

Tittabawassee River – Saginaw River & Bay Natural Resource Trustee Councils Draft Supplemental Restoration Plan and Environmental Assessment



Prepared by

U.S. Fish and Wildlife Service

Bureau of Indian Affairs

Saginaw Chippewa Indian Tribe of Michigan

Michigan Department of Environment, Great Lakes, and Energy

Michigan Department of Natural Resources

Michigan Department of Attorney General

February 23, 2023

Preface

An Environmental Assessment is prepared to comply with the National Environmental Policy Act of 1969 (commonly referred to as ‘NEPA’). The Act is the Nation’s premier environmental law that guarantees every American the right to review, comment, and participate in the planning of federal decisions that may affect the human environment.

On July 16, 2020, the Council on Environmental Quality (CEQ) published an update to the regulations implementing the procedural provisions of the National Environmental Policy Act (85 FR 43304). Among the goals of the July 2020 amendments to the regulations was the intent to reduce delays in development of analyses and to promote better, transparent federal decisions consistent with section 101 of the Act. Subsequently, on April 20, 2022, CEQ issued a final rule (87 FR 23453) to amend certain provisions of its regulations for implementing NEPA.¹

In order to achieve greater efficiency, consistent with the recent guidance regarding implementation of the National Environmental Policy Act, the Trustee Councils for the Tittabawassee River and the Saginaw River & Bay have jointly developed this Draft Supplemental Restoration Plan and Environmental Assessment. The geographic areas of interest for the two Trustee Councils are identical, both cases seek to recover and restore natural resources affected by the release of hazardous substances into aquatic systems within the Saginaw Bay watershed, and their criteria for evaluating restoration proposals, as described within their respective restoration plans², are similar. Joint development of this Draft Supplemental Restoration Plan – Environmental Assessment ensures that administrative costs of the two Trustee Councils may be minimized so that the funding dedicated to ecological restoration may be efficiently used in the public’s interest.

This document emphasizes the use of ‘clear language’ to communicate the planning effort of the Tittabawassee River and Saginaw River & Bay Trustee Councils. The Plain Writing Act of 2010 (Public Law 111 – 274) directs federal agencies to adopt language that is “clear, concise, well-organized, and follows other best practices appropriate to the subject.”

Please note that references to Tables, Figures, Appendices, and sections of the document are hyperlinked to the referenced portion of the document. Pressing the ‘Ctrl’ key and clicking on the reference in the document will move the document to the referenced part of the document.

In accordance with Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794d), this document is ‘Section 508 compliant’, meaning that it has been formatted to facilitate the use of automated readers for individuals who may be vision impaired. The font used in this document is ‘Arial’. This font improves the readability of text for individuals that fall within the spectrum of dyslexia that affects approximately 10 percent of the population. Color schemes

¹ Notably, however, since the Trustees received and evaluated project proposals, and began drafting project descriptions and analyses to be included in this Draft Supplemental Restoration Plan and Environmental Assessment prior to the May 20, 2022 effective date of CEQ’s final rule (87 FR 23453), the NEPA analysis contained herein was conducted in accordance with the NEPA regulations in place prior to May 20, 2022.

² *Final Restoration Plan / Environmental Assessment for the Tittabawassee River System Natural Resource Damage Assessment and Final Restoration Plan & Environmental Assessment for Use of Remaining Funds - 1998 Saginaw River and Bay Settlement.* Available by request from t.river.nrda@fws.gov.

used for graphics (Chapter 5 – Environmental Consequences of the Alternatives) are designed to be accessible for the seven to eight percent of the population that is affected by Color Vision Deficiency, more commonly known as color blindness.

Abstract

This Draft Supplemental Restoration Plan considers restoration proposals that have been identified by stakeholders with interests in the Saginaw Bay watershed. These proposals have been evaluated by the Trustees relative to the restoration criteria provided within their previously published restoration plans. The Trustees' evaluation of the restoration proposals also meets the requirements for an environmental assessment, commonly referred to as an 'EA', consistent with the National Environmental Policy Act. Consequently, this document is both a restoration plan and an environmental assessment, and hereafter will be referred to as the 'Draft Supplemental Plan' or the 'Draft Supplemental Restoration Plan.' This Draft Supplemental Restoration Plan is 'tiered' from the two previously published plans, meaning that those two restoration plans remain relevant and applicable to this document, forming the foundation for the analyses reported here.

This Draft Supplemental Restoration Plan and Environmental Assessment relies upon criteria established in the completed restoration plans previously published by the two Trustee Councils working within the Saginaw Bay watershed. These Restoration Plans are the 2020 *Final Restoration Plan / Environmental Assessment For the Tittabawassee River System Natural Resource Damage Assessment* and the 2021 *Final Restoration Plan & Environmental Assessment for Use of Remaining Funds - 1998 Saginaw River and Bay Settlement*. These restoration plans evaluated restoration alternatives and their potential environmental impacts and the impact of adopting a 'No Action' alternative. In both cases, the alternatives selected by the respective Trustee Councils made provision for the future adoption and funding of stakeholder identified restoration projects.

On November 4, 2021, the two Trustee Councils jointly announced the availability of funding for restoration projects to be implemented in the Saginaw Bay watershed, including in and along the Tittabawassee and Saginaw Rivers. Two sources provided funding for this effort, the 2020 settlement with The Dow Chemical Company, and a 1998 settlement with General Motors Corporation. The two Trustee Councils have allocated a total of up to \$5.75 million to fund stakeholder identified restoration projects, in addition to funding projects already identified in the respective restoration plans for the two settlements.

This Draft Supplemental Restoration Plan considers the pre-proposals received from stakeholders with interests in the Saginaw Bay watershed. The Draft Supplemental Restoration Plan presented here provides an introduction and background to the two settlements; the current status of implementation of the existing restoration plans for the two settlements; a brief summary of the affected environment for the proposed restoration projects in the Saginaw Bay watershed; descriptions of the stakeholder restoration pre-proposals considered by the Trustees as restoration alternatives; an analysis of the environmental consequences of the alternatives considered; and, a summary of the analysis that includes the description of the alternative proposed as the Trustees' preferred alternative.

This Draft Supplemental Restoration Plan has been released for public review and comment. The Trustees will consider comments received from the public when making a final selection of an alternative composed of multiple restoration projects.

Table of Contents

ABSTRACT	II
LIST OF FIGURES	1
LIST OF TABLES	1
ACRONYMS AND ABBREVIATIONS	2
EXECUTIVE SUMMARY	5
1.0. INTRODUCTION	4
1.1 Background	4
1.2 Overview of the Saginaw Bay Watershed	5
1.3 The Natural Resource Trustees	5
1.4 Purpose and Need for Action	7
1.5 Legal Mandates and Authorities	7
1.5.1 Natural Resource Damage Assessment Related Authorities	7
1.5.2 Authority Related to the National Environmental Policy Act	8
1.6 The Relationship Between NRDA Authorities and the NEPA	8
1.7 Public Participation in the Planning Process	9
1.8 Administrative Record for the Supplemental Plan	9
2.0. STATUS OF NRDA RESTORATION IN THE PLANNING AREA	10
2.1 The Two Saginaw Bay Watershed Settlements	10
2.1.1 The Saginaw River & Bay Settlement	10
2.1.2 The Tittabawassee River Settlement	11
2.2 Supplemental Restoration Planning	12
2.2.1 Restoration Goals and Objectives	12
2.2.2 Project Scoping and Ranking	13
2.2.3 Restoration Project Evaluation Criteria	14
2.2.4 Monitoring and Stewardship	18
2.2.5 Future Restoration Planning and Monitoring by the Trustees	18
3.0. THE AFFECTED ENVIRONMENT	20
3.1 Geomorphology	20

3.2	Climate	21
3.3	Hydrology	21
3.4	Anthropogenic Influence – Land Use	22
3.5	Ecological Environment	23
3.5.1	Aquatic Habitat and Fish Communities.....	23
3.5.2	Floodplain Habitat	24
3.5.3	Wetlands and Great Lakes Coastal Wetlands	24
3.5.4	Upland Habitats	25
3.5.5	Migratory Birds.....	26
3.5.6	State and Federal Listed Species.....	27
3.6	Natural Resource Based Recreation.....	30
3.7	Saginaw River and Bay Area of Concern.....	31
3.8	Environmental Justice.....	32
3.9	Climate Change.....	33
4.0.	THE RESTORATION ALTERNATIVES	35
4.1	The Preferred Restoration Alternative.....	35
4.1.1	Crow Island State Game Area - Maxwell Land Trust Acquisition	36
4.1.2	South Riverfront Restoration, Midland, MI.....	37
4.1.3	Saginaw Bay Coastal Wildlands.....	38
4.1.4	Saginaw River Headwaters Rec Area – Restoration and Recreational Access along the Tittabawassee River.....	40
4.1.5	Thomas Township Invasive Species Treatment & Tittabawassee Riverbank Stabilization Feasibility Study.....	41
4.1.6	Bay City State Park – Habitat Restoration & Maintenance	42
4.1.7	Chippewa Nature Center – Habitat Restoration and Maintenance.....	44
4.1.8	Tittabawassee River Floodplain Protection and Restoration Project.....	44
4.1.9	Saginaw Bay Sturgeon – Support, Monitoring, and Restoration of a State Threatened Species.....	45
4.1.10	Smith’s Crossing Pedestrian Bridge – Trail & Fishing Access	46
4.2	The No Action alternative	49
4.3	Alternatives Considered But Not Analyzed Further	49
4.3.1	Projects Considered to be Ineligible for Funding	50

4.3.2	Projects Not Considered Due to Ranking	51
5.0.	ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES	54
5.1	Impacts of the Trustees' Preferred Alternative	56
5.1.1	Land and Easement Acquisition	57
5.1.2	Riparian and Wetland Habitat Restoration	60
5.1.3	Coastal Wetland Habitat Restoration	63
5.1.4	Species of Special Concern	65
5.1.5	Natural Resource Based Recreation	67
5.2	Impacts of the No-Action Alternative	69
5.3	Consideration of Species Listed Under the Endangered Species Act	71
5.4	Consideration of Cultural Resources	75
5.5	Cumulative Impacts of the Preferred Alternative	76
5.6	Summary of the Alternatives Analysis.....	76
6.0.	LIST OF PREPARERS, AGENCIES, AND PERSONS CONSULTED	78
6.1	Preparers.....	78
6.2	Agencies and Persons Consulted	78
7.0.	REFERENCES	79
8.0.	APPENDICES	84
8.1	Appendix A-1: Press Release for Restoration Pre-proposals	85
8.2	Appendix A-2: Request for Proposals Instructions	87
8.3	Appendix A-3: Application Portal Instructions and Fields	90
8.4	Appendix B: Stakeholder Restoration Project Proposals.....	92
8.5	Appendix C: Local Agencies, Non-Governmental Organizations, and Others Consulted	95
8.6	Appendix D: Coordination and Consultation - Authorities.....	99
8.7	Appendix E: Saginaw River & Bay Trustee Council Discovery Plan.....	107

List of Figures

Figure 1-1. Geographic location of the Saginaw Bay watershed within the State of Michigan. ..	6
Figure 2-1. Restoration project Site Stewardship Model.....	18

List of Tables

Table ES-1. Restoration projects comprising the Preferred Alternative of the Trustees for the Tittabawassee River and the Saginaw River and Bay.	3
Table 2-1. Threshold acceptance criteria used to evaluate restoration projects. A project is scored using these criteria as having either passed or failed the criteria (pass/fail). A project that fails any of the threshold criteria would not be considered further.	14
Table 2-2. Project focus criteria. The focus criteria are used to evaluate the degree to which a proposed project meets the goal of restoring the affected resources within the area considered.	15
Table 2-3. Project implementation criteria. The implementation criteria are used to evaluate project feasibility, likelihood of implementation, and consistency with regional planning efforts.....	16
Table 2-4. Project benefits criteria. The benefit criteria are used to evaluate the extent and nature of cultural and ecological benefit of the proposed project.	17
Table 3-1. Federally listed threatened and endangered species, along with their state listing status in Michigan, that may occur within the Saginaw Bay watershed.	28
Table 4-1. List of restoration projects proposed for funding by the Tittabawassee and Saginaw River & Bay Trustee Councils, restoration categories with proposed initial funding types, and ranges of preliminary cost estimates.	48
Table 5-1. Summary of adverse and beneficial impacts for the project category of Land Acquisition and Conservation Easements. Impact is defined as adverse (-) or beneficial and scaled as major (-3,3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.	59
Table 5-2. Summary of adverse and beneficial impacts for the project category of Riparian and Wetland Habitat Restoration. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.....	62
Table 5-3. Summary of adverse and beneficial impacts for the project category of Coastal Wetland Habitat Restoration. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.....	64
Table 5-4. Summary of adverse and beneficial impacts for the project category of Species of Special Concern. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3),	

moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.....	66
Table 5-5. Summary of adverse and beneficial impacts for the project category of Natural Resource Based Recreation. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.....	68
Table 5-6. Summary of adverse and beneficial impacts associate with the implementation of a No Action Alternative. Impact is defined as adverse (-) or beneficial and scaled as major (- 3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.....	70

Acronyms and Abbreviations

Acronym	Full Term
AOC	Area of Concern
BMP	Best Management Practice
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
DOC	U.S. Department of Commerce
DOI	U.S. Department of the Interior
EA	Environmental Assessment
EGLE	Michigan Department of Environment, Great Lakes, and Energy
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FR	Federal Register
GHG	Greenhouse Gas
GLRI	Great Lakes Restoration Initiative
MCL	Michigan Compiled Laws
MDNR	Michigan Department of Natural Resources
MDEQ	Michigan Department of Environmental Quality (now known as EGLE)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRD	Natural Resource Damages
NRDA	Natural Resource Damage Assessment
NRDAR	Natural Resource Damage Assessment and Restoration
PCB	Polychlorinated Biphenyl
PCDD	Polychlorinated Dibenzo-p-dioxin
PCDF	Polychlorinated Dibenzofuran
PRP	Potentially Responsible Party
RP	Restoration Plan
SARA	Superfund Amendments and Reauthorization Act

SHPO	State Historic Preservation Office
SRP	Supplemental Restoration Plan
TCRA	Time-Critical Removal Action
THPO	Tribal Historic Preservation Office
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
WCS	Water Control Structure

Executive Summary

This Draft Supplemental Restoration Plan and Environmental Assessment (Draft Supplemental Restoration Plan) is a joint effort of two Natural Resource Trustee Councils, both of which were formed to advance the restoration of natural resources injured as a result of the release of hazardous substances into the Tittabawassee and Saginaw Rivers. The Tittabawassee River Trustee Council has focused on the restoration of natural resources injured by releases of hazardous substances originating from the Dow Chemical Company plant located in Midland, Michigan. The Saginaw River & Bay Trustee Council was formed in the decade of the 1990s to address the release of hazardous substances originating from a now dissolved subsidiary of the General Motors Corporation.

