled cobbles along the shoreline. Figure 27 presents the output from the sediment transport analysis showing the stability of the salient formation (accretion zone) under high and low water levels. The dynamic revetment would remain stable, essentially creating a closed system,

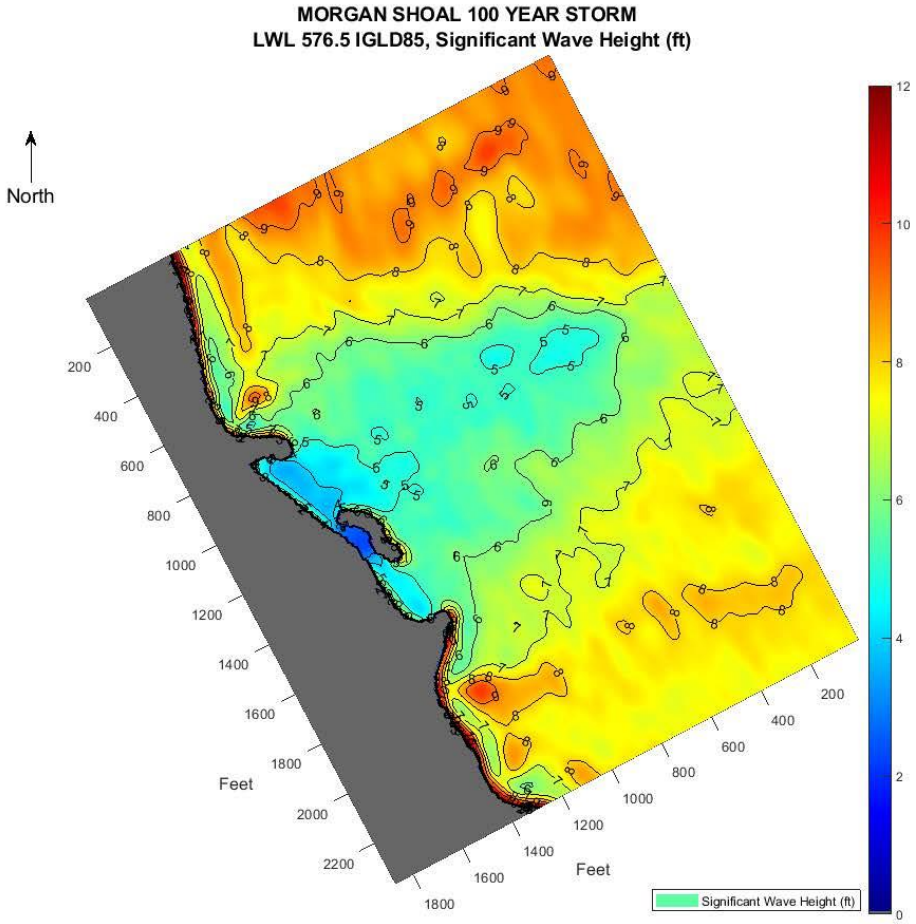

Figure 26: Numerical model output of wave conditions with proposed protection features

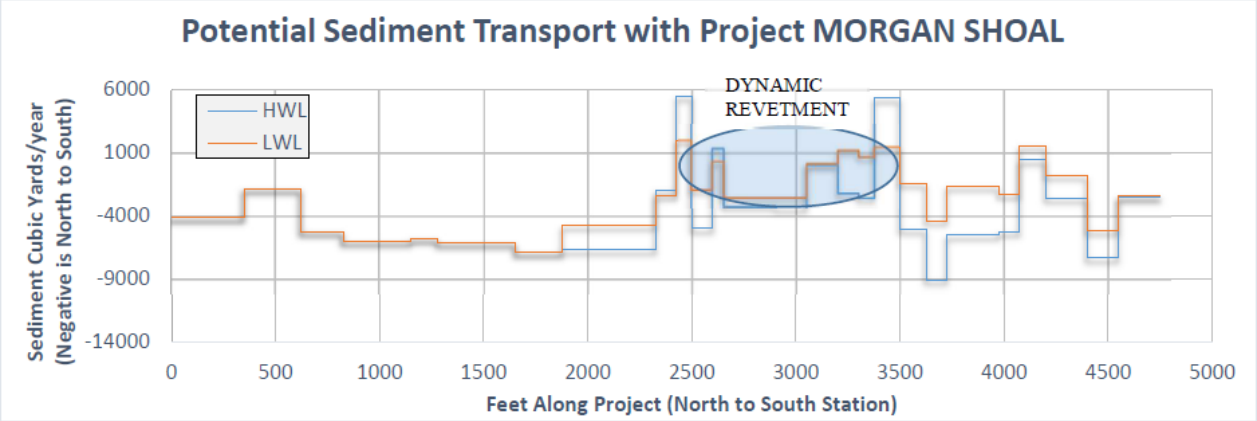

Figure 27: Model output of sediment transport potential along the project shoreline with proposed protection features. High water level (Blue) and Low water level (Red) sediment potential shown. Values below zero indicate sediment erosion, values above zero indicate sediment accumulation.

that would not erode. This would result in the proposed prefilled cobbles to remain within the dynamic revetment system. Currently, the salient is washed away during high water levels.

Therefore, increased stability of the sediment transport at the accretion zone is an intentional beneficial impact of the preferred alternative to promote the long-term stability of the shoreline.

The installation of the new rubble mound revetment along the northern section of the reach would protect the shoreline from actively eroding, therefore cutting off current sediment input into the sediment transport system for this sediment cell. The annual winter introduction of deep water sands and glacial till into the active nearshore zone of the sediment cell would still occur along the majority of the reach. Given the nature of the headlands and breakwater reducing wave energy at the dynamic revetment, there is a potential negligible decrease in material moving landward, limiting material movement to the smaller grain sizes for this section.

The presence of the northern headland may attenuate some sand on the updrift side. However, it is unlikely that a large volume of sand would accumulate here given the sediment starved state of the region, the decrease in sediment inputs into the localized sediment cell, and wave induced current patterns. During high water level conditions, wave induced currents may flush accumulated sand out towards Morgan Shoal with a temporary residence (Figure 25). Sediments would interact with the dynamic hydraulics and wave environment over Morgan Shoal that promote sediment flushing, preventing long term sand accumulation on the shoal. It would be expected that this sediment would remain within the active littoral zone and would still be able to interact with the sediment transport system.

It is not necessary to perform sand mitigation as the decrease of sediment input and alteration of potential sediment transport does not adversely impact any downdrift sediment resources within the sediment cell as they do not exist downstream of the dynamic revetment. Additionally, it is not recommended to perform prefill sand mitigation on the updrift side of the northern headland as continuous sand bypassing would migrate onto Morgan Shoal with longer residence time, potentially adversely impacting aquatic habitat on the shoal.

The approximately 7 acres of lake fill and protection features would have a minor long-term impact on the shoreline. Given the relatively small scale of the shoreline morphology change there would be no impact on the regional scale of Lake Michigan's shoreline. These protection features would have a minor impact on the local wave and circulation environment. However, regionally, this impact would be negligible due to the small scale. The placement of the dynamic revetment, breakwater, and headlands would permanently change the local bathymetry. This would be a minor impact locally. Regionally, this impact on bathymetry would be negligible. The proposed headlands and offshore breakwater in the dynamic revetment segment may attenuate some sand on the updrift side and provide stability to the accretion zone leeward of Morgan Shoal. This impact would be negligible due to the area being sediment-starved with essentially no longshore transport due to historical anthropogenic coastal structures.

Overall, the project would have minor adverse and beneficial long-term impacts to coastal resources and processes at the local scale, and negligible adverse impacts at the regional scale.

No Action Alternative Impact

Under the no action alternative, there would be no impact to the coastal processes. Wave conditions, current patterns, circulation, and sediment transport processes would continue to be dynamic and interact with the varying lake levels and environmental conditions. Given the dynamic nature of coastal processes, there would be an impact on coastal resources such as shoreline morphology and bathymetry.

The above coastal processes would continue to erode the shoreline at varying rates based upon the influences of water levels and storm frequency. Continued shoreline erosion along the reach would impact the shoreline morphology as the revetment continues to deteriorate into functional failure without intervention resulting in land loss. The revetment material and shoreline sediment would continue to wash into the lake which would continue to provide sediment inputs into the sediment transport system and potentially modify localized bathymetry. Much of the northern reach already has active erosion, which is changing the slope to become more gradual and has filled in localized lakebed, altering the bathymetry. This pattern would continue along the northern reach and throughout the remainder of the reach as the revetment material falls into the lake, exposing the backshore to erosion and coastal forces (**Figure 28**). The shoreline is fill from the 1920s and was composed of rubble fill, sandy gravel, and sand (Appendix C) which is more susceptible to erosion due to the lack of compactness of the sediments. Therefore, it is a foreseeable possibility that large areas of backshore erosion could occur quickly during high water storms. These high erosion events causing quick land loss would be more evident along areas of the reach that currently have little to no revetment protecting the backshore or adjacent to areas that have no revetment.

The salient, locally known as pebble beach, would continue to be influenced by coastal processes, varying lake levels, and storm frequency. It is anticipated that the salient would continue its gradual migration downdrift within the lee of Morgan Shoal under the influence of wave-induced currents and water levels. Changing future conditions may alter erosion and accumulation rates of the salient, impacting the quantity of material present. It is known that the salient currently experiences erosion during high water years. Therefore, changing conditions in which there are multiple years of back-to-back high water levels, may cause the salient to experience high rates of erosion, lowering the quantity of pebble material. This could lead to further erosion of the shoreline revetment and backshore due to the salient providing lower protection from wave energy attack.

Continued temporary repairs, similar to the emergency repairs done in 2020, would temporarily pause or slowdown erosion impacts on shoreline morphology in selected sections of the project reach. However, any future repairs are temporary in nature and would eventually succumb to the coastal processes and forces of nature. Overall, erosion would continue to modify the shoreline morphology and localized bathymetry with the no action alternative.

Figure 28:Backshore erosion and land loss with failing revetment. Photo after January 2020 storm as an example of continued erosion under the no action alternative.

3.2.5 Water Quality

Existing Condition

Every two years, Section 303(d) of the Clean Water Act requires states to publish a list of all waters that are not meeting water quality standards. The 49th Street Beach (Assessment ID IL_QR-01), which is located within the vicinity of the proposed project, is listed on the Illinois Environmental Protection Agency 2024 impaired waters (IEPA, 2024). The beach fully supports primary contact; however, fish consumption is impaired due to the presence of mercury and polychlorinated biphenyls (PCBs). Nearshore areas of Lake Michigan (Assessment ID IL_QLM-01) fully support aquatic life, primary contact, and public and food processing water supply uses. However, fish consumption is impaired due to the presence of aldrin, dieldrin, endrin, heptachlor, mercury, mirex, and toxaphene. Nearshore areas of Lake Michigan also have impaired aesthetic quality due to the presence of total phosphorous (IEPA, 2024).

In 2022, the design team investigated an area of saturated soils believed to be a potential wetland located along the southern reach of the Morgan Shoal project site above the ordinary high-water mark for Lake Michigan (Figure 29). The area is approximately 0.09 acres with hydrophytic vegetation, hydric soil, and wetland hydrology present. The hydrology appears to be artificial in nature as the area is in an upland location outside of the influences of Lake Michigan, including wave overtopping. The hydrology source was from a known broken water pipe, for several years, that runs under this area as the appearance of the wetland hydrology and hydrophytic vegetation corresponded with the water line leak. The Chicago Park District repaired the broken water pipe in the spring of 2023 and a noticeable reduction in the hydrophytic vegetation in the area was observed during the growing season. It is then concluded that the area would continue to revert to a non-wetland status with the removal of the artificial hydrology.

Figure 29: Potential Wetland Delineation Site at Morgan Shoal Project Area

Preferred Alternative Impact

The preferred alternative would include placement of 7 acres of fill in Lake Michigan, a Water of the United States (WOTUS), resulting in short-term impacts to water quality during project construction. Sections 401 and 404 of the Clean Water Act apply to this project for the discharge of fill material into WOTUS, as no nationwide permits are to be used for the implementation of the project. A 404(b)(1) assessment is provided in Appendix H.

Placement of materials below the OHWM of Lake Michigan is limited to clean aggregate, clean riprap, armor stone, or processed repurposed onsite materials, such as existing revetment stone and concrete. Fill material that is proposed for placement below OHWM will contain less than 20% fines, or less than 20% passing a #230 sieve, which is the regulatory threshold set forth by the IEPA for conducting water quality testing and analysis to identify water quality impacts associated with placement of fill materials into waters of the U.S. Fill materials will not contain any contaminants that would leach out or violate any condition in the Illinois 401 water quality certification.