Trustee Councils are interagency teams, comprised of representatives of jurisdictional agencies that operate by consensus in the public interest to achieve restoration of injured natural resources. Both of these Trustee Councils include representatives of the U.S. Fish and Wildlife Service on behalf of the Department of the Interior; the Saginaw Chippewa Indian Tribe of Michigan; the Michigan Department of Natural Resources; the Michigan Department of Environment, Great Lakes, and Energy; and the Michigan Department of Attorney General. In addition, the Bureau of Indian Affairs, a bureau of the Department of the Interior, is a member of the Tittabawassee River Trustee Council.

In March of 2020, the Tittabawassee River Natural Resource Trustees published their *Final Restoration Plan / Environmental Assessment for the Tittabawassee River System Natural Resource Damage Assessment* (USFWS 2020). A year later, the Natural Resource Trustees for the Saginaw River and Bay published their *Final Restoration Plan & Environmental Assessment for Use of Remaining Funds - 1998 Saginaw River and Bay Settlement* (USFWS 2021). Both of these restoration plans made provision for the future consideration and adoption of restoration actions identified by stakeholders with interests in the ecological condition of the Saginaw Bay watershed.

On November 4, 2021, the Trustee Councils jointly announced the availability of up to \$5.75 million to fund stakeholder identified restoration projects within the Saginaw Bay watershed. A web-based application portal was designed to facilitate the online submission of restoration pre-proposals. Project proponents were asked to ensure that proposed projects “provide some benefit to the natural resources that were injured as a result of the release of contaminants at issue in one of the relevant court settlements” ([Appendix A-1](#)). The application portal was open to stakeholders until December 31, 2021 ([Appendix A-2](#), [Appendix A-3](#)). The Trustees received 23 project proposals ([Appendix B](#)), with projects focused on habitat restoration (12), recreation (4), monitoring and research (4), land acquisition or easement (2), contaminant removal (1), and stocking of fish (1). The project pre-proposals requested a total of approximately \$8.2 million, surpassing the available allocated funding.

The proposed action addressed in this Draft Plan is the selection of restoration projects. In addition to complying with the National Environmental Policy Act³, a restoration plan is necessary to ensure public opportunity to provide input on the proposed restoration actions.

The Trustees have evaluated and proposed to fund projects to accomplish the following:

- Meet statutory objectives of restoring, replacing, rehabilitating, or acquiring the equivalent of natural resources, and natural resource related services, likely injured or lost as a result of the release of hazardous substances
- Provide a diversity of sustainable habitat types within the Saginaw Bay watershed to enhance fish and wildlife resources that were likely injured by the release of hazardous substances
- Provide for public use and enjoyment of natural resources

After screening the 23 pre-proposals using the project eligibility criteria described within their respective restoration plans, the Trustees then ranked the 16 eligible restoration project ideas using project evaluation criteria, also described in the Trustees' two respective restoration plans noted above. The top-ranking project pre-proposals were further developed, as necessary with the project proponents, and evaluated as the Preferred Alternative within this Draft Supplemental Restoration Plan. As a part of that process, some of the pre-proposal ideas were combined, further reducing the number of projects included in the Preferred Alternative to nine projects (Table ES-1) plus one additional project that may be funded if found feasible.

This Draft Supplemental Restoration Plan provides analysis of potential environmental impacts associated with the restoration projects that comprise the Trustees' Preferred Alternative for restoration in the Saginaw Bay watershed. The Preferred Alternative is unlikely to have significant adverse impacts on the environment. This alternative will meet the mandates under the NRDA statutes and regulations to restore natural resources and services injured by releases of hazardous substances and is consistent with the goals and objectives outlined in the Trustees' respective restoration plans. The Preferred Alternative will have direct beneficial effects and only minor, short-term adverse impacts. By comparison, a No-Action Alternative would not have direct beneficial effects and would instead allow the degraded conditions of habitats in the Saginaw Bay watershed River watershed to persist, which would not be consistent with other regional restoration planning efforts or the Trustees' respective restoration plans.

³ The National Environmental Policy Act is recorded at 42 U.S.C. §§ 4321 et seq. The Council on Environmental Quality is the federal organization responsible for the development and distribution of regulations related to the Act (<https://ceq.doe.gov/>).

Table ES-1. Restoration projects comprising the Preferred Alternative of the Trustees for the Tittabawassee River and the Saginaw River and Bay. Preliminary cost estimate ranges are used to indicate relative costs of the different projects. Total anticipated costs, based on stakeholder estimates, are approximately \$4.7M.

Selected Project	Restoration Category	Preliminary Cost Estimate Range
Crow Island State Game Area - Maxwell Trust Land Acquisition	Conservation land acquisition	\$500,000 to \$1,000,000
South Riverfront Restoration, Midland	Riparian / Wetland habitat restoration, natural resource recreation	\$500,000 to \$1,000,000
Saginaw Bay Coastal Wildlands	Coastal habitat restoration, natural resource recreation	<\$250,000
Saginaw River Headwaters Rec Area – Restoration & Recreational Access Project	Riparian / Wetland habitat restoration, natural resource recreation	\$250,000 to \$500,000
Thomas Township - Invasive Species Management, Bank Stabilization Feasibility Study	Riparian / Wetland habitat restoration, natural resource recreation	\$250,000 to \$500,000
Bay City State Park - Habitat Restoration and Maintenance	Coastal habitat restoration, natural resource recreation	\$250,000 to \$500,000
Chippewa Nature Center - Restoration of Floodplains, Forested Wetlands and Open Grasslands within the Saginaw Bay Watershed	Riparian / Wetland habitat restoration	<\$250,000
Tittabawassee River Floodplain Protection and Restoration	Conservation easement	\$500,000 to \$1,000,000
Saginaw Bay Sturgeon - Support, Monitoring and Restoration of this State Threatened Species	Species of special concern restoration and management	\$250,000 to \$500,000

1.0. INTRODUCTION

1.1 Background

Working on behalf of the public, two Natural Resource Trustee Councils have undertaken the restoration of natural resources injured as a result of the release of hazardous substances into the Saginaw Bay watershed. The Tittabawassee River Trustee Council has focused on natural resource damages related to releases from The Dow Chemical Company (Dow) from its Midland, Michigan, facility; the Saginaw River & Bay Trustee Council has focused on legacy contaminants in the Saginaw River and Bay. In both cases, the Trustee Councils are guided by the Natural Resource Damage Assessment and Restoration (NRDAR) regulations⁴ related to the Comprehensive Environmental Compensation and Liability Act⁵ (CERCLA or Superfund).

Releases of hazardous substances into the Tittabawassee River from Dow's Midland, Michigan, plant, which began operating in the 1890s, resulted in injury to, destruction of, or loss of natural resources. The electrolysis of brine using carbon electrodes likely produced polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) that were released into the environment. Releases into the Tittabawassee River and along its banks resulted in the distribution of these contaminants in water, sediments, and floodplain soils along the Tittabawassee River and the Saginaw River and Bay. In addition, atmospheric releases resulted in contamination of upland soils in and around Midland. Natural resources such as sediments, invertebrates, fish, birds, and mammals have been exposed to, and adversely affected by, these and other hazardous substances. Remedial activities to remove or contain these contaminants are ongoing under the direction of the U.S. Environmental Protection Agency (USEPA) and the Michigan Department of Environment, Great Lakes, and Energy (EGLE), formerly the Michigan Department of Environmental Quality (MDEQ).⁶ The Trustees finalized a settlement for natural resource damages with Dow in July, 2020.

Beginning in the 1940s, a subsidiary of the General Motors Corporation and wastewater treatment plants on the Saginaw River released polychlorinated biphenyls (PCBs) and related compounds into the Saginaw River. These compounds are industrial products that were used in hydraulic oils and the manufacture of electrical insulators, capacitors, and electric appliances, prior to the banning of their use in the late 1970s. Persistent on-site contamination of industrial facilities in the Saginaw Bay area resulted in continued release of these substances even after Congress banned their manufacture and distribution in 1979 because of concerns about their persistence and toxicity⁷. In this case, the Trustees reached a settlement for natural resource damages in 1998 with the General Motors Corporation and other responsible parties.

⁴ The NRDAR implementing regulations are provided at [43 CFR Part 11](#).

⁵ Comprehensive Environmental Compensation and Liability Act of 1980, as amended. The CERCLA was modified by the Superfund Amendments and Reauthorization Act of 1986. This Act is codified at [42 USC §§ 9601 et seq.](#)

⁶ The Michigan Department of Environmental Quality became the Michigan Department of Environment, Great Lakes, and Energy (EGLE) effective April 22, 2019. In this document, "EGLE" will be used to refer to this agency except when referring to documents authored or published by the MDEQ.

⁷ Public Law 94-469; 40 CFR § 761

1.2 Overview of the Saginaw Bay Watershed

The Saginaw Bay watershed encompasses an area of approximately 8,700 square miles over all or portions of 22 counties in the eastern portion of the lower peninsula of Michigan (Fales et al. 2016, Figure 1-1). Twenty-eight rivers, creeks, and designated drainages flow directly into Saginaw Bay, but approximately 75% of the hydraulic load from tributaries comes from the Saginaw River itself (Beeton et al. 1967). The watershed of the Saginaw River encompasses the watersheds of the Tittabawassee, Shiawassee, Bad, Cass, and Flint rivers. The low-lying area where these river basins converge is commonly referred to as the Shiawassee Flats Area (Buchanan et al. 2013). The drainage basins of these rivers move water to the Saginaw River which flows 22 miles from where the Tittabawassee and Shiawassee rivers converge near the City of Saginaw to its mouth at Saginaw Bay on Lake Huron.

Saginaw Bay lies on the western shore of Lake Huron (Figure 1-1). The Bay is 26 miles wide at the mouth and 51 miles long from the midpoint to the mouth of the Saginaw River. Saginaw Bay has a surface area of 1,143 square miles (MDNR 1994a). A broad shoal between Charity Island and Sand Point divides the Bay into outer and inner zones. The outer zone is considerably deeper (mean depth of 48 ft, maximum depth of 133 ft) than the inner zone (mean depth 15 ft, maximum 46 ft). The eastern shore of the outer Bay is rocky and the western is sandy. The Bay has several islands; the most prominent being Charity Island between Whitestone and Oak points. A group of marshy low-lying islands (North, Stony, and Katechay) lies southwest of Sand Point on the southeast shore of the Bay. These islands are surrounded by marshy shallows that provide important habitat for waterfowl (PSC 2002). This association of rivers, wetlands, and coastal freshwater marshes forms one of North America's largest freshwater wetland complexes.

1.3 The Natural Resource Trustees

Natural Resource Trustees (Trustees), as part of the Natural Resource Damage Assessment and Restoration process, are authorized to act on behalf of the public to assess injuries to natural resources, and the loss of their associated services, resulting from the release of hazardous substances into the environment. The goal of this process is to plan and implement actions to restore, replace, or rehabilitate the natural resources that were injured or lost as a result of the release of a hazardous substance, or to acquire the equivalent resources or the services they provide. The Trustees consist of the entities with jurisdiction for natural resources within a particular geographic area. Regulations define the federal and tribal trustees; state governors identify those agencies that will represent the state. The Tittabawassee River Trustee Council and the Saginaw River & Bay Trustee Council are comprised of representatives of the following entities:

- The State of Michigan, acting through the Michigan Department of Natural Resources (MDNR), the Michigan Department of Environment, Great Lakes, and Energy (EGLE), and, the Michigan Department of Attorney General (MDAG);
- The Saginaw Chippewa Indian Tribe of Michigan; and
- U.S. Department of the Interior, acting through the U.S. Fish and Wildlife Service (USFWS) for both Trustee Councils, and, for the Tittabawassee River Trustee Council, also through the Bureau of Indian Affairs (BIA).

Figure 1-1. Geographic location of the Saginaw Bay watershed within the State of Michigan.



The respective restoration plans of the two Trustee Councils provide a more detailed discussion of the administration of the Trustee Councils and the Natural Resource Damage Assessment and Restoration process.

1.4 Purpose and Need for Action

The purpose of the Trustees' planning effort is to advance restoration of natural resources and their associated services in the Saginaw River watershed consistent with the two settlements that direct the activities of the two Trustee Councils. In accordance with the regulations governing the NRDAR process, the Trustees are tasked with restoring, rehabilitating, replacing, or acquiring the equivalent of injured natural resources and the services those resources provide. The need for this effort is directly related to the injury of natural resources resulting from the release of hazardous substances into the Saginaw Bay watershed.

The proposed action considered in this Draft Supplemental Restoration Plan is the selection of stakeholder-identified restoration projects in the Saginaw Bay watershed. With the publication of this Draft Supplemental Restoration Plan, the Trustees intend to:

- Provide the public an opportunity to participate in restoration planning;
- Identify a proposed restoration alternative that, when implemented, would meet the objectives of restoring, replacing, rehabilitating, or acquiring the equivalent of natural resources and services injured as a result of the release of hazardous substances;
- Describe how the specific restoration projects in the proposed alternative would provide a diversity of habitat types to enhance fish and wildlife resources; and
- Describe how the restoration projects in the proposed alternative would provide for public use and enjoyment of natural resources.

1.5 Legal Mandates and Authorities

1.5.1 Natural Resource Damage Assessment Related Authorities

Trustees are responsible for assessing injuries to natural resources from releases of hazardous substances, quantifying natural resource injuries, and seeking compensation from potentially responsible parties for restoration of natural resources. Authority to act on behalf of the public is granted to trustees by statute and regulation:

- The Comprehensive Environmental Compensation and Liability Act (CERCLA);
- The National Oil and Hazardous Substances Contingency Plan;⁸ and
- Federal Water Pollution Control Act⁹ (Clean Water Act, CWA).

The State of Michigan is further authorized to recover the value of damages to natural resources under Part 31, Water Resources Protection, and Part 201, Environmental

⁸ The National Contingency Plan provides the framework for the federal response to oil spills and the release of hazardous substances. The current version of the plan may be found at [40 CFR Part 300](#).

⁹ The Clean Water Act regulates the discharge of pollutants into the waters of the United States and may be found in the U.S. Code at [33 USC § 1251 et seq.](#)

Remediation, of the Michigan Natural Resources and Environmental Protection Act (Public Act 451, as amended).

The CERCLA requires that the Trustees develop a plan for implementing restoration and further stipulates that implementation cannot occur until there has been adequate public participation in the planning process.

1.5.2 Authority Related to the National Environmental Policy Act

Actions by federal Trustees to restore natural resources or services are subject to the National Environmental Policy Act of 1969 (NEPA).¹⁰ The NEPA guarantees every American the right to review, comment, and participate in the planning of federal decisions that may affect the human environment. The NEPA requires federal agencies to provide public notice of proposed actions and provide for participation by the public in the planning process. In this case, the federal Trustee is the USFWS acting on behalf of the Department of the Interior.

In July 2020, CEQ updated the NEPA implementing regulations (July 16, 2020, 85 FR 43304) with an aim to reduce delays in development of analyses and to promote better, transparent federal decisions. Subsequently, less than two years later, on April 20, 2022, CEQ issued a final rule (87 FR 23453) to once again amend certain provisions of the NEPA regulations. This final rule went into effect May 20, 2022, and generally restored provisions that were in effect for decades before being modified in 2020. However, since the Trustees received and evaluated project proposals, and began drafting project descriptions and analyses to be included in this Draft Supplemental Restoration Plan and Environmental Assessment well before the May 20, 2022 effective date of CEQ's final rule, the NEPA analysis contained herein was conducted in accordance with the NEPA regulations in place prior to May 20, 2022.

The Trustees are relying on their previously published restoration plans to serve as primary source material for this Draft Supplemental Restoration Plan. This tiered approach increases the efficiency of the Trustees' NEPA process by reducing repetitive discussions of broader information applicable to the NRDA restoration program. Like the previously published plans, this Draft Supplemental Restoration Plan was developed to meet the requirements of an Environmental Assessment under the NEPA.

1.6 The Relationship Between NRDA Authorities and the NEPA

The NEPA applies to the decision to fund restoration actions undertaken by federal Trustees; both the NEPA and the CERCLA require that the Trustees integrate the public in the restoration planning process. The two Trustee Councils have integrated the required analyses and processes under CERCLA and NEPA in this Draft Supplemental Restoration Plan, as they did in their respective previously published restoration plans. This integrated approach allows the Trustees to meet the public involvement requirements of these statutes concurrently.

¹⁰ The National Environmental Policy Act of 1969 is codified at [42 USC §§ 4321 et seq.](#) The implementing regulations of the NEPA may be found at [40 CFR Part 1500-1599.](#)

This Draft Supplemental Restoration Plan relies on the framework set out in the Trustees' respective plans to conduct project-level, site-specific analyses, consistent with the statutes, that will permit the Trustees to move forward with the identification of a preferred alternative for specific restoration actions.

1.7 Public Participation in the Planning Process

Public participation and input are essential aspects of the restoration planning process and are required under the NEPA and CERCLA implementing regulations. Both of the Trustee Councils provided drafts of their respective restoration plans for public review and comment prior to the identification of their selected alternatives for restoration in the Saginaw Bay watershed. The Tittabawassee River Trustee Council made their draft restoration plan available for public review between November 8, 2019 and December 31, 2019. The Saginaw River & Bay Trustee Council made their draft restoration plan available between November 12, 2020 and December 18, 2020. Both of these restoration plans included future funding of stakeholder identified restoration actions as elements of their respective selected alternatives.

In this case, stakeholders were asked to directly participate in restoration planning by developing restoration actions and providing the Trustees with pre-proposals to be jointly considered for funding by the two Trustee Councils. The Trustee Councils provided a public web portal that allowed stakeholders to submit proposals electronically. The web portal was available for submission of pre-proposals from November 4, 2021 to December 31, 2021. This Draft Supplemental Restoration Plan is being made available to the public for review and comment. Comments will be received until March 27, 2023. Comments regarding the Draft Supplemental Restoration Plan may be submitted electronically at t.river.nrda@fws.gov, using "Draft Supplemental Restoration Plan" in the subject line of your communication. Comment may also be submitted by mail to:

SR & B Draft Supplemental Restoration Plan
US Fish and Wildlife Service
Contaminants Section
2651 Coolidge Road, Suite 101
East Lansing, MI 48823

Ongoing outreach by the two Trustee Councils to the general public includes hosting and attending informational meetings (e.g., the State of the Bay conference), issuing press releases, and participating in meetings of the Tittabawassee River / Saginaw River Community Advisory Group.

1.8 Administrative Record for the Supplemental Plan

This Draft Supplemental Restoration Plan references a number of documents prepared by the Trustees as a part of either the NRDAR or NEPA processes. These documents are part of what is known as the Trustees' administrative record. The administrative record forms a compilation of the relevant materials that have contributed to the decisions of the Trustee Councils related to the development of this Draft Supplemental Restoration Plan. Electronic or hard copies of these materials are available by request. Requests for a listing of documents within the administrative record, or copies of individual documents, should be directed to the Saginaw River & Bay Case Manager, US Fish and Wildlife Service, 2651 Coolidge Road, Suite 101, East Lansing, MI 48823.

2.0. STATUS OF NRDA RESTORATION IN THE PLANNING AREA

2.1 The Two Saginaw Bay Watershed Settlements

2.1.1 The Saginaw River & Bay Settlement

In 1998, the Natural Resource Trustees, consisting at that time of the USFWS, the MDEQ, the MDAG, and the Saginaw Chippewa Indian Tribe of Michigan reached a settlement to address natural resource injuries with the General Motors Corporation, Bay City, and the City of Saginaw. The 1998 settlement was set forth in a Consent Judgment approved by the U.S. District Court for the Eastern District of Michigan on June 4, 1999 (Docket #98CV10368). The 1998 settlement provided for substantial cleanup of contaminated sediments as well as for protection and restoration of fish and wildlife habitats in the Saginaw River and Bay area. The settlement included provision for the dredging of contaminated settlements (\$10.9M), acquisition of conservation lands (\$7.7M), restoration of natural resources (\$4.6M), and improved public access to natural resources (\$2.5M). Dredging within the Saginaw River and Bay, completion of restoration projects, and acquisition of conservation properties were completed between 1999 and 2009.

Also as part of the settlement, the City of Saginaw provided renewable 99-year leases for the Green Point Environmental Learning Center and an associated 80 acres of adjacent riparian and upland habitats to the Shiawassee National Wildlife Refuge (NWR). The settlement also included dedicated funding in the amount of \$520,000 for restoration associated with the Green Point Environmental Learning Center. The 1998 settlement identified the federal Trustee as the entity to “use these funds and the interest thereon at the Green Point Environmental Learning Center to restore, replace, or acquire equivalent resources consistent with CERCLA and applicable regulations.” The USFWS is the federal Trustee with responsibility for administration of these funds dedicated to the Green Point Area Restoration Project. As of August 2022, the Shiawassee NWR has removed golf related infrastructure such as tees and shelters, removed an abandoned pump system and related power supply, begun treatment of non-native and invasive species, and initiated design of a wetland in the area of a former irrigation ditch.

Sufficient funding remained from the 1998 settlement (\$5.7M) to allow the Trustees to undertake planning for additional restoration actions in 2020. The Trustees released a Draft Restoration Plan for public review in late 2020 and published a Final Restoration Plan to guide the use of these remaining funds in March 2021.¹¹ The 2021 Final Plan includes the restoration and maintenance of properties acquired by the State of Michigan following the 1998 settlement; the restoration of the Saginaw River mouth property acquired by the Saginaw Chippewa Indian Tribe of Michigan; restoration and maintenance of the Charity islands that were added to the National Refuge System following the 1998 settlement; as well as the Green Point Area Restoration Project. Implementation of the stewardship projects began in the fall of 2021 and, depending on the specific project, such as the Green

¹¹ Final Restoration Plan & Environmental Assessment for Use of Remaining Funds – 1998 Saginaw River and Bay Settlement. Available by email request to clark_mccreedy@fws.gov.

Point Area Restoration Project, implementation may continue in phases over at least the next five years.

The selected alternative also includes an allocation of \$750,000 in funding for the future identification and implementation of stakeholder proposed restoration actions. This Draft Supplemental Restoration Plan serves as the planning document that provides the environmental analysis and evaluation of restoration projects identified by stakeholders with interests in the Saginaw River watershed.

2.1.2 The Tittabawassee River Settlement

Beginning as early as the 1890s, the Dow Chemical Company (Dow) released a wide range of hazardous substances from its plant in Midland, Michigan, including polychlorinated dibenzo-*p*-dioxins (PCDDs) and dibenzofurans (PCDFs). Hazardous substances were released into the Tittabawassee River, transported downstream into the Saginaw River and Saginaw Bay, and into associated floodplains. Atmospheric releases also contaminated upland habitats in and near Midland, Michigan. Natural resources, including sediments, and invertebrates, fish, birds, and mammals that use these habitats have been adversely affected by releases from Dow's Midland plant.

In March 2020 the Natural Resource Trustees for the Tittabawassee River published a Final Restoration Plan that described restoration actions consistent with a negotiated settlement reached with Dow. Under the terms of the settlement, Dow is obligated to fund and implement eight restoration projects to restore injured resources. Dow was also required to provide \$6.75M to be used by the Trustees to implement five additional projects as well as \$15M for future projects, long-term stewardship of projects, and Trustee costs to manage and monitor restoration.

Projects now being planned or implemented pursuant to the settlement with Dow include all or parts of the following:

- Tittabawassee River Floodplain Restoration and Bike Trail Project
- Thomas Township Nature Preserve
- Tittabawassee River Green Corridor
- Shiawassee National Wildlife Refuge Restoration
- Shiawassee National Wildlife Refuge Expansion
- Saginaw Riverfront Park, now called Saginaw River Headwaters Rec Area
- Bay City Ecological Restoration
- Saginaw River Mouth Boating Access Site Expansion
- Greater Midland Nature Preserve, to be renamed in the future
- Eagle Ridge Nature Preserve
- Saginaw Chippewa Indian Tribe of Michigan Restoration
- Midland Fish Passage
- Saginaw Bay Spawning Reefs

The projects noted above are described in detail within Section 4.3 of the Trustees' Final Restoration Plan¹² (Alternative B: Projects and Flexible Funding for Stewardship and Proposals). Projects that will open to the public in 2022-2023 include the Eagle Ridge Nature Area, the Thomas Township Nature Preserve, the Tittabawassee Floodplain and Bike Trail Project, and the Saginaw River Mouth Boating Access Site Expansion. In addition, significant progress has been made with funding provided for the Shiawassee National Wildlife Refuge Restoration and the Saginaw River Headwaters Rec Area. For additional updates on restoration projects, please see [the related webpages](#)¹³.

2.2 Supplemental Restoration Planning

2.2.1 Restoration Goals and Objectives

The Trustees' overall goal for actions reviewed within this Draft Supplemental Restoration Plan is consistent with the goals expressed in both restoration plans previously published by the two Trustee Councils: to restore, rehabilitate, replace, or acquire the equivalent of those natural resources injured by hazardous substances released into the Tittabawassee and Saginaw rivers. This would include objectives related to improving habitat quality and enhancing the fish and wildlife of the Saginaw River watershed, as well as improving natural resource related services, such as wildlife watching, fishing, and flood storage, among others.

To accomplish this goal, the Trustees have sought the assistance of stakeholders, including members of the public, with an interest in the ecological condition of the Saginaw Bay watershed. The Trustee Councils jointly announced the availability of funding dedicated to the support of stakeholder identified restoration actions on November 4, 2021. The Trustees are obligated by regulation to pursue restoration projects with a strong nexus to the injured resources or the loss of their associated services. As described above, the restoration actions described within both the Tittabawassee River Restoration Plan (USFWS 2020) and the Saginaw River & Bay Restoration Plan (USFWS 2021) provided interested stakeholders useful benchmarks of the sort of restoration actions that would meet the restoration criteria described within the two plans. Both of these restoration plans feature selected actions that address the ecological condition of aquatic habitats, riparian habitats, coastal wetland habitats, or provide some means for the public to participate in natural resource-based experiences associated with these or related habitats. This effort to select and implement stakeholder identified restoration actions should result in similar outcomes given that the Trustees have used the evaluation criteria from the two previously published plans to evaluate restoration proposals received from the public.

Funding from the two settlements for stakeholder identified restoration actions can be used to address habitat degradation resulting from causes other than the release of contaminants so long as the restoration would benefit the types of natural resources and services that

¹² Final Restoration Plan / Environmental Assessment For the Tittabawassee River System Natural Resource Damage Assessment. Available by email request to t.river.nrd@fws.gov.

¹³ <https://www.fws.gov/project/tittabawassee-river-natural-resource-damage-assessment-and-restoration#Restoration%20Plan%20and%20Projects>

were injured by the release of hazardous substances into the Saginaw Bay watershed. For example, the presence of an inadequate stream crossing in a tributary near where it enters the Tittabawassee River may not be related to the release of polychlorinated biphenyls or dioxin-like compounds, but its replacement with a passable stream crossing would benefit aquatic organisms, including fish, that were injured by the releases of these contaminants into the Tittabawassee and Saginaw rivers. In this example, the focus is on the outcome of the restoration which addresses a resource previously injured by the release of hazardous substances.

2.2.2 Project Scoping and Ranking

On November 4, 2021, the two Trustee Councils jointly announced the availability of funding for restoration projects to be implemented in the Saginaw Bay watershed, including in and along the Tittabawassee and Saginaw rivers (Appendix A-1). The two Trustee Councils have allocated up to \$5.75 million to fund stakeholder identified restoration projects, in addition to the restoration projects previously identified in the respective Restoration Plans for the two settlements.

The Trustees asked stakeholders to provide their restoration ideas to the two Trustee Councils in the form of pre-proposals that were submitted for consideration by way of an online tool, referred to as the “Restoration Portal”. The application process required stakeholders to provide narrative descriptions of project ideas, the location of their proposed restoration project, cost estimates, and timeframes for implementation, in addition to other information (Appendix A-2: Request for Proposals Instructions, Appendix A-3: Application Portal Instructions and Fields).

The Trustees received 23 project ideas that were submitted to the Restoration Portal between November 4, 2021, and the December 31, 2021, deadline. The Trustees reviewed all project pre-proposals relative to the threshold acceptance and evaluation criteria previously published in the Trustees’ respective restoration plans (Table 2-1 through Table 2-4). Sixteen project pre-proposals met the acceptance criteria, seven pre-proposals failed to meet all acceptance criteria. After initial screening using the threshold acceptance criteria (Table 2-1), the Trustees proceeded to rank the resulting 16 restoration project ideas using the three categories of evaluation criteria (focus, implementation, benefit; Table 2-2 through 2-4).

A panel of Trustee representatives developed a systematic protocol to ensure objective and consistent ranking across the 16 project ideas. The panel wrote narrative descriptions for low, medium, and high scores for each of the criteria and referred to those when assigning scores for each project proposal. The panel grouped restoration proposals by type (e.g., land acquisition, riparian or wetland habitat restoration, coastal habitat restoration, natural resource recreation) to facilitate consistent scoring of project ideas. In some cases, the panel contacted submitters to obtain additional information if needed to inform scoring or to discuss modifications to an idea that could improve its consistency with the Trustees’ restoration goals and criteria.

The Trustees have proposed the top ranked restoration projects for funding in the Supplemental Restoration Plan, depending on public comments received on this Draft Supplemental Restoration Plan.

2.2.3 Restoration Project Evaluation Criteria

As described in the previously published restoration plans from the two Trustee Councils, the Trustees evaluated and prioritized specific projects using a set of evaluation criteria. These criteria are consistent with the regulations governing the NRDAR process. The evaluation criteria fall into two categories: threshold criteria that must be met for a project to be considered (Table 2-1), and additional criteria that inform the selection process by identifying desirable qualities used to rank alternatives. These additional criteria are divided into three types: project focus, implementation, and benefits (Table 2-2 through Table 2-4).