No long-term, significant adverse effect on the quality of water of Lake Michigan is expected and short-term effects would be minimized with appropriate BMPs for the coastal environment. An individual 401-water quality certification (WQC) would be obtained from the Illinois Environmental Protection Agency (IEPA) prior to construction. The project will comply with the conditions and best management practices imposed by IEPA in the 401-water quality certification. The Contractor will be required to implement and monitor a soil erosion and

sediment control plan that conforms with the requirements of NPDES General Construction Stormwater Permit ILR10 and follows the guidelines of the Illinois Urban Manual. Project construction would comply with all applicable water quality standards. No mitigation as a result of the fill in the lake is required for the reasons set forth in the Clean Water Act 404(b)(1) analysis in Appendix H.

The preferred alternative would also include filling a small artificial wetland that was created from a water line break in an upland portion of the project site. The water line break has been repaired, and the area is reverting to its non-wetland natural condition. No mitigation is required for the fill, because the wetland is not jurisdictional under the Clean Water Act.

No Action Alternative Impact

Shoreline erosion would continue under the no action alternative, which could result in a minor adverse impact of localized near-shore sedimentation and increased turbidity, especially during high erosion events. The overall effect on Lake Michigan's water quality would be insignificant. Therefore, no significant effects are expected to water quality under the no action alternative.

3.2.6 Floodplains

Existing Condition

Flood hazard zones have been determined by the Federal Emergency Management Agency (FEMA) for the area. Most of the project area lies within the floodplain (Figure 30). The flood zone is categorized as AE (EL 590 feet) or the 100-year floodplain at a lake water elevation of 590 feet. A 100-year floodplain is an area having a one percent annual chance of flooding.

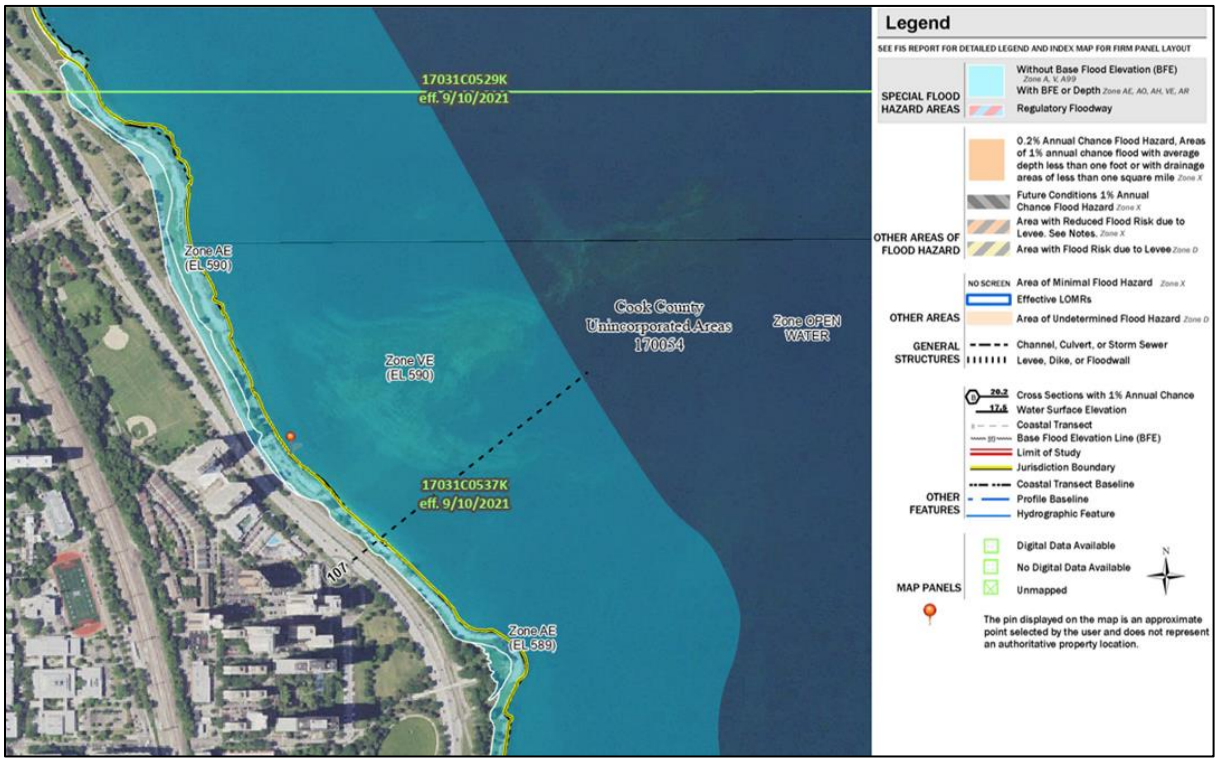

Figure 30: Floodplain map for project area.

Preferred Alternative Impact

The preferred alternative would alter the localized floodplain along the Lake Michigan shoreline from 45th – 51st Street such that the revetment reconstruction, elevation changes, and additional lakefill would bring most of the project area out of the 100-year floodplain. This would be a beneficial impact for human use. FEMA would determine what the actual floodplain would be for the area, however it is likely that the floodplain would be restricted to the water's edge of the reconstructed revetment and shoreline, similar to other completed segments along the Chicago shoreline. There would be no impact to the floodplain at the regional or lake-wide level due to the small, localized scale of the project area compared to the Lake Michigan system.

No Action Alternative Impact

Shoreline erosion would continue under the no action alternative, which would result in the expansion of the floodplain along the shoreline. The floodplain would expand from the Lake Shore bike path further inland toward DuSable Lake Shore Drive along the narrowest stretch of the project reach, threatening that transportation resource. Typically, an expansion of the floodplain would be beneficial to the lacustrine system, however due to the small scale, the overall effect would be insignificant. Additionally, the floodplain expansion would adversely impact significant transportation resources as discussed in Section 3.5; therefore, the floodplain expansion is undesirable.

3.2.7 Air Quality

Existing Condition

The Clean Air Act requires the U.S. Environmental Protection Agency (USEPA) to set national ambient air quality standards (NAAQS) for six criteria pollutants (carbon monoxide, lead, nitrogen dioxide, particulate matter, ozone, and sulfur oxides) which are considered harmful to public health and the environment. Areas not meeting the NAAQS for one or more of the criteria pollutants are designated as "nonattainment" areas by the USEPA. The proposed project, located in the Chicago Metropolitan area, is a non-attainment area for ozone (2015 standard), and in maintenance status for ozone (2008 standard) lead, and PM-10 (USEPA 2020). See Table 1 for additional details.

Table 1: Cook County, Illinois Status for NAAQS Six Criteria Pollutants (USEPA 2023).

NAAQS	Area Name	Most Recent Year of Nonattainment	Current Status	Classification
8-Hour Ozone (2008)	Chicago – Naperville, IL-IN-WI	2021	Redesignation to maintenance 5/20/2022	Serious
8-Hour Ozone (2015)	Chicago, IL-IN-WI	2023	Nonattainment	Moderate
Lead (2008)	Chicago, IL	2017	Redesignation to maintenance 3/28/2018	-
PM-10 (1987)	Cook County, Southeast Chicago	2004	Redesignation to maintenance 11/21/2005	Moderate

The United States Environmental Protection Agency's (USEPA) Mandatory Reporting Rule of Greenhouse Gases (MRR-GHG) applies to direct GHG emitters, fossil fuel suppliers, industrial gas suppliers, and facilities that inject carbon dioxide (CO2) underground for sequestration

(containment) or other reasons. The State of Illinois aims to reduce GHG emissions to net zero by 2050.

Preferred Alternative Impact

Project construction would cause short-term, insignificant adverse air quality impacts. To minimize temporary adverse impacts to air quality during construction activities, construction equipment would be current with air quality federal emission requirements, include functional emission controls, and use low sulfur diesel fuels. Additionally, dust control measures would be used during dry weather, including but not limited to the use of covered loads, street sweeping and tire brushes to avoid tracking soils onto public roads, and watering/sprinkling unstabilized earthwork areas to minimize windblown dust. Long-term, once constructed, the project would be neutral in terms of air quality, with no features that either emit or sequester air pollutants to a large degree. Due to the temporary nature of any adverse air quality impacts, a general conformity analysis was not conducted.

Regarding greenhouse gas (GHG) emissions, construction of the proposed action would take approximately 3 years, and the average working day is anticipated to be 8 hours. The proposed action would be broken up into three phases, with Phase two containing most of the project work. Therefore, the majority of GHG emissions would occur during Phase two through the operation of construction equipment (i.e. bulldozers, skid steers, backhoes, rollers, etc.), marine equipment and through trucks transporting materials on site (Appendix I).

The preferred alternative would not sequester carbon nor impact the ability of the State of Illinois to meet its emissions goals. Implementation of the preferred alternative would not result in significant short-term or long-term impacts related to GHG emissions or air quality more generally within Cook County.

No Action Alternative Impact

No effects to air quality are anticipated to occur as part of the no action alternative. Regarding GHG emissions, repairs for the no action alternative would take approximately 90 days every 10 years or as repairs are needed. The no action alternative would be smaller in scope and shoreline linear feet (assumed approximately a third of the preferred alternative) as it would include repairing segments of the reach every 10 years or as needed. Due to the smaller scope and less equipment operation hours, the no action alternative would have lower GHG emissions compared to the preferred alternative.

The no action alternative would not sequester carbon nor impact the ability of the State of Illinois from meeting their emissions goals. The no action alternative would not result in significant short-term or long-term impacts on air quality or GHG emissions.

3.2.8 Land Use

Existing Condition

Land use conditions are described in the 2020 EA and conditions have not changed.

Preferred Alternative Impact

The implementation of the preferred alternative would add 7 acres of fill into the Lake. Of the 7 acres, a significant portion would be the revetment structure with the remainder as public parkland. The additional parkland and revetment would be a long-term beneficial impact for recreational and shoreline protection land uses.

No Action Alternative Impact

Shoreline erosion would continue under the no action alternative. This would be a minor adverse impact to recreational land uses and over time, a significant adverse impact to shoreline protection land use.

3.3 Biological Resources

3.3.3 Aquatic Communities

Existing Condition

Fish

Identification of fish species potentially present in the project area was determined utilizing the Fishes of the Chicago Region Database (Veraldi, unpublished data), a 2022 USACE fish survey, and literature reviews. In general, the surf zone and open water fish assemblages of Lake Michigan would be the communities that are expected to occur within the project area. The degraded shoreline comprised of timber cribs, failing limestone revetment, and rubble mound stone offers the most diverse aquatic habitat along the approximately one mile reach due to the crevices and interstitial spaces between rocks, stones, and cobbles being utilized by multiple species. The project area includes a shallow surf zone (e.g., pebble beach) and a rocky shoreline zone that quickly transition to open water. The shallow surf zone fish assemblage typically consists of longnose dace (*Rhinichthys cataractae*), emerald shiner (*Notropis atherinoides*), sand shiner (*Notropis stramineus*), and spottail shiner (*Notropis hudsonius*), with less frequent presence of lake chub (*Couesius plumbeus*), and mimic shiner (*Notropis volucellus*). Fishes are also often found among the shoreline rocks such as juvenile yellow perch (*Perca flavescens*), juvenile smallmouth bass (*Micropterus dolomieu*), various sunfishes (*Lepomis spps.*), and the invasive round goby (*Neogobius melanostomus*).

The open water fish assemblage typically consists of alewife (*Alosa pseudoharengus*), freshwater drum (*Aplodinotus grunniens*), common carp (*Cyprinus carpio*), the state listed longnose sucker (*Catostomus catostomus*), white sucker (*Catostomus commersonii*), silver redhorse (*Moxostoma anisurum*), black bullhead (*Ameiurus melas*), channel catfish (*Ictalurus punctatus*), brown trout (*Salmo trutta*), lake trout (*Salvelinus namaycush*), rainbow trout (*Oncorhynchus mykiss*), chinook salmon (*Oncorhynchus tshawytscha*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), and yellow perch (*Perca flavescens*). The open water fishes are typically found in deeper water throughout the project area and over the rocky outcrop of Morgan Shoal. Morgan Shoal is an ecological hotspot for fishes that utilize the shoal for refuge habitat, foraging, and spawning activities (Willink 2016).

Macroinvertebrates

Macroinvertebrates within the project area are described in the 2020 EA and conditions have not changed.

Preferred Alternative Impact

Implementation of the preferred alternative is not expected to have any long-term significant adverse impacts to aquatic communities. The project includes placement of fill within the lake, as well as construction activities to remove and reconstruct the existing shoreline revetment that would disturb the land-to-water interface, causing physical disturbance to habitat and temporary turbidity. Aquatic communities along the shoreline would be disturbed during construction. However, this would be a minor, short-term impact. Fish and other free-swimming organisms

would tend to avoid the area and repopulate the shoreline habitat soon after construction is complete. The placement of the underwater breakwater near Morgan Shoal may alter fish behavior (i.e., temporarily vacate the area). However, this would be a negligible, short-term impact.

The reconstruction of the revetment would not remove significant aquatic habitat. While seven acres of fill would be placed in Lake Michigan, the lost aquatic habitat is not unique, and the project would ultimately replace shoreline habitat in kind with similar habitat type and quality. The current state of the degraded limestone block revetment offers many crevices for habitat and the new rubble mound revetment would also offer many crevices between armor stones. The installation of the detached breakwater would also serve as 0.4 acres of new rocky habitat for fishes and aquatic organisms. This conversion from open water habitat to rocky habitat creates additional refuge, foraging, and spawning opportunities.

Lastly, the installation of the cobble stones at the dynamic revetment would replicate the existing shallow surf zone habitat and would expand this habitat type. The existing area has approximately 0.3 acres of submerged habitat, while the dynamic revetment would include approximately 1.3 acres of submerged habitat within its 3.5-acre footprint.

BMPs such as silt fencing would be used to minimize any potential runoff of sediment into the lake that could cause turbidity and potentially impact fish and aquatic invertebrates.

Overall, construction of the preferred alternative would have minor, short-term construction related impacts, but no long-term adverse impacts. The preferred alternative would result in long-term beneficial impacts to aquatic communities.

No Action Alternative Impact

No effects to aquatic communities are anticipated to occur as part of the no action alternative.

3.3.4 Terrestrial Communities

Existing Condition

Reptiles and Amphibians

Reptiles and amphibians within the project area are described in the 2020 EA. The state listed mudpuppy (*Necturus maculosus*) is discussed in section 3.3.5.

Birds

Birds within the project area are described in the 2020 EA and conditions have not changed. The state listed black-crowned night heron (*Nycticorax nycticorax*) is discussed in section 3.3.5.

Mammals

Mammals within the project area are described in the 2020 EA and conditions have not changed.

Parkland

Current parkland includes lawn and sparse tree habitat zones that are maintained by the Chicago Park District. There are currently 367 trees within the project area. Additionally, there are several sections along the shoreline that are behind temporary erosion TrapBags that prevent access for mowing and maintenance that are currently overgrown with terrestrial plants.

Preferred Alternative Impact

The implementation of the project is not expected to have any long-term, significant adverse impacts to terrestrial communities. The project location is an urban environment with limited wildlife present. Wildlife in the project area is typically comprised of common species rather than special status wildlife. Construction activities could temporarily alter the behavior of these animals, but this would be a negligible, short-term impact. Of the 367 existing trees, 315 trees would be protected and preserved, with no construction occurring within these tree protection zones. Additionally, approximately 200new trees would be planted. The preferred alternative would result in the construction of a 1.7-acre dune, a 1.4-acre oak savannah, and a 1.2-acre prairie habitat zone which could have minor, long-term beneficial impacts to terrestrial habitat.

Avian species are also likely to be present in the project area. The Chicago area is part of the Mississippi Flyway for migratory birds. However, there is relatively limited resting or foraging habitat where the project is located. Overwintering ducks have been observed over Morgan Shoal, but in-water and nearshore barge work would occur between May 1st and October 31st when they are not present. Overall, construction of the preferred alternative would have minor, short-term construction related impacts and minor long-term, beneficial impacts to terrestrial communities.

No Action Alternative Impact

Shoreline erosion would continue under the no action alternative, which could result in continued terrestrial habitat loss, including tree loss the overall effect would be a minor adverse impact to terrestrial communities.

3.3.5 Threatened & Endangered Species

Existing Conditions

Federal

A query of the U.S. Fish and Wildlife Service's (USFWS) Environmental Conservation Online System Information for Planning and Consultation (ECOS-IPaC) on August 18, 2025 resulted in an official species list of federally listed threatened, endangered, candidate, and proposed species that may be present within the project area (Project Code: 2024-0011139). The obtainment of the official species list from ECOS-IPaC fulfills the requirement for federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action". Seven federally listed threatened, endangered, or proposed species were identified as potentially occurring within the project area (Table 2). There is no listed critical habitat present in the project area.

No federally listed threatened and endangered species are known to be present within the project area. The project area is within the range of the endangered piping plover (*Charadrius melodus*), the endangered Hine's emerald dragonfly (*Somatochlora hineana*), the endangered leafy prairie-clover (*Dalea foliosa*), the threatened rufa red knot (*Calidris canutus rufa*), the threatened eastern massasauga (*Sistrurus catenatus*), the threatened eastern prairie fringed orchid (*Platanthera leucophaea*), and the proposed threatened monarch butterfly (*Danaus plexippus*). However, the project area contains no habitat likely to be used by threatened or endangered species, with the possible exception of migratory avian species utilizing the area for foraging. Table 2 provides a summary of federally listed species with potential to be in the project area.

Table 2: Federally listed species with the potential of occurring within the project area.

Species Name	Federal Status	Habitat	Potential to Occur
Piping Plover (*Charadrius melodus*)	Endangered	Sandy beaches, tidal flats, and shores of large lakes and rivers	**Not expected to occur**; lack of suitable habitat. Known presence at Montrose Beach 11 miles north of Morgan Shoal, and 63rd Street Beach 1.8 miles south of Morgan Shoal
Red knot (*Calidris canutus rufa*)	Threatened	Found in coastal areas or large wetland complexes. Migratory window is May 1 through September 30	**Not expected to occur**; Lack of suitable habitat
Eastern massasauga (*Sistrurus catenatus)*	Threatened	Graminoid dominated plant communities (e.g., fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands)	**Not expected to occur**; lack of suitable habitat
Hine's emerald dragonfly (*Somatochlora hineana*)	Endangered	Spring-fed wetlands, wet meadows and marshes. Critical habitat has been designated for this species within Cook County; however, it is not within the vicinity of the project area.	**Not expected to occur**; lack of suitable habitat
Monarch butterfly (*Danaus plexippus)*	Proposed Threatened	Prefer grassland ecosystems with native milkweed and nectar plants.	**Not expected to occur**; lack of suitable habitat.
Eastern prairie fringed Orchid (*Platanthera leucophaea*)	Threatened	Mesic to wet prairies	**Not expected to occur;** lack of suitable habitat
Leafy prairie-clover (*Dalea foliosa*)	Endangered	Prairie remnants along the Des Plaines River in Illinois, in thin soils over limestone substrate	**Not expected to occur;** lack of suitable habitat

Piping Plover (Great Lakes Population)

Status. The Piping Plover (*Charadrius melodus*) is federally listed as endangered for the Great Lakes population.

Distribution and habitat. The Piping Plover range includes the Great Lakes region during the summer months. Wintering grounds are located along the southern Atlantic and Gulf coasts of the U.S., as well as in the Bahamas and Cuba. Nesting along Great Lakes shorelines primarily occurs in Michigan and Wisconsin, with occasional nesting in the other Great Lakes states. Great Lakes habitat includes open, sparsely vegetated areas with minimal human disturbance.

Potential for occurrence. There are no known observations of piping plovers utilizing the Morgan Shoal shoreline. The presence of the salient may offer a stopover opportunity for plovers that are making their way to the nearest known nesting location at Montrose Beach, 11 miles north or to the known stopover location at 63rd Street Beach, 1.8 miles south. However, the salient, composed of pebbles, is very narrow and outside of their typical sandy beach habitat

requirements. Therefore, this species is not expected to occur within the vicinity of the project location.

Rufa red knot
Status. The rufa red knot (*Calidris canutus rufa*) is federally listed as threatened.

Distribution and habitat. The rufa red knot nesting range centers in Canada north of the Arctic Circle. Their winter range is primarily located in southern South America. The rufa red knot is known to migrate along the Mississippi Flyway, which includes the Chicago area. The migratory period for the species extends from May 1 through September 30. The rufa red knot uses different habitats for breeding, wintering, and migration. Breeding habitats are elevated and sparsely vegetated ridges or slopes. They are often located adjacent to wetlands and lake edges for feeding. Wintering and migration habitats are often muddy or sandy coastal areas, such as the mouths of bays and estuaries, and tidal flats (NatureServe 2019).

Potential for occurrence. The rufa red knot, which could potentially migrate through the area, would primarily be utilizing sand and dune habitat. There is no suitable migration habitat present for the rufa red knot in the project area. The nearest suitable sand and dune habitat is located approximately one mile north at 41st Street Beach and one mile south at 57th Street Beach. Since there is no suitable habitat for rufa red knot within the immediate vicinity of the project location, this species is not expected to occur.

Eastern massasaugua
Status. The eastern massasauga (*Sistrurus catenatus*) is federally listed as threatened.

Distribution and habitat. Eastern massasaugas live in an area that extends from central New York and southern Ontario to southcentral Illinois and eastern Iowa. Historically, the snake's range covered this same area but within this large area the number of populations and numbers of individuals within these populations have steadily shrunk. Generally, only small, isolated populations remain. Massasaugas live in wet areas including wet prairies, marshes, and low areas along rivers and lakes. In many areas massasaugas also use adjacent uplands during part of the year. They often hibernate in crayfish burrows but may also be found under logs and tree roots or in small mammal burrows.

Potential for occurrence. There is no suitable habitat (e.g., fens, sedge meadows, peatlands, wet prairies, open woodlands, and shrublands) within the vicinity of the project for this species. Therefore, the eastern massasauga is not expected to occur within the vicinity of the project location.

Hine's emerald dragonfly
Status. The Hine's emerald dragonfly (*Somatochlora hineana*) is federally listed as endangered.

Distribution and habitat. Historically, the Hine's emerald dragonfly was also found in Alabama, Indiana, and Ohio but has probably been extirpated in those states. Today the dragonfly can only be found in Illinois, Michigan, Missouri, and Wisconsin. The Hine's emerald dragonfly lives in calcareous (high in calcium carbonate) spring-fed marshes and sedge meadows overlaying dolomite bedrock (USFWS, 2006).

Potential for occurrence. There is no suitable habitat within the vicinity of the project for this species. Therefore, the Hine's emerald dragonfly is not expected to occur within the project area.

Monarch butterfly
Status. The monarch butterfly (*Danaus plexippus*) is listed as a proposed threatened species.

Distribution and habitat. Monarch butterflies are found across North America wherever suitable feeding, breeding, and overwintering habitat exists. The monarch butterfly population east of the Rocky Mountains contains most of the North American monarch population, which completes its northward migration through successive generations. They are found in the highest concentrations along a migratory flyway corridor through the central United States. In spring the monarchs leave overwintering grounds in Mexico and migrate north into Texas and the Southern Plains, then up through the Northern Plains and the Midwest, and finally up into the Great Lakes Region. By late summer, eastern monarchs have spread north into Canada and eastward from the central migratory corridor throughout the Northeast and Southeast states. From September into early October, fall southern migration to Mexico begins, with many monarchs following the reverse path south along the central migratory corridor. Monarchs are typically found in grassland habitats, although they can be found anywhere where their food source is found (e.g., milkweed, wildflowers in the genus *Asclepias*, etc.).

Potential for occurrence. Preferred suitable habitat is not readily available within the project area. The site lacks undisturbed grassland habitat that would support monarch butterfly food sources, however limited patches of food sources may exist along un-mowed unintentional natural areas lakeward of temporary trap-bags.

Eastern Prairie Fringed Orchid
Status. The eastern prairie fringed orchid (*Platanthera leucophaea*) is federally listed as threatened.

Distribution and habitat. The range of this species occurs mostly east of the Mississippi River in fewer than 60 sites in Illinois, Iowa, Maine, Michigan, Ohio, Virginia, Wisconsin, and in Ontario, Canada. The eastern prairie fringed orchid occurs in a wide variety of habitats, from mesic prairie to wetlands such as sedge meadows, marsh edges, even bogs. A symbiotic relationship between the seed and soil fungi, called mycorrhizae, is necessary for seedlings to become established (USFWS, 2005a).

Potential for occurrence. There is no suitable habitat within the vicinity of the project for this species. Therefore, the eastern prairie fringed orchid is not expected to occur within the project area.

Leafy Prairie-Clover
Status. The leafy prairie-clover (*Dalea foliosa*) is federally listed as endangered.

Distribution and habitat. This species is found in prairie remnants along the Des Plaines River in Illinois, in soils over limestone substrate. It favors sites with a wet spring and fall and a dry summer (USFWS, 1997).

Potential for occurrence. There is no suitable habitat within the vicinity of the project for this species. Therefore, the leafy prairie-clover is not expected to occur within the project area.