Table 2-1. Threshold acceptance criteria used to evaluate restoration projects. A project is scored using these criteria as having either passed or failed the criteria (pass/fail). A project that fails any of the threshold criteria would not be considered further.

Criteria	Description
A1: Complies with applicable and relevant federal, state, local, and tribal laws and regulations.	Projects must be legal, likely to receive required permits, and must consider public health, welfare, and the environment.
A2: Addresses resources injured by hazardous substances or services lost because of injuries in the Saginaw Bay watershed.	Projects must restore, rehabilitate, replace, or acquire the equivalent of injured natural resources, as measured by their physical, chemical, or biological properties or their services.
A3: Is technically feasible.	Projects must be likely to meet Trustee objectives within a reasonable period of time.
A4: Project is within the Saginaw Bay watershed.	The selected alternatives within the Trustees' previously published restoration plans specify that restoration projects will be implemented within the Saginaw Bay watershed.

Table 2-2. Project focus criteria. The focus criteria are used to evaluate the degree to which a proposed project meets the goal of restoring the affected resources within the area considered.

Criteria	Description	Relative Weight ¹⁴
F1: Onsite restoration.	Restoration/rehabilitation is preferred. Projects that benefit natural resources on site (within or adjacent to the Tittabawassee River, the Saginaw River, or Saginaw Bay) are preferred. Acquisition of the equivalent is least preferred.	Higher
F2: Addresses or incorporates restoration of targeted trust resources and services, as evidenced in Trustee mandates and priorities.	Priorities will be based on the resource types injured and degree of injury. Targeted resources include fish and wildlife and their habitats with emphasis on dynamic floodplain and riverine habitats, habitat continuity, water quality, soil and sediment quality, public game, wildlife, or recreation areas, threatened and endangered species, native species, important food-web species, recreationally significant species, and culturally significant resources.	Medium
F3: Focuses restoration on resources that are unlikely to be addressed by other programs.	Projects that target resources or resource services that will be slow to recover will be favored over projects that target resources or resource services that will recover quickly naturally.	Lower

¹⁴ Prior to evaluating pre-proposals, the Trustees adjusted relative weights of some criteria to reflect priorities consistent with the many projects already implemented from the Trustees' respective restoration plans. In retrospect, adjustment of weighting did not change the outcome of project ranking.

Table 2-3. Project implementation criteria. The implementation criteria are used to evaluate project feasibility, likelihood of implementation, and consistency with regional planning efforts.

Criteria	Description	Relative Weight
I1: Project is cost-effective, including planning, implementation, and long-term operation, maintenance, and monitoring activities.	Projects are preferred that have a high ratio of expected benefits to cost. Projects will be evaluated relative to other projects that benefit the same resource. Cost-sharing, including for maintenance and monitoring, will be considered in evaluating expected costs.	Higher
I2: Benefits can be measured for success by evaluation or comparison to baseline and can be scaled to the proper level of resource injury.	Projects will be evaluated in terms of whether the benefits can be quantified and project success determined. Projects can be scaled to provide restoration of appropriate magnitude. Small projects that provide minimal benefit, or larger projects that cannot be appropriately reduced, are less favored.	Higher
I3: Uses established, reliable methods or technologies known to have a high probability of success.	Projects will be evaluated for their likelihood of success given the proposed methods. Factors that will be considered include whether the proposed technique is appropriate to the project, whether it has been used before, and whether it has been successful. Projects incorporating experimental methods, research, or unproven technologies will be given lower priority.	Medium
I4: Takes into account completed, planned, or anticipated response actions.	Projects that restore or enhance habitat impacted by response actions will be preferred. Projects proposed in areas to be impacted by response actions must be coordinated with response actions to provide cost savings and to avoid damage to the restoration project by any subsequent response actions.	Medium
I5: If source control is involved, it reduces exposure of natural resources to hazardous substances.	Projects that address source control will be evaluated in terms of the extent to which they reduce exposure to hazardous substances, including by reducing volume, mobility, or toxicity.	Lower
I6: Is consistent with regional planning.	Project will be evaluated for consistency with regional planning, especially planning that has been publicly reviewed or formally adopted. Examples include species recovery plans and fish and wildlife management plans.	Medium

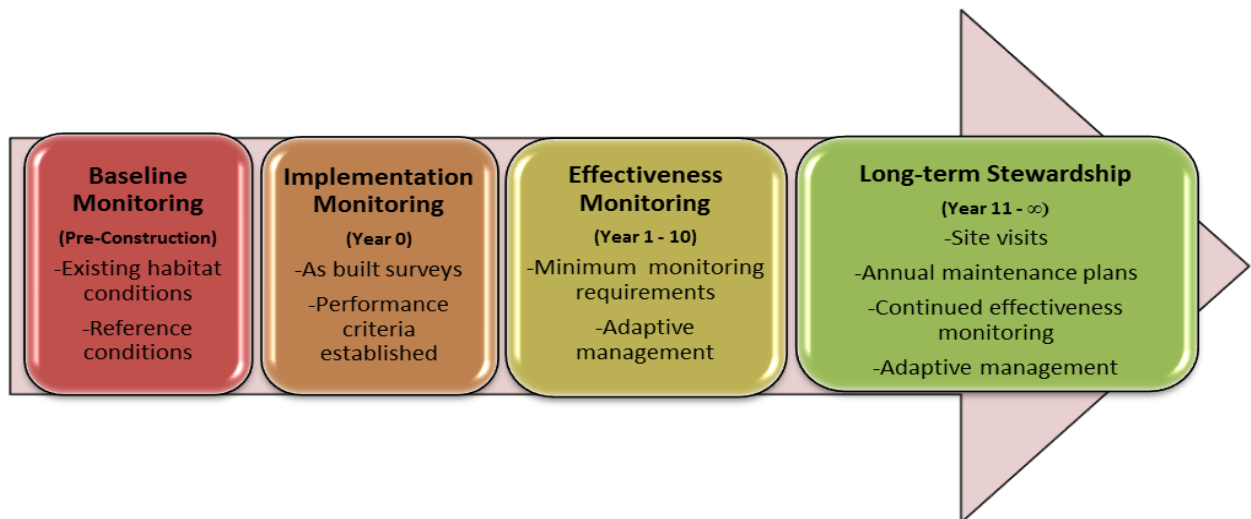
Table 2-4. Project benefits criteria. The benefit criteria are used to evaluate the extent and nature of cultural and ecological benefit of the proposed project.

Criteria	Description	Relative Weight
B1: Provides the greatest scope of ecological, cultural, and economic benefits to the largest area or population.	Projects that benefit more than one injured resource or service will be given priority. Projects that avoid or minimize additional natural resource injury, service loss, or environmental degradation will be given priority.	Higher
B2: Provides benefits not being provided by other restoration projects being implemented/funded under other programs.	Preference is given to projects, or aspects of existing projects, that are not already being implemented or have no planned funding under other programs. Although the Trustees may support restoration planning efforts by other programs, preference will be given to projects that would not otherwise be implemented without NRDA funds.	Higher
B3: Aims to achieve environmental equity and environmental justice.	Low-income and ethnic populations (including Native Americans) may be affected the most by environmental pollution, and sometimes benefit the least from restoration programs. A restoration program should benefit low-income and ethnic populations (including Native Americans) in proportion to the impacts to these populations. Therefore, restoration should not have disproportionately high costs or low benefits to low-income or ethnic populations. Where these groups experience service losses such as subsistence fishing, restoration programs should attempt to address these losses.	Medium
B4: Maximizes the time over which benefits accrue.	Preference is given to projects that provide benefits sooner and for a longer period of time. Projects that incorporate resiliency to the impacts of climate change, and therefore provide longer-term benefits, are preferred.	Higher

2.2.4 Monitoring and Stewardship

Monitoring, project maintenance, and long-term stewardship are intended to ensure that restoration projects provide long-term benefits to injured resources. The Trustees envision that project monitoring will consist of three primary components: baseline monitoring, implementation monitoring, and effectiveness monitoring (Figure 2-1). Baseline monitoring is used to assess the current condition of a project area prior to the initiation of implementation. Implementation monitoring tracks and documents the individual components of project implementation to ensure that a project is implemented as proposed. Effectiveness monitoring is intended to evaluate the degree to which the expected outcomes, in parameters related to ecological restoration and ecological services, are achieved.

Figure 2-1. Restoration Project Site Stewardship Model.



Planning and provision for long-term stewardship within the design of each restoration project whenever practicable increases the probability that each restoration project will continue to benefit injured resources long after initial project implementation. Ideally, long-term project stewardship would continue beyond 10 years following implementation, and more preferably would include mechanisms to ensure maintenance of ecological condition in perpetuity. In evaluating proposed restoration projects, the Trustees consider the likelihood that project proponents will be able to provide appropriate stewardship of proposed projects. Wherever possible, the Trustees advocate that projects be protected through legal mechanisms such as fee title transfers, conservation easements, deed restrictions, or other means to permanently ensure that restoration project areas are maintained so as to provide their intended ecological values and services.

2.2.5 Future Restoration Planning and Monitoring by the Trustees

Future monitoring by the Trustees is likely to include the monitoring of implementation of funded restoration projects and the monitoring of the ecological outcomes of those

restoration projects financially supported by the Trustees. The Trustees have also made provision to support, as needed and as funding allows, the maintenance of restoration actions funded under the restoration plans previously published by the two Trustee Councils. Maintenance actions would be supported to ensure that the desired condition and ecological benefit of ecological restoration is maintained into the future.

If the Trustees of the two NRDA cases in the Saginaw Bay watershed determine that there is sufficient funding to support additional restoration actions beyond those described here or within previously published restoration plans, the Trustees would initiate a new restoration planning effort. Any new restoration planning cycle would commence with outreach to Saginaw River and Bay watershed stakeholders to solicit their ideas and priorities for restoration. Restoration proposals would be evaluated using criteria such as those described here, a supplemental restoration plan would be produced, and stakeholders would be given the opportunity to provide review and feedback on the draft of any such plan.

3.0. THE AFFECTED ENVIRONMENT

In this section of the Draft Supplemental Restoration Plan, the Trustees describe the environmental setting, referred to as ‘affected environment,’ in which proposed restorations could occur. The affected environment includes both the area in which injury was assessed for the two settlements as well as the expanded area in which proposed restoration actions could occur, namely the Saginaw Bay watershed (Figure 1-1). The ‘affected environment’ is a term commonly used in analyses such as this one and signifies that area of the environment that the Trustees have considered as appropriate for implementation of restoration projects.

The 1998 Consent Judgment for the Saginaw River & Bay directs the Natural Resource Trustees to use restoration funds for the “purchase and restoration of lands within the Saginaw Bay watershed.” Similarly, the Consent Decree for the Dow – Tittabawassee settlement refers to an assessment area that includes the “100 year floodplain of the Tittabawassee River”, the “100 year floodplain of the Saginaw River”, and “Saginaw Bay extending from the mouth of the Saginaw River to an imaginary line drawn between Au Gres and Sand Point” and the Trustees’ Restoration Plan for that settlement described the area in which restoration would occur as including the Saginaw Bay watershed. Therefore, for the planning of the proposed restoration actions considered here, the Trustees have identified the affected environment for the Draft Supplemental Restoration Plan as the Saginaw Bay watershed, encompassing the waters of the Saginaw River, the Tittabawassee River, their tributaries, and Saginaw Bay (Figure 1-1).

Both previously published restoration plans¹⁵ of the two Trustee Councils substantially address elements of the affected environment. Stakeholders interested in the ecological condition of the Saginaw Bay watershed are encouraged to consult these restoration plans.

3.1 Geomorphology

Much of the Saginaw Bay watershed is in the Saginaw and Tawas Lake Plain Ecoregions with the watersheds of headwater streams extending into the Mio Plateau, Cadillac Hummocky Moraines, Lansing Loamy Plain, and Interlobate Dead Ice Moraines (U.S. EPA 2010). Glacial advance and retreat have provided the primary force shaping the dominant features of the landscape. Recent summaries of the geology within the Saginaw Lake Plain Ecoregion and the Shiawassee Flats area are provided by Newman (2011), Buchanan et al. (2013), and Heitmeyer et al. (2013). Newman (2011) provides the following summary of the geology of the area:

At the end of the last glaciation, approximately 12,000 years ago, this area was covered with an inland lake and a river which connected the present day water bodies of Lake Michigan and Lake Huron. The underlying geology is primarily Pennsylvanian sandstone and shale, which is generally not exposed in this region. The upper layers were initially identified as lacustrine (e.g., lake) deposited clays and silts (Farrand and Bell 1982). However, an investigation by Westjohn and Weaver (1996) suggested that the predominant surface layer in Saginaw County is a relatively thick (>50 ft.) layer of dense, clay-rich, basal lodgment till overlying a glaciofluvial aquifer.

¹⁵ *Final Restoration Plan / Environmental Assessment for the Tittabawassee River System Natural Resource Damage Assessment and Final Restoration Plan & Environmental Assessment for Use of Remaining Funds – 1998 Saginaw River and Bay Settlement.* Available by email request to t.river.nrda@fws.gov.

Soils are predominately poorly drained clay and silt-clay soil types, reflecting the geologic history of the area as a glacial lake plain (Heitmeyer et al. 2013). Soils are characterized as types that experience frequent flooding (Heitmeyer et al. 2013), ranging from poorly drained to very poorly drained (Newman 2011, Heitmeyer et al. 2013).

3.2 Climate

The climate of the region is generally described as continental to semi-marine (Eichenlaub et al. 1990). The Great Lakes, including the Saginaw Bay, modify air masses from the Gulf of Mexico, Canada, and the Northern Pacific (Albert 1995, Albert et al. 1986) to influence regional weather patterns. The region receives between 30 to 35 inches of precipitation per year, including an average of 36 inches of snowfall. About 50% of this precipitation occurs as rain from April through September. Long-term, regional precipitation is increasing with earlier peak spring runoff (Newman 2011). Average annual low and high temperatures are 24° and 68° F. Prevailing winds average 12 miles per hour from the southwest in early spring.

3.3 Hydrology

The Saginaw Bay watershed can be delineated into three primary sub-basins: East Coastal, Saginaw, and West Coastal. The Saginaw sub-basin predominates, encompassing approximately 6,300 sq. mi. (Arthur et al. 1996). Four primary drainage basins move water through the Saginaw sub-basin to the Saginaw River, which discharges into Lake Huron: the Tittabawassee to the northeast, the Cass to the east, the Flint to the southeast, and the larger Shiawassee basin to the south (Heitmeyer 2013). Low-lying topography within the Saginaw sub-basin and fluctuating water levels within Lake Huron are the primary environmental factors that influence local hydrology. Long-term water levels in Lake Huron average approximately 579 ft above mean sea level with historically high water levels at approximately 582 ft above mean sea level (USACE 2020). Current water levels, as of June 2022, were reported by the National Oceanic and Atmospheric Administration as 580.08 ft above mean sea level.¹⁶ Elevations within the Saginaw Lowlands physiographic region, which approximates the Saginaw Bay watershed, range from 547 to 695 ft above mean sea level (Heitmeyer et al. 2013). Consequently, high lake levels, or wind-driven fluctuation in water-levels (seiche events) may result in sustained periods of inundation within low-lying areas of the Saginaw River sub-basin (Newman 2011, Buchanan et al. 2013, Heitmeyer et al. 2013). Peak flows generally occur in March coinciding with snowmelt.

Upper watersheds are dominated by porous, well-drained soils that result in relatively stable river flows whereas lower watersheds generally have heavier, poorly drained soils that are tilled and ditched to promote rapid drainage of agricultural lands. These soil types and drainage alterations result in a flow regime that is characterized as 'flashy,' meaning that flows may be highly variable and may change rapidly (ATS 2007). Channelization of tributaries may contribute to the flashy character of these rivers, seasonal flood flows, and low summer baseflows.

¹⁶ https://www.glerl.noaa.gov/data/dashboard/GLD_HTML5.html, accessed 07/19/2022.

3.4 Anthropogenic Influence – Land Use

Industrial and chemical development, associated with the larger river systems of the Saginaw Bay watershed, is frequently associated with legacy contaminants, particularly in the Saginaw and Tittabawassee river watersheds. Industrial facilities and wastewater treatment plants on the Saginaw River, beginning in the 1940s, released PCBs and related compounds into the Saginaw River. The industrial use of PCBs was banned in the 1970s; however, the prior release of these compounds and their slow rate of degradation has resulted in their persistence in the environment. Similarly, chemical manufacturing in the Tittabawassee watershed has resulted in the release of polychlorinated dibenzo-*p*-dioxins (dioxins) and polychlorinated dibenzofurans (furans) into the environment.

The U.S. Army Corps of Engineers (USACE) has actively dredged the Saginaw River channel since the 1960s to accommodate commercial shipping (USACE 2004, 2007). Historically, dredged sediments were placed in the open water of Saginaw Bay or deposited along the Saginaw River shoreline. Since the construction of a confined disposal facility (CDF) in the bay in 1978, contaminated sediments have been placed in the Saginaw Bay CDF. More recently a dredged material disposal facility (DMDF) was constructed in the upper river for contaminated sediments dredged in upstream areas of the harbor. Both dredging activities and shipping traffic along the Saginaw River, as well as high flow events from storms, contribute to the resuspension and redistribution of contaminated sediments.

The Saginaw Bay watershed is populated by approximately 1.4 million people. The sub-basins of the watershed have a greater proportion of developed land than the watershed as a whole: Saginaw River (30%), Flint River (20%), Kawkalin River (13%), Shiawassee River (12%), Big Creek (11%), Pine River (10%), and the Tittabawassee River (10%) (Fales et al. 2016). Urban centers occur within immediate proximity of the major rivers within the larger watershed and, rurally, residences may be clustered along streambanks within floodplains. Consequently, industrial and municipal discharges, combined sewer overflows, livestock operations, and failed septic systems have been identified as persistent sources of contaminants, bacterial contamination (*Escherichia coli*, or *E. coli*), and excess nutrients to the watershed (MDEQ 2012, Fales et al. 2016). Physical alteration of streambanks, such as hardening with the use of riprap, and channelization of tributaries to facilitate drainage occur throughout the various sub-basins of the watershed.

In addition to legacy contaminants and bacterial contamination, excess sediment and nutrients, and in particular phosphorus, comprise some of the most significant sources of water quality impairment in the Saginaw Bay watershed. Both point and non-point sources contribute to nutrient loading in the Saginaw Bay watershed.

Point sources contributing to total phosphorus load in the Saginaw River and Bay include industrial and municipal discharges, the most significant comprised of sewage outflows. It was not until 1954 that the last major community in the watershed, Bay City, constructed a wastewater treatment plant. Smaller communities continued to discharge untreated sewage directly into the Saginaw Bay until at least 1965 (PSC 2012). With the passage of the 1972 Federal Water Pollution Control Act, commonly known as the Clean Water Act, funding was made available to communities to upgrade wastewater treatment facilities. Between 1972 and 1988, approximately \$500 million was used to improve wastewater treatment facilities in the

Saginaw Bay watershed (PSC 2012). Though targets continue to be exceeded, total phosphorus loads in the Saginaw River and Bay subsequently declined in response to this investment in infrastructure (PSC 2012, Stow et al. 2014).

Efforts to characterize and address non-point source pollution in the Saginaw River and Bay continues to focus on the predominant land use within the watershed, agriculture. Agricultural land use encompasses at least 49% of land surface area.

3.5 Ecological Environment

3.5.1 Aquatic Habitat and Fish Communities

Aquatic habitat types vary from headwater streams, to major rivers, to the Saginaw Bay and are shaped by flow, depths, water quality, and bottom substrates. Substrates within both the Saginaw and Tittabawassee rivers consist of sandy, fine-grained sediments generally 1.5 - 7.5 ft thick, reaching up to 12 ft thick in some areas. Sediments are transported downstream during periods of high flow, commonly following large precipitation events, and deposited in the floodplain and other depositional areas within the river. The Saginaw River is a lower-energy river, with a wider channel and lower rates of sediment deposition and has comparatively less connection with its floodplain than does the Tittabawassee River. All the rivers within the larger watershed have been affected by anthropogenic activities, beginning with logging in the mid-late 1800s, dam and berm construction in the 1900s, other infrastructure construction such as bridges and pipeline crossings throughout the 1900s, and contamination. The bottom substrate in Saginaw Bay varies from year to year but ranges from mostly cobble to silt; the relative sand content throughout the Bay has increased since the 1970s (Nalepa et al. 2003, ATS 2006, Schrouder et al. 2009, Siersma et al. 2014).

Aquatic macroinvertebrate communities found within the Saginaw River and Saginaw Bay include worms, flatworms, leaches, oligochaetes, crayfish, isopods, amphipods, mayflies, stoneflies, damselflies, caddisflies, true flies, midges, gastropods, and mussels. Aquatic invertebrates serve an important role within aquatic ecosystems by supporting important ecological functions as prey to biota and digesting and degrading plant material (MDNR 1994b, MDEQ 2008).

Fish community structure within Saginaw Bay has undergone substantial change in recent decades. Fielder and Thomas (2014) provide a recent summary of status and trends of the fish community within the Saginaw Bay. They suggest that the predominant, most recent, change within the fish community of Saginaw Bay has been the collapse of certain prey species. Alewives (*Alosa* spp.) and rainbow smelt (*Osmerus mordax*) have dramatically declined or been extirpated within Saginaw Bay while the non-native and invasive round goby (*Neogobius melanostomus*) has become well-established. The disappearance of the invasive alewife has provided for greatly increased walleye (*Sander vitreus*) reproductive success (Fielder et al. 2007) and, in 2009, populations reached recovery targets. Reproductive success of yellow perch (*Perca flavescens*), another important species of recreational and commercial value, is evident, though recruitment has been limited by predation pressure due perhaps to the loss of alternate prey species.

Numerous fish species occur within the main stems of the Saginaw River tributaries including carp (*Cyprinus carpio*), channel catfish (*Ictalurus punctatus*), quillback (*Carpoides cyprinus*), freshwater drum (*Aplodinotus grunniens*) white suckers (*Catostomus commersonii*), emerald shiners, (*Notropis atherinoides*) golden redhorse (*Moxostoma erythrurum*), gizzard shad (*Dorosoma cepedianum*), northern hog suckers (*Hypentelium nigricans*), northern pike (*Esox lucius*), rock bass (*Ambloplites rupestris*), shorthead redhorse (*Moxostoma macrolepidotum*), smallmouth bass, walleye, white bass (*Morone chrysops*), yellow perch, longnose gar (*Lepisosteus osseus*), and logperch (*Percina caprodes*) (Schrouder et al. 2009).

3.5.2 Floodplain Habitat

Floodplains of the Saginaw River tributaries are ecologically similar, though the Saginaw River corridor itself is more developed, with less hydrologic connection to its floodplain, as compared to other rivers in the watershed. Historic riparian forest vegetation primarily consisted of a beech-sugar maple community on clay soils. Wetter, riparian soils also supported red maple (*Acer rubrum*), American elm (*Ulmus americana*), white ash (*Fraxinus americana*), and American basswood (*Tilia americana*). Intensive agricultural production since the mid-19th century has altered the natural landscape over much of this ecoregion, including within the Saginaw River floodplain (U.S. EPA 2016).

The Shiawassee Flats Area, where four rivers converge to form the Saginaw River, contains freshwater estuarine and floodplain riparian habitats (Buchanan et al. 2013). Albert and Comer (2008) provide a summary of what would have been the likely composition of presettlement vegetative communities within the Shiawassee Flats. Based on historic General Land Office surveys, they suggest that the Shiawassee Flats may have been dominated by a core area of shrub swamp and emergent marsh encompassed within a black ash (*Fraxinus nigra*) dominated swamp forest (Albert and Comer 2008, Heitmeyer et al. 2013). Small wet prairie inclusions were historically mapped by General Land Office surveyors (Albert and Comer 2008).

The Shiawassee State Game Area and the Shiawassee NWR are adjacent properties that occur within the Shiawassee Flats area near the confluence of the Shiawassee and Tittabawassee Rivers where they form the Saginaw River. Collectively, these two properties, managed by the MDNR and the USFWS, respectively, provide some of the largest remaining contiguous riparian forest in the Saginaw Bay watershed, as well as some of the most substantial areas of emergent marsh habitat, characterized by interspersed open-water and cattail dominated marsh. These areas are rigorously managed to minimize the occurrence of invasive plants to provide high quality habitats for migratory waterfowl (Dunton 2018).

3.5.3 Wetlands and Great Lakes Coastal Wetlands

The Saginaw Bay watershed supports substantial areas of emergent marsh, forested riparian wetlands, and one of the largest areas of freshwater coastal wetlands in the Great Lakes (Albert 2003, Albert et al. 2005). These coastal wetlands vary in type and may include lacustrine associated wetlands (shorelines and open, protected, or sand-spit

embayments), riverine associated wetlands (drowned river mouths, connecting channels, and deltas), and barrier enclosed wetlands (barrier beach lagoons and swale complexes) (Albert 2003, Albert et al. 2005).

Great Lakes embayments are partially protected areas of water. They may be characterized as open embayments, protected by the curvature of the Great Lakes shoreline, or they may be characterized as protected embayments, which receive some additional protection from wave action due to features such as sand spits. Saginaw Bay open embayment wetlands are generally low in diversity, dominated by three-square (*Schoenoplectus americanus*), a bulrush that can tolerate the force of wave action along the shoreline. Sand spit embayments support dense beds of submergent and emergent marsh vegetation such as blue-joint grass (*Calamagrostis canadensis*) and tussock sedges (*Carex stricta*).

Wetlands associated with river deltas form with downstream flow and accumulation of sediments at a river mouth. Deltas typically form wide, slower moving areas of current that allow sediments to settle, forming islands and bars. This frequently forms a branched system of waterways of shallow pools or flats. The Saginaw River mouth is an example of a river delta wetland habitat. Drowned river mouth wetlands are characterized by a permanent channel within a floodplain. A drowned river mouth is typically separated from the body of the Great Lakes by sandy or rocky spits. Marshes often form in areas behind spits and may provide spawning and nursery areas for fish such as northern pike and resting or foraging habitat for migrating waterfowl.

Dune and swale habitats (barrier enclosed wetlands) are unique in that they feature alternating sand ridges that encompass depressional wetlands that form parallel to the lake shore. These areas formed with glacial retreat and are typically isolated wetlands sheltered from wave and wind action.

Emergent marshes are closely related to coastal wetlands and are closely linked to fluctuating Great Lakes water levels. When water levels fall, mudflats may be exposed and may be subsequently colonized by vegetation, creating an emergent marsh. These areas are among the most productive of all Great Lakes coastal habitats for waterfowl and other waterbirds. Many of the properties managed by the Michigan Department of Natural Resources feature Great Lakes emergent marsh habitats. Large marshes or marshes within a wetland complex often support a diverse breeding bird community because of the variety of habitat conditions. Periods of declining water levels, particularly in areas characterized by sandy substrates, have been associated with the rapid colonization and dominance of coastal marshes in the Great Lakes and Saginaw Bay by the highly invasive and non-native species *Phragmites australis* (Tulbure and Johnston 2010).

3.5.4 Upland Habitats

The Saginaw Bay watershed lies predominately within the Saginaw Lake Plain subregion of the Huron / Erie Lake Plains Ecoregion (U.S. EPA, 2010). This ecoregion is a broad, fertile, nearly flat plain punctuated by relic sand dunes, beach ridges, and glacial end moraines. Presettlement land cover, likely representative of the Shiawassee Flats area within this ecoregion, may have consisted of beech-sugar maple forest (37%), shrub/swamp emergent

marsh (28%), mixed hardwood swamp (27%), lake/river (6%), with inclusions of wet prairie (2%) within other habitat types. Oak savanna would have been typically restricted to sandy, well-drained dune and beach ridges.

Timber harvesting began in the early-1800's; sawmills were established on all major rivers in the Saginaw Valley (Foehl and Hargreaves 1964). By the mid-1800s timber harvest of primarily white pine (*Pinus strobus*) was the primary economic activity in the state (Fitting 1970, Heitmeyer et al. 2013). By 1900, most of the mature stands of native forest had been cut. As timber harvest diminished, agriculture became more important in the region. Cleared land was typically used for corn and wheat production and native wet prairies were hayed or grazed (Heitmeyer et al. 2013). At present, agriculture is the predominant land use within the Saginaw Bay watershed, accounting for approximately 49% of the land area. Agricultural land use differs widely by sub-basin, comprising approximately 8% of land use within the Tawas River watershed and approximately 86% in the Sebewaing River watershed (Fales et al. 2016). Crop production is predominated by corn, soybeans, and sugar beets (USDA NASS 2014). The northern Saginaw Bay watershed contains a greater proportion of forested lands, while the southern half of the watershed is dominated by agriculture (Fales et al. 2016). The largest remaining single contiguous forest within the Tittabawassee watershed, one of the main tributaries of the Saginaw River, is located within the Shiawassee NWR, consisting of approximately 3,500 acres (USFWS 2001).

3.5.5 Migratory Birds

The Saginaw Bay watershed is encompassed by Bird Conservation Region 12 – Boreal Hardwood Transition, but lies just north of the boundary of Bird Conservation Region 23 – Prairie Hardwood Transition. The Bird Conservation Regions (BCRs) are broad ecological units identified by the North American Bird Conservation Initiative (USFWS 2008). BCR 12 is characterized by both coniferous and northern hardwood forests, generally nutrient poor soils, numerous lakes, bogs, and rivers. BCR 23 was once dominated by prairies in the west and south portion of the BCR, beech-maple forests in the northern portion of the BCR, and areas of oak savannah between these two ecotypes. Because of the variation in ecotypes within these two BCRs, and the intersection of large rivers that may serve as migratory corridors for birds, a substantial number of avian species are known to seasonally occur in the area.