State

The Illinois Department of Natural Resources Ecological Compliance Assessment Tool (EcoCAT) was queried on May 2, 2025 to determine the potential presence of any state protected resources that may be in the vicinity of the project location. The search identified black-crowned night heron (*Nycticorax nycticorax)*, and longnose sucker (*Catostomus catostomus*) as state-listed species that could be within the vicinity of the project location (Table 3). Additionally, the Department sent letters on November 2, 2022 and May 12, 2025 (as the original letter was only valid for two years) that identified records of the state listed Mudpuppy (Necturus maculosus) within 0.25 miles of the project location, along the same shoreline habitat (Table 3).

Black-crowned night-herons are common in wetlands across North America, including saltmarshes, freshwater marshes, swamps, streams, rivers, lakes, ponds, lagoons, tidal mudflats, canals, reservoirs, and wet agricultural fields. They require aquatic habitat for foraging and terrestrial vegetation for cover. The black-crowned night heron is a known summer resident along the Chicago shoreline, with observations of foraging herons along the project reach. However, based on information from the Illinois Department of Natural Resources (IL DNR) and the Chicago Audubon, there are no known observations or records of breeding black-crowned night herons within the project area. The nearest known breeding pair resides within Jackson Park, approximately 1.5 miles south. The existing sparse trees in the project area do not provide suitable breeding habitat with adequate cover, therefore breeding pairs are not expected to occur.

There are records of the state listed longnose sucker (*Catostomus catostomus*) caught over Morgan Shoal during their breeding season in the spring. These fish were caught within 0.25 miles of the shoreline likely utilizing the rocky outcropping for spawning habitat. It is unlikely that longnose suckers would be utilizing the rocky shoreline for spawning due to the wave energy.

The IL DNR has identified records of the state listed mudpuppy (Necturus maculosus) within 0.25 miles of the project location along the rocky shoreline habitat. An additional survey conducted in March 2023 resulted in the capture of three mudpuppy individuals within the project area along the rocky shoreline (Figure 31) (Appendix J). Mudpuppies are known to reside in the deeper waters of Lake Michigan during the summer months and migrate inland to overwinter along the rocky shoreline.

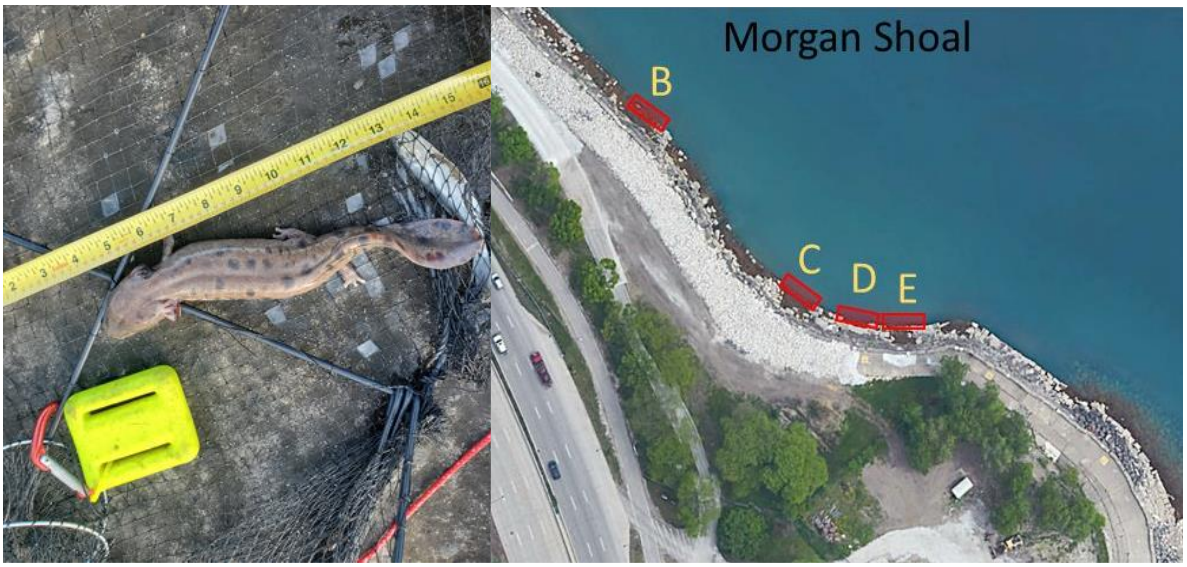

Figure 31: State listed mudpuppy collected along the Morgan Shoal shoreline (left). All three mudpuppies were found at Site D (right).

Table 3: State-listed Species with the Potential of Occurring within the Project Area

Species Name	List Status	Habitat	Potential to Occur
Black-crowned Night Heron (*Nycticorax nycticorax*)	Endangered	Foraging habitat of wetlands, streams, rivers, lakes, ponds, lagoons, mudflats, and wet agricultural fields. Breeding habitat of marsh reeds or trees with adequate cover	**Foraging – Occurs;** birds have been observed foraging along shoreline in project area **Breeding – Not expected to occur**; lack of suitable breeding habitat
Longnose Sucker (*Catostomus catostomus*)	Threatened	Open water, lakes. Breeding in spring over rock and gravel.	**Occurs in vicinity;** species collected during breeding season over Morgan Shoal
Mudpuppy (*Necturus maculosus)*	Threatened	Clear lakes. Overwinters along rocky shorelines and substrates	**Occurs in project area**; species collected in project area during overwintering along rocky shoreline

Preferred Alternative Impact

Federally Listed Species

USACE determined that the preferred alternative would have 'no effect' on the piping plover, rufa red knot, Eastern Massasauga, Hine's emerald dragonfly, monarch butterfly, eastern prairie fringed orchid, and leafy prairie-clover. The project area lacks suitable habitat for these species as described in Table 2 and largely consists of a disturbed urban lacustrine environment. The installation of the dynamic revetment with an expanded area may provide a stopover opportunity for piping plovers that are making their way 11 miles north to the known nesting ground at Montrose Beach or to the known stopover location at 63rd Street Beach, 1.8 miles south. Additionally, the installation of native plants within the new dune, savannah, and prairie habitats may provide suitable feeding habitat for the monarch butterfly.

While the northern long-eared bat and the tricolored bat were not listed by the USFWS as having the potential to occur in the project area, these species have a historical range within the project area. Tree cutting falls within the scope of work, therefore out of an abundance of caution for impacts to bats, a tree cutting window and BMP would be in place. No cutting of any trees suitable for bat roosting (i.e., greater than 5 inches diameter at breast height (DBH), living or dead, with loose hanging bark, or with cracks, crevices, or cavities) would occur from April 1 through September 30. Tree removal would be mitigated by planting five trees, at least 2 inches DBH each, for each tree which is removed that is ten inches or greater DBH. The CPK's preferred methodology for tree replacement is inch-for-inch replacement for all trees removed, which results in more replacement trees than the above USFWS recommendation for bat consideration.

Illinois State Listed Species

The state listed black-crowned night heron (*Nycticorax nycticorax)* and mudpuppy (Necturus maculosus) occur within the project area and the state listed longnose sucker (*Catostomus catostomus*) occurs within the project vicinity. There would be no long-term significant adverse impacts to three state listed species.

The black-crowned night herons observed within the project area are likely flyover birds with occasional foraging observed. Construction activities would occur during the breeding season for the species. However, there are no records of breeding pairs in the project area. Therefore, there would be no long-term significant adverse impacts.

The IL DNR recommended in the November 2, 2022 and May 12, 2025 letters that near-shore work be conducted between May 1st and October 31st to avoid impacts to mudpuppies. This environmental window would be followed to avoid impacts, where feasible. Therefore, there would be no significant impacts to mudpuppies. Additionally, the installation of rubble mound revetment throughout the reach may provide beneficial impacts, as the crevices between stones would provide suitable overwintering habitat for mudpuppies.

Longnose suckers typically spawn in the spring, which may overlap with in-water work. Therefore, in-water placement of the breakwater and headlands near Morgan Shoal may cause temporary adverse impacts to sucker behavior causing fish to vacate the area due to general construction noise and potential turbidity. However, this would be a short-term, minor impact. Since placement of the breakwater is outside of Morgan Shoal's footprint, there would be no impact on longnose sucker spawning habitat from placement of fill material. Overall, there would be no long-term significant adverse impacts to longnose suckers.

No Action Alternative Impact

No significant impacts to state or federally listed threatened or endangered species are anticipated to occur as part of the no action alternative.

3.3.6 Invasive Species

Existing Conditions

Known invasive species within the Chicago region are listed below, however this is not a comprehensive list.

Invasive aquatic species include zebra mussel (*Dreissena polymorpha*), quagga mussel (*Dreissena rostriformis bugensis*), round goby (*Neogobius melanostomus*), alewife (*Alosa*

pseudoharengus), and spiny water flea (*Bythotrephes longimanus*). Invasive plant species include common buckthorn (*Rhamnus cathartica*), garlic mustard (*Alliaria petiolate)*, Japanese honeysuckle (*Lonica japonica*), reed canary grass (*Phalaris arundinacea)*, purple loosestrife (*Lythrum salicaria*), and common reed (*Phragmites australis americanus).* Invasive insect species include emerald ash borer (*Agrilus planipennis*), Asian longhorned beetle (*Anoplophora glabripennis)*, and gypsy moth (*Lymantria dispar)*.

The Chicago Park District's natural resources department includes invasive species management as part of their maintenance of parklands. Some areas of lawn within the project area may contain invasive plant species and are inaccessible due to temporary control measures along the shoreline.

Preferred Alternative Impact

The implementation of the preferred alternative would have a negligible impact related to the presence of any invasive plant species that may be present along the shoreline. As part of the implementation, native plants would be planted to combat the presence of invasive plant species. Additionally, any existing inaccessible areas that may have invasive plants would be made more accessible for management. There would be no significant impact related to the presence of invasive aquatic species as the installation of the revetment along the shoreline would neither introduce invasive species nor increase habitat opportunities for invasive species, as the proposed habitat types are similar to what currently exists.

No Action Alternative impact

No significant impact related to the presence of invasive species is anticipated to occur as part of the no action alternative.

3.4 Cultural & Social Resources

3.4.3 Archaeological & Historic Properties

Existing Condition

The Morgan Shoal Revetment Reconstruction project area is located in the city of Chicago, along the shoreline between 45th and 51st Street within Burnham Park, a 658-acre park owned and managed by the Chicago Park District. The project Area of Potential Effects (APE) is defined as the project footprint, all staging and access areas, and a visual buffer from the southern edge of 41st Street through to the northern side of Promontory Point.

The South Park Commission, serving a geographic area from the Chicago River south to 138th Street and from Lake Michigan west to Cicero Ave, began the process of acquiring property for the new park in 1885. The concept for Burnham Park originated with architect and planner Daniel H. Burnham. Burnham envisioned connecting Jackson Park with downtown through a series of parks and boulevards. His vision of a south lakefront park with a series of manmade islands, a linear boating harbor, beaches, meadow, and play fields was published in his 1909 Plan of Chicago. Unfortunately, Burnham died in 1912 and did not see his plan come to fruition.

A $20 million bond was issued to create what would become Burnham Park in 1920, and clean fill began to be deposited along the shoreline to build out the existing acreage into Lake Michigan. Promontory Point was one of the first features created in the1920s, and the rest of the park was filled from north to south through the 1930s. The park was named in honor of

Burnham in 1927, although Northerly Island is the only design element built from Burnham's original plan for a string of manmade islands. Burnham Park hosted the Century of Progress World's Fair on the newly created Northerly Island in 1933 and 1934 and was officially acquired by the Park District in 1934 as part of the Park Consolidation Act.

The City of Chicago Department of Planning commissioned an inventory and evaluation of the historic parks in the City of Chicago in 1982 by preservation architect Phillip Hamp as part of a consulting team from the Office of John Vici, Inc., and landscape architect Stephen F. Christy (Vinci et al. 1983). The purpose of the survey was to make an inventory of all physical aspects of Chicago's parks which are historically significant and create a five-grade rating system to classify Chicago's parks for historical significance. Hamp and Christy assigned Burnham Park a Grade 2, as the park contains historically significant buildings and structures, but is not cohesive or significant in its site planning or landscaping. Burnham Park was then named within the National Register of Historic Places (NRHP) Multiple Property Documentation Form (MPDF) in 1990, titled "The Historic Resources of the Chicago Park District." (Sniderman and Tippens 1990). While the MPDF disagreed with the methodology behind Hamp and Christy's typology and rating system, the Hamp and Christy study remains the most comprehensive inventory and evaluation of Chicago Parks as a whole and Burnham Park specifically.