In order to facilitate the conservation of migratory birds, the USFWS has identified Birds of Conservation Concern. These are species that without additional conservation action are likely to become candidates for listing under the Endangered Species Act of 1973, as amended. In the State of Michigan, 37 species have been identified as Birds of Conservation Concern (USFWS 2008); many of these species occur seasonally within the Saginaw River and Bay watershed. In addition, the Audubon Society has identified habitats of particular value to migratory birds; two habitat areas in the watershed have been designated as globally important. This includes portions of Saginaw Bay that provide notable areas of colonial waterbird habitat.

All migratory birds are protected under the Migratory Bird Treaty Act of 1918 whether or not they have been designated as a species listed under the Endangered Species Act or the

State of Michigan Natural Resources and Environmental Protection Act. In addition, the Bald and Golden Eagle Protection Act of 1940 provides bald eagles (*Haliaeetus leucocephalus*) and their nests further protections beyond that provided by the Migratory Bird Treaty Act of 1918.

3.5.6 State and Federal Listed Species

Species designated as federally threatened or endangered under the Endangered Species Act that may occur within the Saginaw Bay watershed include two species of bats, two bird species, one snake species, two mussel species, one butterfly species, and two flowering plants (Table 3-1). Occurrence was determined by consulting publicly available records from the Information and Planning and Consultation system (IPaC, USFWS 2022 for the following counties: Arenac, Bay, Clare, Genesee, Gladwin, Gratiot, Huron, Iosco, Isabella, Lapeer, Livingston, Midland, Mecosta, Montcalm, Oakland, Ogemaw, Osceola, Roscommon, Saginaw, Sanilac, Shiawassee, and Tuscola counties). Critical habitat for the piping plover (*Charadrius melodus*) occurs in the northeast area of Saginaw Bay within the boundaries of the Tawas Point State Park. Federally designated threatened and endangered species are legally protected under the Endangered Species Act.

Similar to species designated as threatened or endangered elsewhere, virtually all of the federally listed species that may occur within the Saginaw Bay watershed are to some degree associated with unique habitats or are habitat specialists. The two bat species use unique hibernacula with narrow temperature and humidity requirements; the three birds species use narrowly specific habitat types that differ substantially among the species; the two snake species use unique wetland types; in addition to water quality, the three mussel species require specific bottom substrates as habitats; the butterflies are associated with unique habitats and may be associated with unique plant species that provide egg laying sites; and, the listed plants are associated with rare habitats (e.g., the Pitcher's thistle (*Cirsium pitcheri*) occurs only in dune environments).

The only designated critical habitat for an endangered species in the vicinity of the Saginaw Bay is an area of habitat for the piping plover. Critical habitats are identified and designated when they are regarded as essential to the recovery of an endangered species. Critical habitat for the endangered piping plover occurs within the Tawas Point State Park, in the northeast portion of Saginaw Bay. Approximately 2.0 miles of shoreline in the park, extending 500 meters inland, is designated as critical habitat for the piping plover. The entire area of this designated critical habitat occurs within the state ownership of the park.

A substantial number of species have been designated as state threatened, endangered, or of special concern under the State of Michigan's Endangered Species Act, Part 365 of the Natural Resources and Environmental Protection Act (Public Act 451 of 1994, as amended). A comprehensive list of these species, organized by county, with historic records of occurrence by county, is publicly available from the Michigan Natural Features Inventory. Life history information, as well as habitat associations for state listed species, is also available through links to the county element data provided by the [Michigan Natural Features Inventory](#).

Species designated as federally threatened or endangered are also identified as State of Michigan listed species. Species that are designated by the State of Michigan as threatened or endangered under the Natural Resources and Environmental Protection Act of 1994 are protected under Michigan statute. Species designated as of special concern are not afforded legal protection but receive management emphasis because of their declining or relict populations in the state.

Table 3-1. Federally listed threatened and endangered species, along with their state listing status in Michigan, that may occur within the Saginaw Bay watershed.

Species	Federal Status	State Status	Habitat Associations
Indiana Bat <i>Myotis sodalis</i>	Endangered	Endangered	Well-developed riparian woods; woodlots within 1-3 miles of rivers and streams; upland forests. Caves and mines as hibernacula.
Northern Long-Eared Bat <i>Myotis septentrionalis</i>	Endangered	Special Concern	Hibernates in caves and mines-swarming in surrounding wooded areas in autumn. Roosts and forages in upland areas.
Piping Plover <i>Charadrius melodus</i>	Endangered	Endangered	Uses wide, sandy beaches that are flat and have very little vegetation. Nesting territories include small creeks and wetlands.
Piping Plover - Critical Habitat	Critical		Approximately 2.0 km (1.2 mi) of Lake Huron shoreline in Iosco County, Michigan. The entire designated area is part of Tawas Point State Park.
Red Knot <i>Calidris canutus rufa</i>	Threatened		Migratory bird that uses large wetland complexes during the migratory window of May 1-Sep. 30.
Eastern Massasauga Rattlesnake <i>Sistrurus catenatus</i>	Threatened	Special Concern	Shallow wetlands or shrub swamps in spring. Crayfish towers or small animal burrows which are adjacent to drier upland open shrub forest sites. During summer, massasaugas move to drier upland areas.

Species	Federal Status	State Status	Habitat Associations
Northern Riffleshell <i>Epioblasma torulosa rangiana</i>	Endangered	Endangered	Found in small to large streams. Buries itself in bottoms of firmly packed sand or gravel.
Snuffbox Mussel <i>Epioblasma triquetra</i>	Endangered	Endangered	Found in small creeks to large lakes, and inhabiting areas with a swift current. Adults burrow in sand, gravel, or cobble substrates.
Monarch Butterfly <i>Danaus plexippus</i>	Candidate	Not listed	This showy, large species is obligatorily associated with habitats that support milkweed species for reproduction.
Eastern Prairie Fringed Orchid <i>Platanthera leucophaea</i>	Threatened	Endangered	Mesic to wet prairies and meadows.
Pitcher's Thistle <i>Cirsium pitcher</i>	Threatened	Threatened	Grows on the open sand dunes and low beach ridges of Great Lakes shores. Found in near-shore plant communities or non-forested areas of dune systems.

3.6 Natural Resource Based Recreation

Of the 22 counties in the Saginaw Bay watershed, all have some form of publicly available master plans to aid in maintaining recreational opportunities within their respective counties. Six of the 22 counties border Saginaw Bay: Arenac, Bay, Huron, Iosco, Saginaw, and Tuscola. All the counties, and in particular those that border Saginaw Bay, make substantial note of the role of natural resource-based recreation as a fundamental driver of tourism within their respective economies.

Three MDNR divisions provide substantial opportunities for natural resource-based recreation in the six counties that border Saginaw Bay: Forest Resources Division, Wildlife Division, and Parks and Recreation Division. In addition to providing public access to recreational lands or waterways for activities such as hunting, fishing, or bird-watching, the MDNR provides recreational opportunities associated with managed facilities such as State Forest and State Park campgrounds; hiking, bicycle, equestrian, and ski trails; designated ATV/ORV trails; snowmobile trails; and, access to the Michigan Cross Country Cycle Trail.

State-owned lands available for recreation within the Saginaw Bay watershed include those managed by the Forest Resources Division: 220,000 acres within the Gladwin Management Unit (Arenac, Bay, Clare, Gladwin, Isabella, and Midland counties); 275,000 acres within the Roscommon Unit (Ogemaw and Roscommon counties); and portions of the Grayling Unit in Iosco County. State recreation sites within close proximity to Saginaw Bay include Port Crescent State Park, Sleeper State Park, Sanilac Petroglyphs Historic State Park, Bay City State Recreation Area, Black Creek State Forest Campground, Ambrose Lake State Forest Campground, Rifle River Recreation Area, and Tawas Point State Park.

Federal lands managed for natural resource values include sites within the Huron-Manistee National Forest, Michigan Islands NWR, and the Shiawassee NWR. The Shiawassee NWR provides recreational opportunities for hunting, fishing, trapping, hiking, bicycling, cross country skiing, wildlife observation, photography, environmental education and interpretation, and other uses as described in more detail in the Shiawassee NWR Comprehensive Conservation Plan (USFWS 2001). In 2006, it was determined that the Refuge received 117,500 recreational visits. This was comprised of approximately 84,400 visits by residents of the State of Michigan and 34,100 visits by non-residents (Carver and Caudill 2007). Primary recreational use consisted of non-consumptive recreational activities such as hiking and wildlife observation.

Recently, the Michigan Department of Natural Resources designated eight waterways as water trails, including a portion of the Flint River that is within the Saginaw Bay watershed.¹⁷ The Department of Natural Resources also makes related community-based information available to recreational paddlers.¹⁸ Similarly, user groups have identified locations or trails related to recreational bird-watching. For example, the Saginaw Basin Land Conservancy and Michigan

¹⁷ https://www.michigan.gov/dnr/0,4570,7-350-79133_79206_83617-485656--,00.html

¹⁸ <http://www.michiganwatertrails.org/>

Audubon have developed a Saginaw Bay Birding Trail that identifies birding opportunities around Saginaw Bay in Arenac, Bay, Huron, Iosco, Saginaw, and Tuscola counties.¹⁹

Few studies have directly addressed the economic impact associated with natural resource related recreation specifically in the Saginaw Bay area. Regarding recreational visits just to the Shiawassee NWR, Carver and Caudill (2007) estimated that in 2006 the Refuge received 117,520 visits and returned \$2.42 in economic benefit in return for each dollar expended. Based on a 2006 survey, approximately 60% of the general public in the Saginaw Bay watershed visits the Saginaw Bay or coastal marsh area multiple times a year for outdoor recreation, primarily for fishing, but also for boating, beach-going, nature observation, hunting, and a variety of other activities (Whitehead et al. 2006). With respect to just the resource value associated with Saginaw Bay Great Lakes coastal wetlands, Whitehead et al. (2009) estimated that the present value of each acre of Saginaw Bay coastal marsh for the purpose of recreation was \$1,870 and an additional \$551 for non-recreationists. They estimated that the total recreation-related present value of Saginaw Bay coastal marsh could be as high as \$2,421 per acre. The recreation plans noted above similarly acknowledge the role of natural resources in supporting local economies in the Saginaw River and Bay area.

3.7 Saginaw River and Bay Area of Concern

The Great Lakes Water Quality Agreement was first signed by the federal governments of the United States and Canada in 1972 to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes. It has been amended and revised several times since then, most recently in 2012 (MDEQ 2012). The 1987 amendment directed the parties to designate Areas of Concern, which are defined as geographic areas that fail to meet water quality objectives of the Agreement, and cause impairment of beneficial uses or of the area's ability to support aquatic life. The International Joint Commission, working with the Parties and coordinating with state and provincial governments, designated 43 areas of concern in eight Great Lakes states and two Canadian provinces around that time, including the Saginaw River and Bay Area of Concern.²⁰

The 1987 Amendments to the Great Lakes Water Quality Agreement defined beneficial use impairments and directed the parties to develop and implement remedial action plans for each area of concern, in cooperation with the state and provincial governments. The original remedial action plan for the Saginaw River and Bay Area of Concern was finalized in September 1988 and was instrumental in guiding efforts to implement remedial actions related to beneficial use impairments. Updated remedial action plans were completed in 1995, 2002, 2008, and 2012 (MDEQ 2008, MDEQ 2012). The remedial action plans, as well as additional information about the Saginaw River and Bay Area of Concern, are publicly available at https://www.michigan.gov/egle/0,9429,7-135-3313_3677_95060-506904--,00.html.

Designation of areas of concern within the Great Lakes area in 1987 was based on environmental degradation related to 14 specific beneficial use impairments. Impairment within

¹⁹ <http://www.saginawbaybirding.org/>

²⁰ <https://www.epa.gov/glwqa>

the Saginaw River and Bay Area of Concern was based on ecological conditions that impacted 12 of the 14 beneficial use impairments. Impairment was related to excess nutrients (eutrophication), elevated bacteria levels, aquatic habitat loss, and chemical contaminants such as PCBs, dioxins, and furans. While significant progress has been made, and three of the beneficial use impairments have been officially removed for the Saginaw River and Bay Area of Concern, remaining beneficial use impairments still include restrictions on fish and wildlife consumption, eutrophication or undesirable algae, degradation of fish and wildlife populations, beach closings, degradation of aesthetics, bird or animal deformities or reproductive problems, degradation of benthos, degradation of phytoplankton and zooplankton populations, and restriction on dredging activities (ECCC and the U.S. EPA. 2018).

Along with previous and planned projects from the two NRDA settlements, natural resource agencies and their partners have implemented significant restorations of Saginaw Bay coastal wetlands and habitats in the Saginaw Bay watershed with funding from the Great Lakes Restoration Initiative, North American Wetlands Conservation Act Program, and other public and private sources. Based on an analysis completed in 2012, over 63% of the wetlands below the 585 ft contour line had been protected (Selzer et al. 2014), meeting one of the goals for removing the beneficial use impairment for loss of habitat. Natural resource agencies and their partners have also removed barriers to fish movement in the watershed, prioritizing among over 300 barriers to fish passage in the Saginaw Bay watershed (Selzer et al. 2014). Two of the most significant barriers to fish passage in the watershed were addressed with the installation of a series of rock ramps at the Chesaning Dam on the Shiawassee River (Selzer et al. 2014) and the Frankenmuth Dam on the Cass River (The Nature Conservancy 2017). Periodic monitoring will determine how successful these projects have been in enabling fish passage. The Midland Dam on the Tittabawassee River, which is currently a significant impediment to fish passage on the Tittabawassee River, is scheduled to be modified for improved fish passage by 2025 as part of the Tittabawassee River NRDAR settlement with Dow.

3.8 Environmental Justice

Environmental justice generally seeks to address environmental inequities that have disproportionately burdened communities that have low socioeconomic status or are predominately made up of people from racial or ethnic minorities. The State of Michigan defines environmental justice as “the equitable treatment and meaningful involvement of all people, regardless of race, color, national origin, ability, or income and is critical to the development and application of laws, regulations, and policies that affect the environment, as well as the places people live, work, play, worship, and learn.”²¹ The Trustees have specifically considered and incorporated environmental justice in their decision-making by including equity and environmental justice as a Restoration Project Evaluation Criteria. To better characterize how a particular project may address issues regarding environmental justice, the Trustees considered

²¹ EGLE Office of the Environmental Justice Public Advocate, <https://www.michigan.gov/environmentaljustice/> (last visited March 2, 2021).

data available through the Michigan Department of Environment, Great Lakes, and Energy's Environmental Justice Screening Tool, an environmental justice mapping tool.²²

The Michigan Environmental Justice Screen evaluates a suite of demographic and environmental characteristics to determine a community's relative status regarding indices of concern. This tool provides a series of interactive maps and charts that depict these indices related to environmental justice for the community or area of interest. The Michigan Environmental Justice Screen uses the unit of census blocks within particular geographic areas to develop rankings based on environmental, health, and socioeconomic factors. In general, the higher the relative percentile ranking (0-100), the greater likelihood of risk related to issues of environmental justice. For example, the census block that encompasses the Green Point Environmental Learning Center on the Shiawassee NWR, bordering the City of Saginaw to the south, has an Environmental Justice Screen ranking of 73. The area in the vicinity of Tobico Marsh near the mouth of the Kawkalin River, has an Environmental Justice Screen ranking of 30. These considerations are integrated into the Trustee's criteria which are used to evaluate restoration proposals.