While Burnham Park has not been formally listed on the NRHP, based off the Hamp and Christy study as well as the significance criteria established in the MPDF, it is eligible under Criterion A for its connection to the Century of Progress World Fair and the development of the Chicago shoreline. It is also eligible under Criterion B for its connection to Daniel Burnham and the Commercial Club of Chicago. As Hamp and Christy noted in their inventory, Burnham Park has no historical importance as a physical landscape, except for Promontory Point at the southern end of the park and Northerly Island at the north end. Promontory Point was designed by landscape architect Alfred Caldwell and was independently listed on the NRHP under Criteria A and C in 2017. Criteria C pertains to the design or construction having great artistic value or being the work of a master, in this case, Alfred Caldwell. However, Caldwell's influence did not extend to the rest of Burnham Park or the Morgan Shoal project area (Vinci et al. 1983). Other notable historic statues and monuments within Burnham Park include the Adler Planetarium (1913, designated a National Historic Landmark and listed on the NRHP), the Thaddeus Kosciuszko Memorial (1904), the Karel Havlicek Monument (1911), the Wallach Fountain (1930, listed as a contributing feature to Promontory Point), the Balbo Monument (1934), and the Nicolaus Copernicus Monument (1973).

While Burnham Park is thus considered eligible for listing on the NRHP, there are no significant features within the direct project footprint that would contribute to its eligibility under Criterion A or B. While the original limestone revetment dates to the 1930s, it retains very little historic or structural integrity. As discussed in Section 3.2.2 – Shoreline History, the Morgan Shoal revetment has been continually subject to erosion and instability, requiring multiple rehabilitations and enhancements dating back to 1938 due to rotting timber piling and loss of crib material destabilizing the structure. Functional failure of the revetment was noted to have started in 1986 and continues to occur along the shoreline segment. Currently, only 9% of the Morgan Shoal revetment is considered intact, none of which includes the original limestone blocks. When compared to the nearby Promontory Point, which largely retains the original tiered limestone design and material and sits within a landscape designed by Alfred Caldwell, it is evident that Morgan Shoal does not exhibit the same level of structural integrity or artistic value.
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Therefore, USACE has determined that the Morgan Shoal revetment is not a contributing feature to the NRHP eligibility of Burnham Park or eligible for the NRHP on its own merit. However, since the limestone blocks are socially significant to the local community (see Section 2.4.2 for further discussion), the preferred alternative includes reuse of the viable limestone blocks throughout the design and includes a portion of reconstructed step-stone revetment. Given that Burnham Park is a manmade feature consisting entirely of imported fill, there is no potential for prehistoric archaeological resources to exist within the project APE. Refer to Appendix K for supplemental information.

Underwater Resources

Although not listed on the NRHP, the project APE is near the remains (e.g., the ship's metal boiler and propeller) of the Silver Spray wreck located in Lake Michigan on top of the Morgan Shoal bedrock. The Silver Spray, a 109-foot passenger steamer, ran aground on Morgan Shoal in July of 1914, just a few hundred feet off Hyde Park's 49th Street shoreline (Thiel 2013). The wooden steamship had broken up during failed salvage operations causing wooden timbers to drift to shore. While there is still various small debris, the propeller and metal boiler are the prominent remains of the ship on Morgan Shoal approximately 581 feet offshore (Figure 32).

Figure 32: Silver Spray shipwreck remains on Morgan Shoal. Propeller (left) and boiler (right).

Preferred Alternative Impact

Based on the preliminary identification of historic properties, the preferred alternative is not anticipated to have an adverse impact on any known archaeological sites or historic properties. While Morgan Shoal is located within the NRHP-eligible Burnham Park and within visual range of the NRHP-listed Promontory Point, the Morgan Shoal revetment does not contribute to the eligibility of either property as defined by Criteria A, B, C, or D. The preferred alternative would have a positive visual impact on both properties, as the design would integrate the Morgan Shoal segment into the adjacent shoreline architecture while incorporating the remaining intact limestone blocks from the existing revetment into the design. The wreckage of the Silver Spray would be located approximately 303 feet from the toe of the new north headland, approximately 496 feet from the toe of the breakwater and approximately 206 feet offshore from the designated work limit. Therefore, the wreckage would not be impacted by the proposed project as the placement of the underwater breakwater and the headlands are not on Morgan Shoal nor near the wreckage.

No Action Alternative impact

The no action alternative would have a potentially adverse impact on historic structures located west of DuSable Lake Shore Drive, as the Morgan Shoal revetment would continue to degrade over time, increasing the potential for flood damage.

3.4.4 Limestone with social significance

Existing Condition

The original revetment design (Figure 8) and current conditions (Figure 10 and Figure 11) are discussed in Section 3.2.4. The limestone revetment along the Morgan Shoal corridor hosts more than 1,000 rock carvings by mostly anonymous creators dating back to 1930. These rock carvings were not commissioned as part of a sanctioned art exhibit, but rather by individuals who independently carved their initials, names, symbols, dates, figures, and/or elaborate images into the limestone revetment blocks. These urban petroglyphs, while technically a form of graffiti, have collectively become a social history and collective work of art that spans the 22 miles of Chicago's shoreline, including the Morgan Shoal corridor (Swislow 2021).

These stone carvings are in various states of weathering. Some carvings are heavily eroded making them hard to identify, while other carvings are deeply grooved with distinguished features still retained. The stones are subjected to environmental and coastal elements that continue to weather or degrade the carvings. The oldest known carving along this stretch of shoreline dates back to 1930 (Figure 33), however many later dates appear on other carved stones. Multiple carvings are sometimes clustered together on a single block that leads to a collective value of initials, names, and figures.

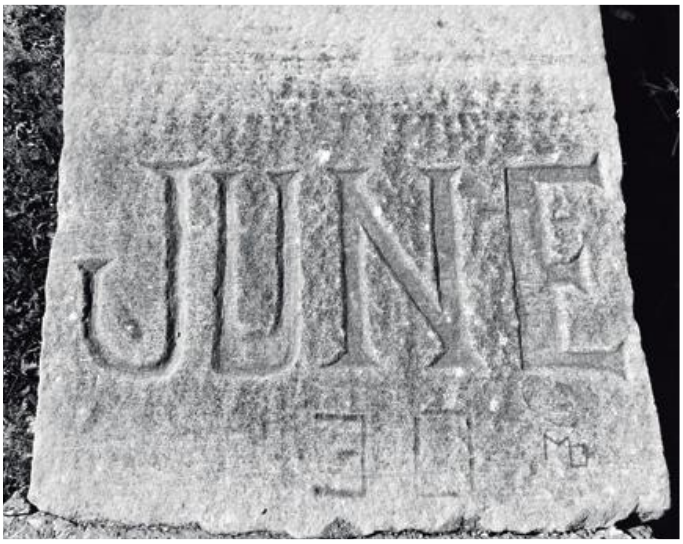


Figure 33: June 1930, MO initials (2018). Photo Credit: William Swislow, Lakefront Anonymous

Even though there are over 1,000 known carvings, there are only hundreds of blocks known to have carvings on them as many blocks host a multitude of individual carvings. A multi-year survey conducted by Interesting Ideas, William Swislow, from 2018 – 2023 identified 383 limestone blocks that had stone carvings. Utilizing this previous survey as a base, USACE conducted a survey in 2023 that identified 162 limestone blocks with stone carvings in the project area. Photographs and descriptions from both surveys can be found in Appendix L. It is worth noting that differences in the number of blocks identified with carvings between the

surveys is largely due to the dynamic nature of the coastal environment. Between the years, blocks were either dislodged causing them to be buried or fall into the lake during storms and high lake levels, their carvings were further eroded, or the blocks were made inaccessible to surveyors due to hazardous shoreline walking conditions (Figure 34, Figure 35).

Figure 34: Winged skull Frank (2018). Photo Credit: William Swislow, Lakefront Anonymous (Left). Same rock carving in 2023 on dislodged and partially buried stone (Right) (USACE survey).

Figure 35: Checkerboard (2018). Photo Credit: William Swislow, Lakefront Anonymous (Left). Same rock carving in 2023, partially buried and eroded (Right) (USACE survey).

It is worth noting that while the limestone blocks and the rock carvings are not currently on a list of formally protected federal or state cultural resources, these carvings hold a social significance to local Chicagoans who appreciate the artistic and collective value as well as their contribution to documenting social history. In addition to the local significance, the large-scale accumulation of urban stone carvings is unlike anything else in the world with very few other modern examples for comparison (Swislow 2021).

Preferred Alternative Impact

The implementation of the preferred alternative would involve the reconstruction of the revetment and modification of the shoreline as previously described in Section 3.2.4. With the

reconstruction, it is necessary to excavate, grade, and modify the existing shoreline. Through these actions, the existing limestone blocks would be impacted. Given the highly degraded state of the shoreline and the proposed alternative plan, it is not feasible to have the limestone blocks remain in place. Implementation would require them to be excavated and moved from their existing locations.

Given the social significance of the limestone blocks and rock carvings on them, purposeful effort would be made to salvage limestone blocks, both with and without carvings, where feasible. It is anticipated that approximately 1480 limestone blocks are intended to be salvaged, relocated and reused in the preferred alternative plan. There would be several reuse options based on their condition, as not every block would meet structural and technical design criteria for coastal protection. Salvaged blocks would be handled in such a way as to avoid cracking and disintegration and placed on shims to facilitate future lifting and handling. The blocks would be stored to prevent tipping or falling and protected from damage during the revetment construction period until such time as they may be safely incorporated into the final work. The general material reuse plan is presented in Table 4 and also includes other materials to be salvaged in addition to limestone blocks.

The backshore of the dynamic revetment would include the reconstruction of a step stone revetment approximately 1,070 linear feet long using intact salvaged limestone blocks from the original 1920s construction. The step stone revetment would be two to three blocks high, mimicking the original design. The height of the backshore revetment is limited to three blocks so as not to block lake views from the park and due to the irregularities of the blocks themselves posing stacking stability concerns. Figure 36, Figure 37, and Figure 38 show visualizations for planned limestone reuse in the stepped revetment at the backshore of the dynamic revetment, seating within the expanded pebble beach, and seating throughout the park.

Even with the significant effort to salvage carved and uncarved limestone blocks, it is not feasible to salvage every block. There is also the possibility of blocks being broken, damaged, or otherwise lost during the removal process even with BMPs in place. Overall, there would be a minor adverse impact on socially significant limestone but reuse as described above and in Table 4 would reduce that impact.

Table 4: Material Reuse within Morgan Shoal project area

Material Type	Quantity*	Existing Condition	Proposed Reuse
North end limestone blocks	152 each (EA)	Very large (10 ton) quarried limestone blocks from the 43rd to 45th Street Project (2012)	Create uniform edge condition along new armor stone revetment adjacent to restored park
Carved limestone blocks	90 EA	Limestone blocks from original 1920s/30s construction or later additions (e.g. 1940s “Paved Beach”) with rock carvings	Repurposed as seating and spread throughout the park, may be included in stepped revetment if size criteria met
Large limestone blocks (uncarved)	720 EA	Intact limestone blocks from the original 1920s/30s construction	Create stepped revetment at back of dynamic revetment (AKA expanded pebble beach) and along the parkside of the concrete ADA transition structure

Material Type	Quantity*	Existing Condition	Proposed Reuse
Small/irregular limestone pieces	670 EA	Remnants of previous revetment structure that have either broken up and/or been dislodged and shaped by the waves	Not suitable to reuse in the stepped revetment at the back of the dynamic revetment, but can be placed for use seating areas
Large concrete blocks	380 EA	Temporary concrete blocks, mostly placed in 2020 to provide emergency protection	Preferred usage is buried as foundation for the salvaged limestone stepped revetment
Pebbles	111 cubic yards (CY)	Wave-rounded stone and concrete remnants from deteriorated revetments and other eroded parkland	Reused within the upper layer of the new dynamic revetment and mixed in with clean cobble
Broken concrete/rubble	1,320 CY	Varied sizes and material types, including stone, concrete, and other construction materials	Solid fragments can be used as fill under the proposed new permanent structures to reduce the need for importing new material
Sand from Trapbags	2,335 CY	Temporary “TrapBags” placed in 2020 to protect parkland from erosion are filled with “bird’s eye” sand	Salvaged clean sand used as fill for the dynamic revetment to reduce the need for importing new material

* Estimated quantity of materials anticipated to be salvaged. May change during construction based on the quantity of materials that is available on site.

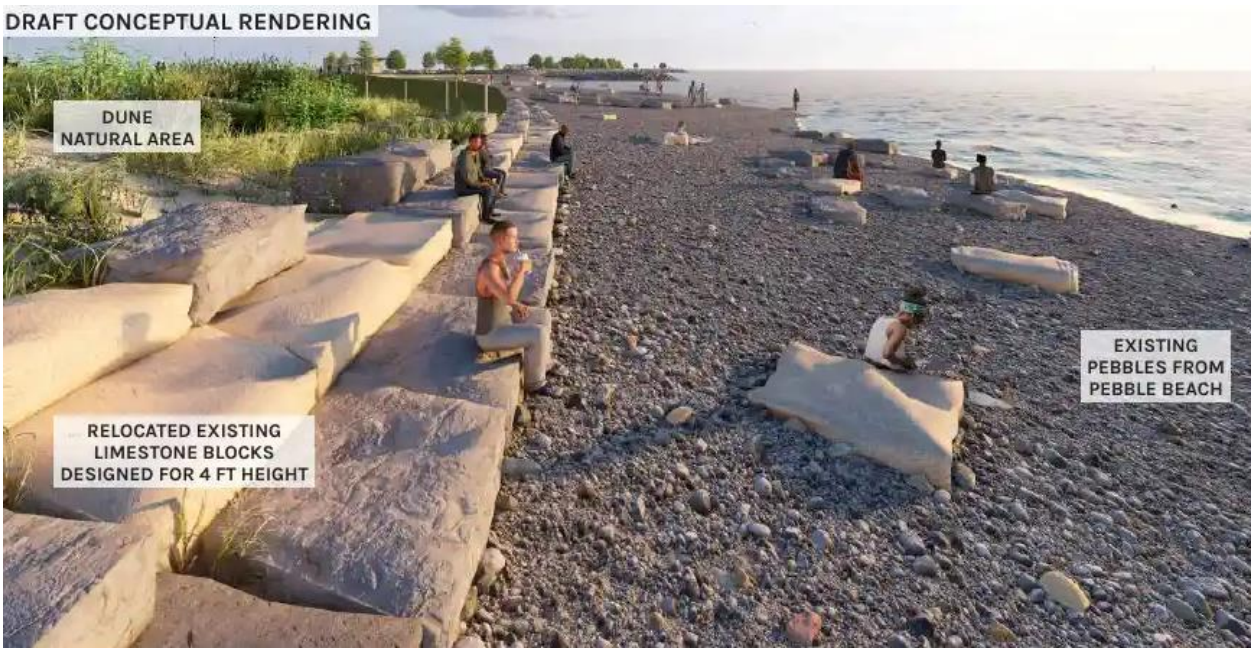
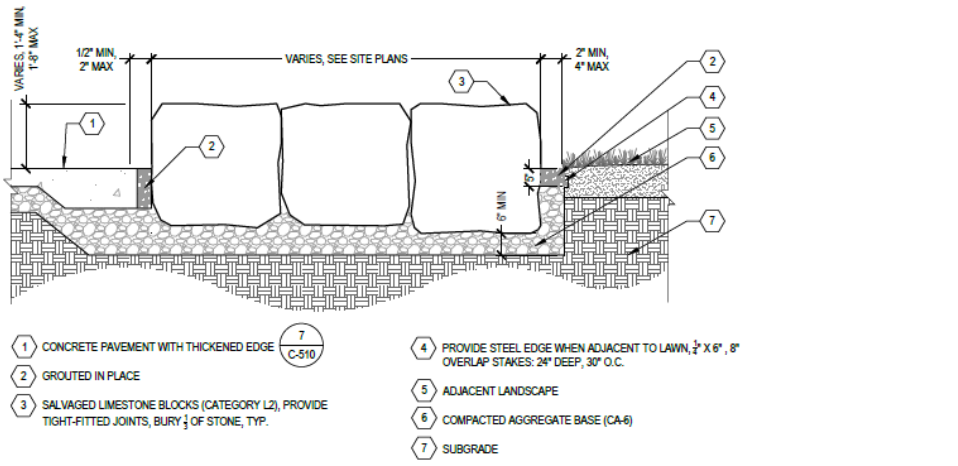
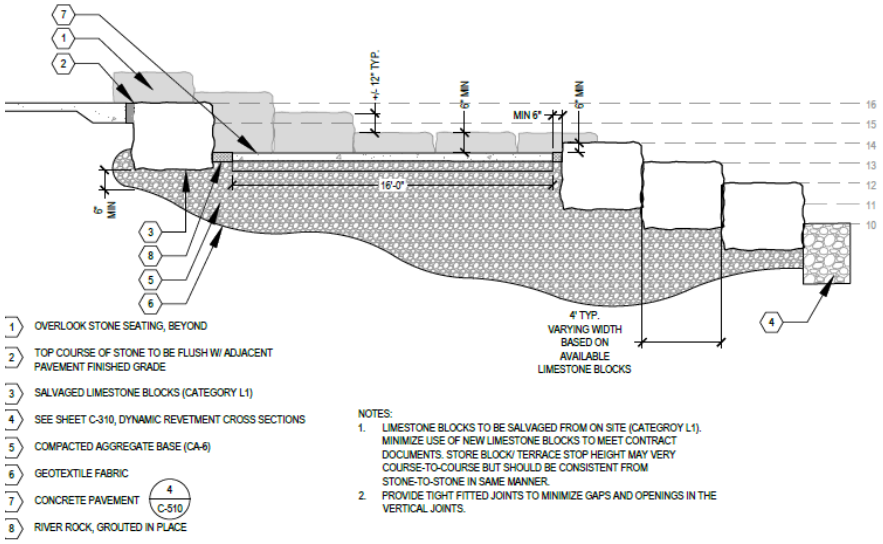


Figure 36: Draft conceptual renderings of material reuse such as backshore limestone stepped revetment, limestone seating and pebble reuse within dynamic revetment.



STONE SEATING AT 51ST STREET OVERLOOK

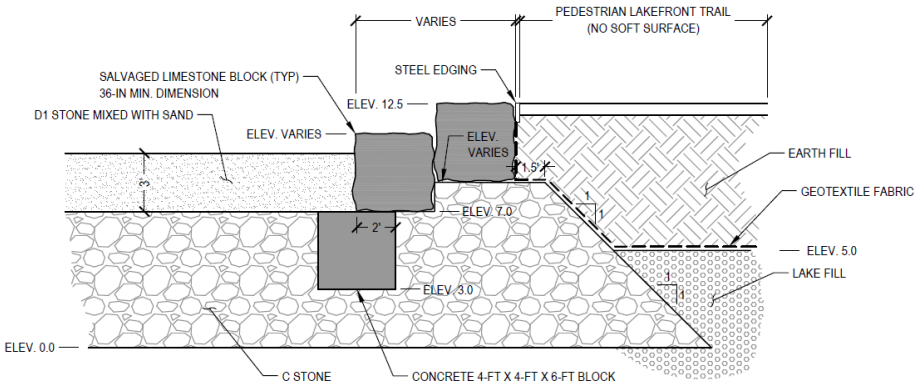
SCALE: 1/2" =



NOTES:
1. LIMESTONE BLOCKS TO BE SALVAGED FROM ON SITE (CATEGROY L1). MINIMIZE USE OF NEW LIMESTONE BLOCKS TO MEET CONTRACT DOCUMENTS. STORE BLOCK/ TERRACE STOP HEIGHT MAY VERY COURSE-TO-COURSE BUT SHOULD BE CONSISTENT FROM STONE-TO-STONE IN SAME MANNER.
2. PROVIDE TIGHT FITTED JOINTS TO MINIMIZE GAPS AND OPENINGS IN THE VERTICAL JOINTS.

OVERLOOK TERRACE LANDING SECTION

SCALE: 1/4" = 1'



LIMESTONE BLOCK WALL AT DYNAMIC REVETMENT

SCALE: 1" = 5'

Figure 37: Example reuses for salvaged limestone blocks in preferred alternative plan set. Seating throughout park (top). Step stone revetment cross-sections at dynamic revetment backshore (middle and bottom).

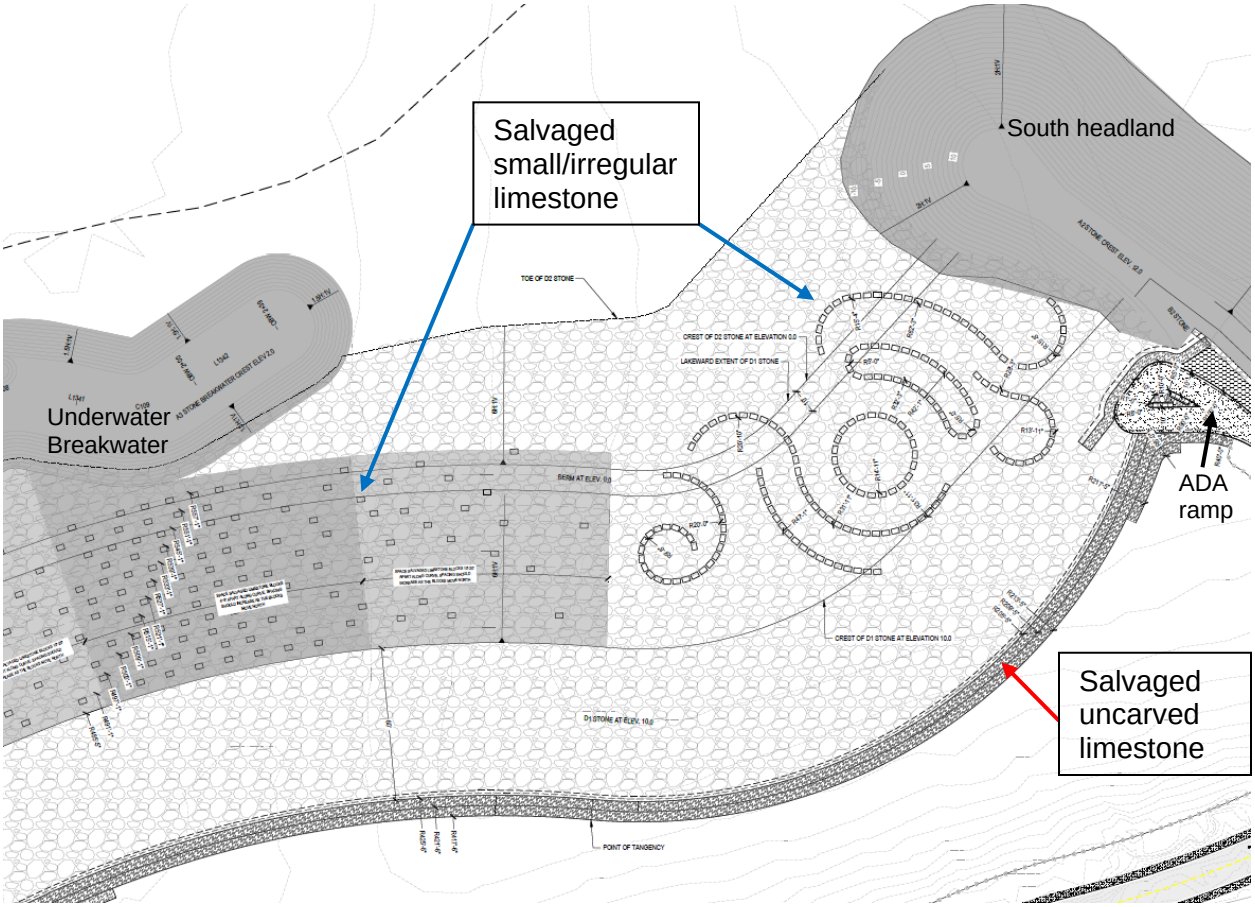


Figure 38: Salvaged limestone reuse at dynamic revetment from preferred alternative plan set excerpt. (Blue) Salvaged small/irregular limestone to be placed as seating on top of dynamic revetment. (Red) Salvaged intact limestone blocks from the original 1920s/30s construction to be used as reconstructed step stone revetment at backshore of dynamic revetment

No Action Alternative impact

The no action alternative would continue to degrade limestone with social significance through exposure to natural coastal processes such has high lake levels and erosion. Overtime, more limestone blocks would fall into the lake and have their artwork eroded. Therefore, there would be a long-term adverse impact on socially significant limestone associated with the no action alternative.

3.4.5 Recreation

Existing Condition

Recreation was generally described for the project area in the 2020 EA and most conditions have not changed. However, access conditions have changed, and aquatic recreation was not previously described and is thus described below.

The shoreline along the Morgan Shoal corridor historically offered water access and views of Lake Michigan while the step stone revetment was intact (Figure 39). As the revetment began to fail and the shoreline eroded, water access became more limited. The actively eroding shoreline

created unsafe conditions for individuals to recreate or walk along the once intact limestone revetment, which now has large blocks that are damaged, displaced, or completely missing, creating significant gaps and safety hazards. While some adventurous park goers continue to utilize the degraded revetment to climb the rocks or access the water, generally these conditions are unsafe for typical users. Additionally, temporary TrapBags were placed from 45th Street to 49th Street as part of the 2020 Storm Protection Emergency Repair that have greatly limited one's ability to the lakefront and partially obstructed the view of the lake from the Lakefront Trail (Figure 40). Currently, there is no ADA accessibility to the water's edge with the only ADA accessibility confined to the lakefront trails.