3.9 Climate Change

Though there is substantial year-to-year variability in the parameters used to assess climate change, it appears certain that the Great Lakes and their associated embayments, such as Saginaw Bay, will continue to experience decreased ice coverage, either in extent or in the number of days of coverage (Wang et al. 2012, Mason et al. 2016), and increasing mean water temperatures in the future (Andresen 2012). At a minimum, for shallow water embayments, such as the inner portion of Saginaw Bay, this may result in increased light penetration in the water column and at the sediment interface. Increased light penetration and increasing water temperatures may further compound the dynamics of a eutrophic system already compromised by invasive species (e.g., dreissenid mussels, *Phragmites*) and algal blooms (Mason et al. 2016).

Along with increasing temperatures, precipitation patterns and frequency of extreme weather events are expected to change over the next decades as compared to historical patterns. Annual precipitation in the Great Lakes region is expected to increase in the future as warmer air temperatures allow the atmosphere to hold more moisture, with precipitation becoming more concentrated in winter and spring months while decreasing in the summer months by 5% to 15% by the end of the century (Wuebbels et al. 2019). Heavy rainfall events are already increasing in intensity and frequency across the United States with the largest changes observed in the Midwest and Northeast, and projected climate changes are expected to continue to increase the likelihood of extreme weather events (Wuebbels et al., 2019). These changes are likely to increase flooding and erosion, putting additional stress on infrastructure such as dams, dikes, water drainage systems, sewers, roads, and other infrastructure such as landfills (Sarhadi and Soulis 2017).

²² <https://www.michigan.gov/egle/maps-data/miejscreen>

Landscape-scale climate-related change may further enable colonization of the Great Lakes by new invasive species including non-native fish (Mandrak 1989) and may also result in reduced habitat suitability for particular guilds of birds (Mortsch et al. 2006, Wires et al. 2010). Warmer water temperatures may also result in distributional shifts of species. For example, warm-water fish species may encroach upon habitats that have historically sustained cold-water species; the ranges of cold-water fish species may become more restricted, and these species may become less abundant. The timing of migration and spawning events may similarly shift in response to changes in temperature and water flow.

The stressors resulting from climate change will compound the impact of other stressors, such as habitat degradation and environmental contamination (Kling et al. 2003, Glick et al. 2011, Collingsworth et al. 2017, Myers et al. 2017). Ecosystem resilience to the impacts of climate change will, in part, be related to the efficacy of efforts to restore and maintain substantial areas of native habitats in areas such as the coastal Great Lakes.

4.0. THE RESTORATION ALTERNATIVES

At a minimum, consideration for funding requires that restoration projects must meet the purpose and need for restoration (Section 1.4) and must meet the Trustees' threshold eligibility criteria (Table 2-1). Once a project is determined to be eligible for consideration, projects are ranked using evaluation criteria, as described in Section 2.2.2, to select restoration projects that best meet these criteria to include in a Preferred Alternative. The projects that the Trustees have included in their Preferred Alternative are those that ranked as best meeting the Trustees' goals and objectives among the projects submitted to the Trustees. Additional project ideas received but determined to be non-eligible or not currently viable by the Trustees, are summarized and discussed below in Section 4.3 (Alternatives Considered But Not Analyzed Further).

The Trustees are required to evaluate a No-Action Alternative under NEPA (40 C.F.R. § 1502.14(d)) and, similarly, a Natural Recovery Alternative under CERCLA (43 C.F.R. § 11.82(c)). These requirements will be addressed as the No-Action Alternative in this document. The No-Action Alternative gives the Trustees and the public a basis of comparison when evaluating other alternatives.

4.1 The Preferred Restoration Alternative

The Preferred Alternative consists of a suite of projects that would, if implemented, provide benefits to natural resources injured by the release of hazardous substances into the Saginaw Bay watershed and provide natural resource services similar to what would have been provided had those releases not occurred. Collectively, these projects are expected to increase habitat quality and quantity, promote habitat connectivity, create new public use opportunities, and benefit natural resources within the Saginaw Bay watershed.

The Trustees requested that project proponents submit pre-proposals for their consideration. The Trustees chose to take an iterative approach to project development, with the intent of allowing for the refinement of cost estimates and enhancement of project design during the review process. The Trustees will continue to work with project proponents to ensure the delivery of natural resource benefit with project implementation. Several of the projects have been modified to incorporate additional emphasis on restoration or to enhance the capacity to deliver natural resource restoration. At least one project requires some level of feasibility study, design, or engineering work before accurate cost estimates can be made for full implementation of the project, so those implementation costs are not yet included in proposed expenditures. Under the Preferred Alternative, the Trustees estimate initial expenditure of approximately \$4.65 million for nine projects as described in Section 4.1 and listed in Table 4-1. The Trustees will use revised cost estimates as implementation progresses, limiting expenditure of funds to the available \$5.75 million for the nine projects plus, if found to be feasible, the tenth project described in Section 4.1.10.

Project proponents will be expected to commit to monitoring and long-term stewardship of their projects as described in Section 2.2.4, and comprehensive cost estimates developed for the projects are expected to include monitoring and adaptive management. Depending on the project, the Trustees may contribute a portion of the funding or other support needed for

baseline monitoring, initial implementation and effectiveness monitoring, and adaptive management actions through this round of funding.

If proposed projects are later found to be infeasible or are funded through other sources, the Trustees may, as appropriate, shift funding to enhance long-term stewardship and monitoring of other NRDA-funded projects, increase the scale of selected projects (e.g., add additional years or acres of invasive species control), substitute substantively similar projects, or issue a new request for restoration project ideas. In addition, the Trustees may adjust funding totals for individual projects based on updated cost information, within the funding currently available.

4.1.1 Crow Island State Game Area - Maxwell Land Trust Acquisition

This project would consist of acquisition of an approximately 360-acre parcel from the Maxwell Land Trust to be added to the Crow Island State Game Area within its approved acquisition boundary. Crow Island State Game Area is managed by the Wildlife Division of the Michigan Department of Natural Resources and lies in both Bay and Saginaw counties. The parcel under consideration for acquisition lies within the Michigan Wildlife Action Plan's Great Lakes Marsh and Inland Emergent Wetlands priority area for conservation action and would address one of the Wildlife Action Plan's priorities: "Restore, manage, and protect Great Lakes Marsh and Inland Emergent Wetlands on state, federal, and private lands for focal species" (Derosier 2015). All focal species for the Great Lakes Marsh and Inland Emergent Wetlands habitat type (black tern, king rail, black-crowned night heron, and eastern fox snake) have historic records of occurrence in Bay and Saginaw counties and would benefit from additional managed wetland habitat in the watershed.

The parcel is currently intensively farmed with a typical row crop rotation of corn and soybeans, made possible in the floodplain only through tiling and active water pumping to maintain suitable soil moisture for farming. As such, restoration to functioning emergent floodplain wetland is highly feasible using cost-effective, well-developed techniques. Additional ecosystem services would be provided on the parcel itself and provide benefits for species with large home ranges by providing more contiguous habitat in the Crow Island State Game Area. The acquisition would also contribute to improved water quality and flood storage, as described below.

Restoration would include disruption of the existing field tiles and the discontinuation of active water pumping to restore hydrology to the parcel. The MDNR Wildlife Division would investigate suitable locations for reconnection(s) to the Saginaw River floodplain to allow the parcel to act as a large reservoir for regional flood storage. Reconnection would likely include active (e.g., water control structures) and passive (e.g., spillways) water control for efficient intake and controlled release of flood waters.

Depending on management of the area, this parcel would be able to absorb between 1,083 and 1,444-acre ft of water during flood events. This will serve to reduce the severity and duration of the seasonal flood burden experienced by adjacent communities. The intake of floodwaters would also filter the high-nutrient runoff, namely nitrogen and phosphorous, common within Saginaw River and Bay tributaries and improve the health of Saginaw Bay.

This project will provide additional public recreational opportunity and enjoyment of natural resources by increasing accessibility to public conservation lands in southern Michigan. This region of Michigan has a proportionally low availability of public land relative to the area population. By restoring the parcel to an emergent wetland, seasonal and year-round wildlife use of the surrounding Crow Island State Game Area will increase. Direct benefits, in terms of nature-based recreation, include an increase in hunting, trapping, and fishing opportunities. The restoration will provide additional acreage for wetland dependent or obligate wildlife viewing, especially birding, as the Game Area is a stop along the Saginaw Bay Birding Trail (<http://www.saginawbaybirding.org/>). The Game Area also lies directly along and immediately adjacent to the Bay-Zil Rail Trail, a leg of the statewide Iron Belle Trail system. Restoration will provide additional opportunity for wildlife viewing along this trail system which is a substantial recreational asset for area communities.

The City of Saginaw and portions of Bay City have substantial under-served populations that lack meaningful, economical access to recreational properties or green space. The addition of this parcel, which lies between the City of Saginaw and Bay City, will improve recreational access in these communities. Because the parcel lies directly adjacent to the Bay-Zil Rail Trail, access to public lands from these cities will be improved. Similar efforts led by the Saginaw County Parks & Recreation Commission (Saginaw River Headwaters Rec Area) and the Shiawassee NWR (Green Point Area Restoration Project) will also provide conservation and recreation lands within proximity to urban areas, including communities experiencing issues of social or environmental inequity.

The Trustees would fund up to \$1.0 million of the acquisition and/or restoration for this project. The MDNR intends to use this funding as match for grant applications to complete the purchase at a fair market value as determined by a state-approved appraiser and proceed with restoration. If the parcel is acquired, the MDNR would expand existing activities at the Crow Island State Game Area to efficiently conduct long-term maintenance and monitoring of this parcel.

4.1.2 South Riverfront Restoration, Midland, MI

The South Riverfront Restoration Project is a project designed to transform a vacant, blighted industrial site into a vibrant wetlands park that will provide connections between the downtown area of the City of Midland and the Tittabawassee River. This project also serves to create a signature gateway that enhances rural access into downtown Midland. The restoration aspects of this project will be complimented by connections to the adjacent Dow Wetland Restoration Site and Towsley Dike Park. The restoration component of this project is the focus of this project proposal.

The South Riverfront Restoration Project will transform a project area dominated by an abandoned hard-surfaced industrial site by replacing the former industrial area with a restored wetland ecosystem adjacent to the riparian corridor of the Tittabawassee River. Removal of a substantial area of broken concrete and blighted structure would achieve the goal of restoring the site to its natural purpose of absorbing and filtering flood waters before releasing them back into the river. The restoration project for the project features the development of wetlands, wetland plantings, reforestation with native species, wetland

boardwalks, river overlooks, fishing piers, and a trail system. These features represent the core elements of the restoration proposal.

By removing the blight of an old industrial manufacturing site and restoring a wetland area to its natural state, and creating a usable public space, this project would add visual appeal to the downtown landscape, create connectable amenities related to nature-based recreational features and establish new points of contact through which residents and visitors can enjoy the Tittabawassee River and downtown Midland. This project is consistent with the City of Midland's Parks & Recreation Master Plan to improve access, ecological awareness, and recreational value of the rivers that traverse the downtown area. When paired with educational and programming opportunities, facilitated by the restoration of functional habitat, a feature will be developed that fosters a unique sense of place for the community. With the addition of a pedestrian footpath over the Tittabawassee River (funded from other sources) a circular point of reference will be created that provides a loop from two distinct and attractive downtown areas: The Tridge / Farmers Market to the recreational boundary delineated by Dow Diamond and Founders Park.

The Trustees propose to fund up to \$1.0 million of an estimated total project cost of \$9.0 million. The Trustees would fund only the restoration component of the project. The funding would be matched by other funding sources by a ratio of approximately 9 to 1, ensuring that the Trustees' funds would be used in a cost-effective manner to achieve ecological and public benefits.

4.1.3 Saginaw Bay Coastal Wildlands

The Saginaw Basin Land Conservancy's Saginaw Bay Coastal Wildlands Project is a partnership initiative with the Saginaw Chippewa Indian Tribe of Michigan to create and maintain a landscape-level coastal wildlife sanctuary and outdoor recreation destination that encompasses the Saginaw River Delta. The goal of the Coastal Wildlands Project is to continue to provide readily accessible, high-quality natural areas that conserve coastal habitats while delivering recreational, ecological, and cultural value to area communities.

As a part of this initiative, the proposed project would provide for comprehensive invasive species control and planting of native species in restoration areas which are critical for the ecological integrity of coastal habitats. Preliminarily, management plans prescribe a series of ecological enhancements and management priorities with the following goals, which are the focus of this proposed project:

Invasive species control. Treatment and removal of invasive species will be necessary to maintain the quality of habitat desired for Saginaw Bay Coastal Wildlands properties. Species such as *Phragmites*, autumn olive (*Eleagnus umbellata*), buckthorn, and honeysuckle create management challenges that will be monitored and addressed with best management practices. Funding would cover direct costs and labor associated with treatment and removal, as well as staff time to monitor for occurrences of new invasive species identified elsewhere in the Saginaw Bay watershed. This work would be implemented across the 227 acres of Saginaw Bay Coastal Wildlands property owned by either the Saginaw Basin Land Conservancy or the Saginaw Chippewa Indian Tribe of

Michigan. Control of invasive species on the Saginaw Bay Coastal Wildlands property would also benefit the Saginaw Chippewa Indian Tribe of Michigan's adjacent properties by controlling a potential source of non-native and invasive species.

Native vegetation establishment. The removal of invasive species would create opportunities for restoration with wildlife-beneficial native species. Native wildflowers and grasses would be used to revegetate these areas. Milkweed species (*Asclepias* spp.), such as common milkweed, swamp milkweed, and butterfly weed, would be prioritized to create additional monarch butterfly habitats in suitable locations. Recent reports of drastic monarch population decline further underscores the need for habitat protection and creation. Shrubs and trees would be selected depending on site conditions and placed in areas where conditions are suitable for this cover type. The requested funding would cover the direct costs of seed, plugs, and bare-root or balled-tree stock, along with site preparation and planting work necessary for each respective restoration treatment tailored to site condition.

Trail maintenance & development. Existing natural surface trails will be maintained and new trail sections will be developed. This will improve visitor experience at Coastal Wildland properties and will also serve to provide the primary route of access for the treatment of invasive species and establishment of native vegetation at each respective site. Although some trails have remained in the same location for many years, modifying routes will periodically become necessary to adapt to fluctuating seasonal water levels and changes in vegetation. Amenities such as interpretive and cultural signage, benches, and waypoint maps would be added to enhance recreational experience.