Figure 39: The south side of the 51st Street rock revetment in the 1950s. Photo credit Mildred Mead. University of Chicago Photographic Archive.

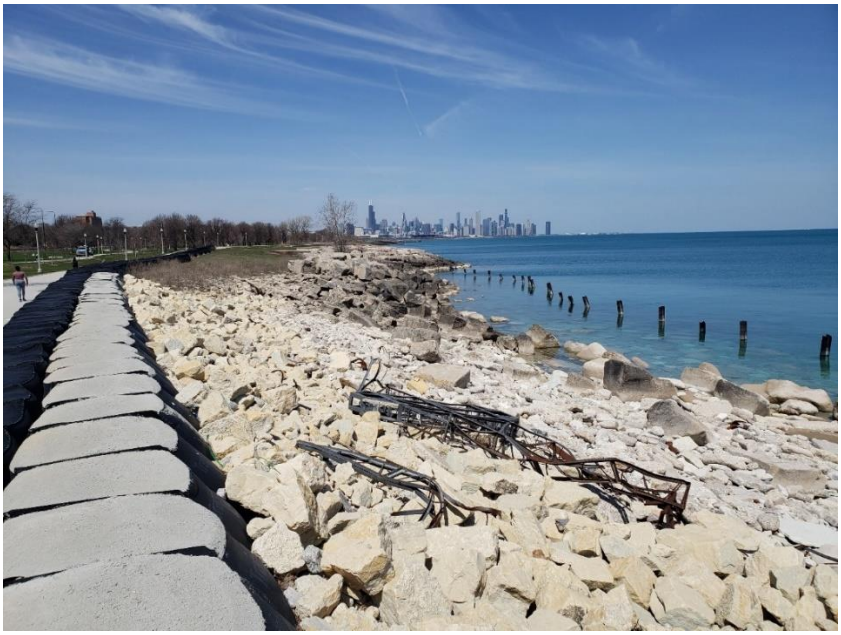


Figure 40: Temporary TrapBags partially impeding one's lake view and one's ability to lake. Eroded shoreline limits use of the lake and is a safety hazard for recreation

In addition to the birdwatching, walking, running, and biking that occurs along the lakefront trail, residents and visitors also enjoy a number of aquatic recreational activities within the Morgan Shoal corridor. While there is no official Chicago Park District beach located within the project area, the shallow salient approximately 300 feet long that exists at approximately 49th Street, is locally known as “pebble beach”. This is a beloved gathering spot for sunbathers, swimmers, rock hunters, and even the occasional community gathering (Figure 41). The waterfront can be reached at this location due to the shallow slope of the salient, however parkgoers still have to climb over concrete blocks and through deteriorated limestone blocks to reach the water’s edge. This location does enable swimmers, snorkelers, and the occasional scuba diver to reach Morgan Shoal, often for the purposes of exploring the wreck of the Silver Spray (Figure 42). Additionally, individuals can be seen climbing, sunbathing on, and jumping off the limestone blocks into deeper waters just north and south of the salient during the summer months. Occasionally, shoreline anglers can be seen fishing, typically along the southern headland at 51st street.

Figure 41: Local community members along the shoreline at approximately 49th Street during summer

Figure 42: Recreational snorkeler exploring the Silver Spray boiler during high lake levels

Preferred Alternative Impact

The implementation of the preferred alternative would provide long-term benefits to recreation and temporary construction-related adverse impacts to recreation and access. The reconstruction of the shoreline revetment would include the creation of approximately 7 acres of new parkland that can be used for recreation activities for the long-term (Figure 4). The new parkland expansion would reduce the distance between the shoreline and Morgan Shoal, thus providing the opportunity for swimmers, snorklers, and divers, to reach the geologic feature more easily.

The installation of the dynamic revetment would provide an expanded 'pebble beach' approximately 1,000 feet long, in which parkgoers can access the water's edge, along with ADA accessibility to the dynamic revetment (Figure 38). Within the dynamic revetment, salvaged limestone blocks would be placed throughout to mimic the more secluded feel of the existing conditions which is often used for seating and sunbathing near the water's edge. The reconstructed step stone revetment along the dynamic revetment backshore would also provide seating and sunbathing opportunities further from the water's edge. The reconstruction of the 51st Street peninsula revetment would include new steel sheet pile into the lake and a stepped concrete revetment similar to the 51st to 54th street segment. This section would be ADA compliant and terminate at the water's edge similar to other 'concrete beach' sections along the lakeshore.

The north and south rubble mound revetment (AKA headlands) would be constructed with 6 – 10 ton armor stone along the slope with the crest of the revetment composed of smaller core stone (1,000 – 2,000lbs) and filter stone (4 – 10 inches). Some sections may incorporate salvaged limestone blocks. Along the rubble mound revetment, lake views would be restored, providing unobstructed views from the lakefront trail. The smaller stone and salvaged limestone would provide the opportunity to walk up to the crest of the rubble mound for closer lake views, if desired. However, the nature of the large armor stone and slope to the water's edge provides some difficulty in reaching the waterfront along these sections, akin to sections of the existing conditions.

Construction of the project is anticipated to begin during the fall of 2026, with in-lake work commencing spring of 2027 and project completion anticipated by the end of 2030. Work would be conducted in three phases (Phase 1: Site preparation, Phase 2: Demolition and Reconstruction, and Phase 3: Landscape restoration and Finalization). Temporary lakefront trail connections would be constructed during Phase 1, in which the shared pedestrian and bike path would remain open to the public, west of the chain link fence through the duration of Phase 2. Traffic control would be required for trail user safety during this timeframe. The majority of the work would occur during Phase 2, in which areas of the shoreline and the water would be temporarily inaccessible for recreational users due to the active construction and safety concerns. During Phase 3, the new parkland and trails that were constructed during Phase 2, would be open for the public. Therefore, during construction there would be a temporary impact on recreational activities and usage of parkland and waterfront.

Overall, the implementation of the preferred alternative would provide long-term benefits to recreation and temporary construction-related minor adverse impacts to recreational activities and access.

No Action Alternative impact

Shoreline erosion would continue under the no action alternative, which would continue to compromise the parkland backshore, erode trails, undermine utilities, limiting safe recreation opportunities and access for the public. Therefore, there would be an adverse impact associated with the no action alternative.

3.4.6 Social Setting

Existing Condition

The project area is located within the city limits of Chicago. Chicago is the 3rd most populous city in the United States with just under 3,000,000 people. The U.S. Census Bureau's American Fact Finder and Quick Facts (U.S. Census Bureau 2025) for Chicago, Cook County, and Illinois were reviewed for socioeconomic information presented in Table 5.

Table 5: Vintage Year 2024 U.S. Census Data for the City of Chicago.

Category	Chicago	Cook County	Illinois
Total Population	2,695,598	5,182,617	12,710,158
Under 18 years	21.5%	20.7%	21.6%
Under 5 years	6.6%	5.2%	5.3%
White	51.2%	65.2%	76.0%
Black or African American	31.6%	23.3%	14.6%
American Indian and Alaska Native	0.8%	0.8%	0.6%
Asian	7.2%	8.3%	6.3%
Native Hawaiian and Other Pacific Islander	0.1%	0.1%	0.1%
Hispanic of Latino	29.0%	27.0%	19.0%
Some other race alone	0.2%	0.2%	0.1%
Two or more races	1.7%	2.3%	2.3%
High School Graduate or Higher	83.8%	88.3%	90.3%
Bachelor's Degree or Higher	37.5%	41.9%	37.2%
Median Household Income	$52,497	$81,797	$81,702
Below Poverty Level	20.6%	13.2%	11.6%

Preferred Alternative Impact

The preferred alternative would have no impact to the social setting within the area. The analysis set forth in the 2020 EA is also applicable to the preferred alternative. The preferred alternative is expected to have a beneficial impact by providing storm protection to DuSable Lake Shore Drive and Chicago Park District property, which is utilized by residents in the area.

No Action Alternative impact

The No Action Alternative would not have an impact on the social setting. Shoreline erosion would continue under the no action alternative, which would continue to compromise access for residents in the area as discussed in Section 3.4.5.

3.5 Traffic and Transportation

Existing Condition

South DuSable Lake Shore Drive (U.S. Highway 41) is a critical piece of transportation infrastructure paralleling the shoreline along the west side of the project area. DuSable Lake Shore Drive is a high-volume expressway that follows the Chicago shoreline for approximately 16 miles, connecting north and south Chicago. Average daily traffic volume near the project area exceeds 117,000 vehicles; emergency vehicles, and daily commuters all depend on DuSable Lake Shore Drive's operation. Separated walking and bicycle trails run through the project area, between DuSable Lake Shore Drive and the shoreline. The trails are part of the larger Lakefront Trail network which transverses the parklands east of DuSable Lake Shore Drive along the Chicago shoreline. The trails are a major route for non-motorized commuters and recreational users.

The above transportation infrastructure has been damaged from high lake levels and storm events. Many of the protective shoreline structures are in disrepair and nearing the end of their useful lives. Portions of the Lakefront Front Trail have been flooded and damaged by wave action and erosion (Figure 43). Short-term and emergency repairs have occurred but periodic closures and repairs of the Lake Front Trail would continue until long-term repairs occur. While DuSable Lake Shore Drive has not flooded in the project area, large storm events have deposited debris, such as rock ejecta, onto the road surface and continued erosion would compromise this significant transportation infrastructure.

Highway traffic generates noise levels typically between 70 and 80 decibels (dB) at 50ft from the source. A noise study was not conducted as part of the impacts analysis; however, it would be expected that the DuSable Lake Shore Drive traffic would produce traffic noise typically found within the above listed range. Sections of the Lakefront Trail reside within 50ft of DuSable Lake Shore Drive, mostly notably at the narrowest section of the reach, and would experience traffic noise levels in the range of 70 to 80 dB. Noise levels decrease as one moves further away from DuSable Lake Shore Drive.

Figure 43: Damage to the revetment and Lakefront Trail in the Morgan Shoal reach of the Chicago shoreline from a storm on January 11, 2020.

Preferred Alternative Impact

Implementation of the preferred alternative would provide a beneficial impact on traffic and transportation by providing long-term protection of transportation infrastructure against high lake levels and erosion. The preferred alternative includes protection features along the lakefront that are expected to minimize the impact of future storm events to lakefront recreational trails and DuSable Lake Shore Drive. Construction would be sequenced to maintain public access to pedestrian and bicycle trails through the duration of construction, thereby limiting short-term impacts from project implementation. DuSable Lake Shore Drive would not be impacted by construction.

Highway traffic noise would not be reduced from the implementation of the preferred alternative; however, sections of the Lakefront trail and the edge of the shoreline would be moved further away from DuSable Lake Shore Drive, allowing for additional noise attenuation to occur, this would be a beneficial impact for Lakefront trail users.

No Action Alternative impact

Shoreline erosion would continue under the no action alternative, which would continue to threaten the stability of DuSable Lake Shore Drive and require repeated emergency temporary erosion control measures. Coastal storm surges would continue to threaten DuSable Lake Shore Drive through wave overtopping, rock ejecta, erosion, and land loss. Land loss would increase the floodplain which would further increase the threat to DuSable Lake Shore Drive, as well as threaten to undermine the structural integrity of the highway. Unsafe conditions on DuSable Lakeshore Drive could lead to vehicular hazards and unsafe conditions for passengers. The Lakefront trail would continue to be subjected to coastal forces, threatening the structure and any Lakefront Trail users (**Figure 44**). Therefore, there would be an adverse impact on traffic and transportation through the no action alternative.

Figure 44: Rock ejecta on the Lakefront trail after the January 11, 2020 storm as an example of continued coastal threats with the no action alternative.

3.6 Hazardous, Toxic & Radioactive Wastes (HTRW)

Existing Condition

A Hazardous, Toxic, or Radioactive Waste (HTRW) investigation was completed for the project area in 1993 in accordance with USACE Engineer Regulation 1165-2-132 as part of the Illinois Shoreline Erosion Interim feasibility study. The investigation relied on site reconnaissance and a review of reasonably ascertainable environmental records, including regulatory database information and historic information, to determine the likelihood that the project area contains a HTRW. A limited update was conducted in general accordance with ASTM Standard Practice E-1527-21 in April 2025. The limited update used online regulatory databases to identify recognized environmental conditions (RECs) or HTRW in the project area. Information obtained using USEPAs Enviromapper online service indicates that there are four previous hazardous waste generators and two active very small quantity hazardous waste generators adjacent to the project area. There is no evidence of release from the adjacent regulated facilities and there are no compliance or enforcement actions recorded that would suggest that the project area has been impacted by adjacent regulated facilities. In addition, the project area is not listed as a RCRA, CERCLA, or Superfund site. There is no evidence of previous underground storage tanks, or leaking underground storage tanks, present onsite based on a search of IEPA online Bureau of Land database. Review of historic information suggests that while the project area is in the vicinity of the previous Nike Missile sites C-40 and C-41, no development associated with these sites is known to have occurred in the project area.

Preferred Alternative Impact

Implementation of the project is not expected to release contaminants into the environment or expose the public to significant amounts of hazardous material. The construction contractor is required to develop a spill prevention and response plan for all hazardous materials that may be

used onsite, develop a solid and hazardous materials and waste management plan prior to starting work, and comply with all applicable local, regional, state, and federal laws, policies, and regulations regarding the transportation, storage, handling, management, and disposal of hazardous materials and wastes. In accordance with ER 1165-2-132, Hazardous Toxic, and Radioactive Waste for USACE Civil Works Projects, construction of civil works projects in HTRW contaminated areas would be avoided where practicable. Where HTRW-contaminated areas or impacts cannot be avoided, response actions, including excavation and disposal of contaminated soils, would be implemented in accordance with USEPA and applicable state regulatory agency requirements. All HTRW response actions, including off-site disposal of materials containing elevated concentrations of contaminants, is 100% nonfederal project sponsor responsibility.

No impacts due to the potential release of HTRW are anticipated under the preferred alternative.

No Action Alternative impact

The implementation of the no action alternative would have no impacts related to HTRW.

3.7 Irreversible and Irretrievable Commitment of Resources

The preferred alternative would not entail significant irretrievable or irreversible commitments of resources. Long-term sustainability actions were included for the benefit of environmental resources.

3.8 Short-term uses of Man's Environment and long-term productivity

NEPA, Section 102(2)(C)(iv) calls for a discussion of the relationship between local short-term uses of man's environment and maintenance and enhancement of long-term productivity in an environmental document. The preferred alternative would reconstruct the revetment along the Chicago Shoreline at the narrowest location along DuSable Lake Shore Drive. This reconstruction would protect the backshore parkland and major traffic artery from erosion and coastal processes. Under the no action alternative, no project would be implemented, therefore, physical, biological, and social resources could be impacted, and the backshore parkland would continue to erode and threaten the stability of DuSable Lake Shore Drive, thereby limiting safe transportation along a major traffic artery and limiting safe recreational activity in the area.

Chapter 4 Conclusions & Compliance

The Morgan Shoal revetment reconstruction would not result in significant adverse environmental effects (Table 6). Adverse effects would be negligible to minor and include short-term periodic negligible sand deposition on Morgan Shoal; short-term noise and air emissions from equipment operation; temporary, minor turbidity from stone and fill placement operations; temporary displacement of some macroinvertebrate, fish, and bird species and associated recreational activities; minor, long-term impacts to coastal resources and process from lake filling activities; and minor, long-term impacts to limestone with social significance due to salvaging and construction activities.

Macroinvertebrates, fish, birds, and recreational users would naturally return upon completion of construction. Reconstruction of the historical limestone step stone revetment along the backshore of the dynamic revetment would aid in conserving the historical limestone that has been lost from decades of erosion and deterioration. Potential long-term beneficial impacts are anticipated for the following: aquatic communities, terrestrial communities, threatened & endangered species, recreation, and traffic and transportation (Table 6).

Table 6: Summary of Environmental Impacts

Environmental Resource	No Action Alternative	Proposed Action
Climate	No impact	No impact
Geology & Soils	Long-term adverse impact (soils) No impact (geology)	Short-term and long-term minor adverse impacts (soils) Short-term negligible adverse impact (geology)
Limnology	No impact	No impact
Coastal Resources and Processes	No short-term or long-term impact (resources and processes) Long-term adverse impact (shoreline erosion)	Minor adverse and beneficial long-term impacts (local scale) Negligible adverse impacts (regional scale)
Water Quality	No short-term or long-term adverse impact	Minor short-term adverse impact No long-term adverse impact
Air Quality	No short-term or long-term adverse impact	Minor short-term adverse impact No long-term adverse impact
Floodplain	No short-term or long-term adverse impact	Beneficial long-term impact
Aquatic Communities	No short-term or long-term adverse impact	Minor short-term adverse impact No long-term adverse impact Beneficial long-term impact
Terrestrial Communities	No short-term or long-term adverse impact	Minor short-term adverse impact No long-term adverse impact Beneficial long-term impact
Threatened & Endangered Species	No short-term or long-term impact	No short-term or long-term adverse impact (Federal & state species exception below) Minor short-term adverse impact (Longnose sucker state listed) Beneficial long-term impact (Mudpuppy state listed)
Invasive Species	No short-term or long-term impact	No short-term or long-term adverse impact
Archaeological & Historic Properties	Potential Long-term adverse impact	No short-term or long-term adverse impact Beneficial long-term impact
Socially significant limestone	Long-term adverse impact	Minor short-term and long-term adverse impact
Social Setting	No short-term or long-term impact	No short-term or long-term impact
Recreation	Long-term adverse impact	Minor short-term adverse impact Beneficial long-term impact
Traffic and Transportation	Long-term adverse impact	No short-term or long-term adverse impact Beneficial long-term impact
HTRW	No short-term or long-term impact	No short-term or long-term adverse impact

4.2 Compliance with Environmental Statutes

The proposed revetment reconstruction project along the 45th to 51st Street Morgan Shoal corridor has been reviewed pursuant to the following Acts and Executive Orders: Fish and Wildlife Coordination Act of 1958; National Historic Preservation Act of 1966; National Environmental Policy Act of 1969; Clean Air Act of 1970; Executive Order 11593, Protection and Enhancement of the Cultural Environment, May 1971; Coastal Zone Management Act of 1972; Endangered Species Act of 1973; Clean Water Act of 1977; Executive Order 11988, *Floodplain Management*, May 1977; Executive Order 11990, *Wetland Protection*, May 1977. The proposed action has been found to be in compliance with these Acts and Executive Orders as described below.

- Fish and Wildlife Coordination Act of 1958: Coordination was commenced with USFWS with the provision of a scoping letter sent October 19, 2022. Coordination under the Fish and Wildlife Coordination Act will be completed once the USFWS has reviewed the Draft SEA during the 45-day public review period and provided any recommendations in a Planning Aid Letter or Coordination Act Report.

- Executive Order 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. The short duration of the work would have no long-term detrimental impacts to migratory birds.

- National Historic Preservation Act of 1966: Section 106 of the National Historic Preservation Act (54 U.S.C. § 306108) requires Federal agencies to take into account the effects of proposed federal undertakings historic properties included or eligible for the National Register of Historic Places. The implementing regulations for Section 106 (36 C.F.R. Part 800) requires Federal agencies to consult with various parties, including the Advisory Council on Historic Preservation, the State Historic Preservation Office (SHPO), and Indian tribes, to identify and evaluate historic properties, and to assess and resolve effects to historic properties. USACE is in the process of completing Section 106 for this project and will update this section following solicitation of public comment through the NEPA process and continued consultation with the Illinois SHPO.

- National Environmental Policy Act of 1969: This Draft SEA has been prepared in accordance with NEPA, as amended by the Fiscal Responsibility Act (42 U.S.C. § 4331 et seq.) and applicable NEPA regulations.

- Clean Air Act of 1970: The proposed Morgan Shoal revetment reconstruction is within Cook County, which is in an air quality non-attainment area. Due to the small scale and short duration of the project, emissions would be limited to temporary vehicle/equipment emissions. Temporary vehicle/equipment emissions would meet current federal regulations. Greenhouse gas emissions are expected to be negligible.

- Coastal Zone Management Act of 1972 (16 U.S.C. § 1451, et seq.): The project site is within the Illinois Coastal Zone. The project would address ongoing erosion and coastal storm damage that has affected parkland and threatens the stability of DuSable Lake Shore Drive. USACE has determined that the proposed activities would “comply with State of Illinois’ approved Coastal Management Program and would be conducted in a

manner consistency with such policies". A determination of consistency with the Illinois Department of Natural Resources' Coastal Management Program pursuant to the Coastal Zone Management Act of 1972 was sought from the Illinois Coastal Management Program (ICMP) in a letter dated August 2, 2024. USACE received a response on June 5, 2024 from the ICMP stating that "Department staff has reviewed the determination and concur that the proposed activity complies with the enforceable policies of the ICMP and would be conducted in a manner consistent with the ICMP."

- Endangered Species Act of 1973 (16 U.S.C. § 1536): USACE determined that the preferred alternative would have 'no effect' on piping plover, northern long-eared bat, tricolor bat, Hine's emerald dragonfly, leafy prairie-clover, rufa red knot, eastern massasauga, eastern prairie fringed orchid, or monarch butterfly. Documentation of the analysis for the 'no effect' determination is included in Section 3.3.5 of the SEA.

- Clean Water Act of 1972 (33 U.S.C. § 1251, et seq.): Pursuant to the Clean Water Act (CWA), as amended, the discharge or fill material associated with the preferred alternative has been found to be compliance with section 404(b)(1) Guidelines (40 C.F.R. Part 230) as set forth in Appendix H, and no mitigation is required for the fill activities. An individual 401-water quality certification (WQC) will be obtained from the Illinois Environmental Protection Agency (IEPA) prior to construction. Project construction would comply with all applicable water quality standards and conditions and best management practices imposed by IEPA in 401-water quality certification .

- Executive Order 11988, *Floodplain Management*, May 1977: The project would bring the shoreline outside of the 100yr floodplain through the reconstruction of the revetment and lakefill activities. While this would be a beneficial impact for human use and shoreline protection, there would be no impact to the Lake Michigan floodplain system due to the small scale and localized project area.

- Executive Order 11990, *Wetland Protection*, May 1977: The project does not impact coastal or terrestrial wetlands as there are none present within the project area. The small (0.09 acre) area with wetland features is unnatural and would revert to non-wetland under both the preferred and no action alternatives, as the broken water pipe sustaining the hydrophytic vegetation has been repaired. No mitigation is required.

This Draft SEA concludes that the proposed Morgan Shoal revetment reconstruction project: 1) would not have significant adverse environmental impacts; 2) would have benefits that outweigh the minor and mostly short-term impacts that may result; and 3) does not constitute a major federal action significantly affecting the quality of the human environment.

4.3 Summary of Compliance with Environmental Statutes

Table 7: Environmental Compliance

Federal Policy	Compliance*
Archeological Resources Protection Act, 16 U.S.C. § 470aa, et seq.	Full Compliance
Clean Air Act, as amended, 42 U.S.C. § 7401, et seq.	Full Compliance
Clean Water Act (Federal Water Pollution Control Act), 33 U.S.C. § 1251, et seq.	Partial Compliance

Federal Policy	Compliance*
Coastal Zone Management Act, 16 U.S.C. § 1451, et seq.	Full Compliance
Endangered Species Act, 16 U.S.C. § 1531, et seq.	Full Compliance
Farmland Protection Policy Act, 7 U.S.C. § 4201, et. seq.	Not Applicable
Federal Water Project Recreation Act, 16 U.S.C. § 460L-12, et seq.	Full Compliance
Fish and Wildlife Coordination Act, 16 U.S.C. § 661, et seq.	Partial Compliance
Floodplain Management (Executive Order 11988)	Full Compliance
Invasive Species (Executive Order 13112, and E.O. 13751)	Full Compliance
Migratory Bird Treaty Act, as amended, 16 U.S.C. § 703, et seq.	Full Compliance
National Environmental Policy Act, 42 U.S.C. § 4321, et seq.	Partial Compliance
National Historic Preservation Act, as amended, 54 U.S.C. § 300101, et seq.	Partial Compliance
Protection & Enhancement of the Cultural Environment (Executive Order 11593)	Full Compliance
Protection of Wetlands (Executive Order 11990)	Full Compliance
Rivers and Harbors Act, 33 U.S.C. § 403, et seq.	Full Compliance
Watershed Protection and Flood Prevention Act, 16 U.S.C. § 1001, et seq.	Full Compliance

Full Compliance: Having met all requirements of the statute.
Partial Compliance: Anticipated full compliance upon completion of Final EA.
Not Applicable: No requirements for the statute required.

4.4 Finding of No Significant Impact (FONSI)

This Draft SEA for the Morgan Shoal revetment reconstruction project in Chicago, Illinois has found that there would be no long term, significant adverse effects resulting from implementation of the proposed action. A 45-day Agency and Public Review period will be held starting in the September 2025 timeframe, in which a public meeting would occur in the middle of the review period. After the 45-day public review period, all pertinent comments received will be incorporated into the Draft SEA to finalize the document. The Final Supplemental Environmental Assessment document and supporting appendices will be made available on the Chicago District's Civil Works and the Public Building Commission's webpage for maximum distribution. The Draft FONSI has been posted at the front of this Draft SEA.

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