Long-range management plan. A collaborative management plan would be jointly developed with the Saginaw Chippewa Indian Tribe of Michigan and the Conservancy. The plan would memorialize a landscape-level management strategy to maintain and enhance project implementation and maintenance. The plan would detail outreach and signage to be installed within the collaborative footprint of the project. This will ensure that the natural and built amenities of the project are cooperatively managed and consistent with the overall goals of the Saginaw Bay Coastal Wildlands Project.

The Trustees would fund the initial implementation phase of the project (years 1-3), provide funding to support the development of outreach materials including signage, support the development of a collaborative management plan with the Saginaw Chippewa Indian Tribe of Michigan, extend funding for maintenance of the Coastal Wildlands Project through year 10 of the project, and augment the capacity of the Saginaw Basin Land Conservancy by supporting the purchase of a skid steer equipped with land management attachments. The Trustees estimate the comprehensive 10-year cost of the project to be \$235,000. This would build on the 1998 Saginaw River and Bay settlement by continuing to improve habitats in the vicinity of the Saginaw River Roney property that was acquired by the Saginaw Chippewa Indian Tribe of Michigan as a part of that settlement.

4.1.4 Saginaw River Headwaters Rec Area – Restoration and Recreational Access along the Tittabawassee River

This project description combines two pre-proposals submitted to the Trustees by the Saginaw County Parks and Recreation Commission. The Trustees combined a proposal to address *Phragmites* treatment with the Commission's proposal to develop accessible fishing access along the Saginaw River. The combined proposals were revised with the addition of a restoration component to improve the ecological condition of the riparian corridor of the Saginaw River and adjacent uplands within the Saginaw River Headwaters Rec Area.

The recreation area is located along the west side of the Saginaw River at the southern boundary of the City of Saginaw. The site features nearly one mile of shoreline that terminates near the confluence of the Tittabawassee and Shiawassee Rivers where they join to form the Saginaw River. In addition to its global significance to migratory waterfowl, the watershed supports a world class walleye (*Sander vitreus*) fishery. The site has exceptional potential for nature-based recreation, a service affected by the past release of contaminants into and around these rivers. Like many wetlands and riparian corridors in the Saginaw Bay watershed, the aggressive non-native plant, *Phragmites* spp. occurs throughout portions of the 334 acres of the Saginaw River Headwaters Rec Area.

The project proposal addresses multiple aspects of resource recovery related to the two settlements within the Saginaw Bay watershed: recreational opportunity related to injuries to riparian and fishery resources, and ecological restoration in the floodplain of the Saginaw River. Moreover, the project would enhance a 'brownfield' site, the long abandoned 334-acre automobile manufacturing complex, commonly known as Saginaw Malleable Iron.

In partnership with the Saginaw Basin Land Conservancy, the treatment of *Phragmites* would be expanded to strive for eradication of *Phragmites* on the site. Treatment would be extended to address the remaining impacted areas of the site (approximately 100 acres).

Along the river, the wooded riparian corridor would be broadened with the planting of native species that provide structural stability, benefit to pollinators, and provide visual appeal to site visitors. Trees and shrubs may include species such as American basswood (*Tilia americana*), Black willow (*Salix nigra*), Paper birch (*Betula papyrifera*), Swamp white oak (*Quercus bicolor*), White pine (*Pinus strobus*), Serviceberry (*Amelanchier canadensis*), Gray dogwood (*Cornus racemosa*), Red osier dogwood (*Cornus sericea*), Black cherry (*Prunus serotina*), and Ninebark (*Physocarpus opulifolius*).

The wooded riparian corridor would be bordered by native flowering shrubs that would transition to native grasses and forbs, benefitting fruit eating birds as well as pollinators. West of the river, groves of native trees within areas of restored grasses and native forbs, would provide the appearance of savanna-like habitats providing additional diversity and visual appeal to area visitors. In partnership with local conservation organizations and agencies, species to be planted would be native to the area and appropriate to site conditions.

To address losses related to recreational fishing, an accessible fishing pier would be constructed along the river to the immediate south of the Center St. Bridge to increase

access opportunities for recreational anglers. This would be only the second Americans with Disabilities Act (ADA) compliant fishing access on the Saginaw River in the City of Saginaw. This location would allow for ease of access in near proximity to the entrance to the site along West Center Street. Proximity of the fishing pier to urban Saginaw will ensure access for a citizenry that might not otherwise be able to participate in recreational fishing for walleye in the Saginaw River. The Saginaw County Parks and Recreation Commission will explore the feasibility of constructing additional walk-in fishing access to provide additional fishing opportunity while protecting and conserving the ecological condition of the restored riparian corridor.

Fishing access would incorporate educational and interpretive signage detailing the watershed and fishery, including Michigan's Eat Safe Fish guidelines. Additional interpretative signage is being developed to educate visitors about the history of the site, from its earliest indigenous uses through its industrialization, and finally, to celebrate the site being reclaimed and opened for public use as the Saginaw River Headwaters Rec Area.

The Saginaw County Parks and Recreation Commission will utilize partnerships with the MDNR, Saginaw Basin Land Conservancy, the Shiawassee NWR, and the Partners Program of the USFWS to refine and deliver ecological benefit and recreational access to the site. The Saginaw Basin Land Conservancy has been instrumental in the initial treatment of *Phragmites*; the Michigan Natural Resource Trust Fund has supported the initial construction of trails throughout the site, another component of recreational access to the Tittabawassee River corridor.

For this project, the Trustees would provide support for the treatment of *Phragmites* on the Rec Area; enhancement of the Tittabawassee River riparian corridor with the planting of native flowering trees, shrubs, and herbaceous species; and the development of fishing access along the Tittabawassee River. The Trustees would provide funding up to the amount of \$400,000 to achieve the proposed restorations actions. The Saginaw County Parks and Recreation Commission and its partners have submitted applications to acquire additional funding, including through the America the Beautiful Challenge program, to meet the total estimated \$650,000 cost of the project. The Saginaw Bay Watershed Initiative Network and Conservation Fund have together already provided a grant of \$20,000 for this project.

4.1.5 Thomas Township Invasive Species Treatment & Tittabawassee Riverbank Stabilization Feasibility Study

The Thomas Township Nature Preserve is located within an urban area to the immediate west of the Tittabawassee River and north of Gratiot Road. As part of this urban area, Thomas Township borders Saginaw Charter Township, which is adjacent to the City of Saginaw. The Nature Preserve property consists of 67 acres that include areas of riparian and moist soil habitats along the Tittabawassee River and a building being renovated as a nature center. Previously managed for the production of row crops, the Township is now restoring the approximately 60-acre core area to a complex of riparian and wetland habitats to be managed in perpetuity for ecological and recreational benefits, largely with previously designated funding from the Tittabawassee River Settlement. In addition, Dow will be

conducting cleanup work on approximately six acres within the 60-acre core area and at two sections of riverbank along the edge of that area in 2022-2023, then restoring those areas with native species plantings as it finishes that work. South of this core area, substantial areas of woody non-native and invasive species occur within the forested tract around the nature center building. Non-native species in the forested tract include Siberian elm (*Ulmus pumila*), autumn olive, and common buckthorn (*Rhamnus cathartica*).

The Township has acquired a 13-acre property to the immediate north of the Thomas Township Nature Center and Preserve along the Tittabawassee River. This property would similarly benefit from the treatment of non-native and invasive species and the re-establishment of native species.

Thomas Township proposes to remove non-native woody species, as well as other invasive species, and replant with native shrubs, trees, and herbaceous species in order to attract native animals and restore the area to native habitats. The Township proposes to re-establish a native overstory using maples (*Acer* spp.), American elm (*Ulmus americana*), American Beech (*Fagus grandifolia*), or birch (*Betula* spp.) trees as appropriate to site conditions. Additional species within the understory would be planted with native shrubs and herbaceous species that will provide habitat for a variety of native insects and birds.

The Trustees combined this proposal to address non-native and invasive species within the 67-acre Thomas Township Nature Preserve with elements of proposals related to additional Thomas Township property and a proposal to stabilize an area of the bank of the Tittabawassee River within the Township's nature preserve. The Trustees would provide funding to Thomas Township to treat non-native and invasive species and establish native habitats in forested areas of the Nature Preserve property, including approximately 5 acres in front of the nature center building and around the parking lot, and on the Township's 13-acre property to the north of the Nature Preserve. Additionally, the Township proposed to stabilize an area of steep eroding bank along the Tittabawassee River on the Township's Nature Preserve property. The Trustees propose to fund a feasibility study to better inform efforts to stabilize this area of bank along the Tittabawassee River. The Trustees have allocated up to \$250,000 for this project to fund the treatment of non-native invasive species, establish native habitats, and to conduct a feasibility study on bank stabilization. Should the stabilization of the steep bank area be shown to be feasible and produce cost-effective benefits to natural resources based on the Trustees' restoration criteria, the Trustees would consider funding all or a portion of the bank stabilization work within the remaining balance of the \$5.75 million currently available for restoration projects.

4.1.6 Bay City State Park – Habitat Restoration & Maintenance

Bay City State Park (SP) in Bay County, Michigan, is an area of significant environmental, historical, and cultural significance. The park contains a variety of unique natural resource habitats, including a wooded dune and swale complex, oak savannah, and lake plain prairie. Bay City SP is also a valuable resource for natural resource education and recreation activities as it offers an active visitor center, an interpretive trail, and spaces for hiking, camping, fishing, wildlife viewing and more. This project would build on restoration efforts

by the MDNR Parks and Recreation Division in the Bay City SP to improve habitats for natural resources and the public's use and enjoyment of those natural resources.

Bay City SP, and most notably the Tobico Marsh State Game Area, also provide crucial habitat and food availability for rare and threatened wildlife, such as the common gallinule (*Gallinula galeata*), bald eagle, and the State endangered king rail (*Rallus elegans*). The marsh is also a historical spawning ground for northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), largemouth bass (*Micropterus salmoides*), and other valuable sport and game fish species. Notably, Tobico Marsh, along the shoreline of Saginaw Bay, is a National Natural Landmark and one of the largest remaining coastal wetlands on the Great Lakes. The marsh contains approximately 900 acres of open water and vegetated wetland and is a valuable staging ground for migratory birds and contains nesting ground for rare bird species like the black tern (*Chlidonias niger*), least bittern (*Ixobrychus exilis*) and short-eared owl (*Asio flammeus*).

Ecosystem services provided by the marsh include filtering of excessive run-off, which decreases pollutants entering underground water sources and the nearby Saginaw Bay, as well as providing food and shelter for many species of fish and wildlife. However, the level of ecological services is currently significantly impaired by non-native and invasive plants that displace native plant species without providing similar ecological value to wildlife.

Invasive species control within the state park is a priority for the MDNR Parks and Recreation Division. This project would bring additional capacity to the park to achieve invasive species control. Pre- and post-implementation vegetation and bird monitoring will be conducted to assess project success and inform future restoration efforts.

The Trustees would provide funding up to \$360,000, for the Saginaw Bay Cooperative Invasive Species Management Area ([CISMA](#)), in coordination with partners in the Arenac Conservation District, MDNR, the Michigan Natural Features Inventory, and Michigan Technological University. The CISMA would lead a project to control invasive species within the area for at least three years with the following objectives:

1. Manage *Phragmites* infestations on private property adjacent to the state park;
2. Conduct drone surveys to assess distribution of non-native species on 780 acres of inaccessible marshland within the state park;
3. Control common buckthorn populations on 485 acres of high ecological integrity wetlands within the state park; and
4. Provide technical support for private landowners to encourage continued invasive species control and re-establishment of native plants.

Additional grant funding from the Michigan Invasive Species Grant Program, the Great Lakes Restoration Initiative (GLRI), and EGLE will provide for staffing, training, equipment and planning for the CISMA coordinator, and the invasive species strike team. Further in-kind contribution from the Arenac Conservation District will provide office space and fringe benefits for employees.

4.1.7 Chippewa Nature Center – Habitat Restoration and Maintenance

The Chippewa Nature Center is a 1,500-acre natural area located at the confluence of the Pine and Chippewa rivers to the west of the City of Midland. The Chippewa River is a tributary of the Tittabawassee River. In addition to providing extensive natural resource related programming for regional youth and adults, the Chippewa Nature Center serves as a regional conservation organization providing restoration services throughout the area of the Saginaw Bay watershed.

This project would build the capacity of the Chippewa Nature Center to restore sensitive ecosystems such as floodplains, forested wetlands, and open grasslands within the Saginaw Bay Watershed through the use of a forestry mower and trailer package. The Chippewa Nature Center has extensive experience and success in managing invasive species on its property, but efforts are currently limited by availability of staff and funding. The ecological health of many sites is compromised primarily by woody invasive plants. The removal of invasive species, followed by promotion of native plant species, would increase plant and wildlife species diversity and improve the overall health of the watershed. Environmental stewardship would also be improved, benefitting outdoor enthusiasts using these sites.

To improve the capacity of the Chippewa Nature Center to deliver ecological restoration within the Saginaw Bay watershed, the Trustees would provide up to \$118,000 of the total \$149,500 cost of the requested equipment. The Trustees anticipate that enhancing the capacity of the Chippewa Nature Center to undertake restoration activities would improve ecological conditions and public use of natural resources in the Saginaw Bay watershed.

4.1.8 Tittabawassee River Floodplain Protection and Restoration Project

The Tittabawassee River Floodplain Protection and Restoration Project would protect, restore, and enhance two privately owned lands, Stevens Family Farm and the 6200 Club, within the 8-year Tittabawassee River Floodplain in Shields, Michigan. This project would restore and permanently protect natural hydrology and provide functional floodplain services, enhance biological diversity and wildlife habitat, and reduce flood hazards.

To achieve the goals of this project, Ducks Unlimited would hold conservation easements and provide stewardship on two private properties totaling 310 acres of wetland and upland floodplain habitat along the Tittabawassee River. These actions would permanently protect the floodplain functions, values, and services provided by these properties. Historically, land use at these properties included agriculture, pasture, a golf course, and mining. The conservation easements would ensure that these properties not return to these or other uses and instead would remain in a natural state in perpetuity, could not be subdivided, and would require lands to be managed to maximize environmental benefits, thereby protecting the capital investment of past and proposed restoration efforts. The properties occur within the acquisition boundary of the Shiawassee NWR; the conservation easement would include a right of first refusal for fee-title ownership by the USFWS.

After the lands are protected by the easements, approximately 40 acres of floodplain wetland restoration and at least 6 acres of wetland enhancement would be undertaken to

improve environmental quality. Former restoration and enhancement efforts on the site have proven successful in achieving high-quality forested and emergent wetlands. The landowners have observed heron rookeries and nesting bald eagles on the site. It is anticipated that wetland restoration and enhancement would increase migratory bird production, improve floodplain fish spawning onsite and downstream, and increase floodwater retention by capturing and confining contaminated sediments. Restoration would be expected to benefit a multitude of birds, mammals, reptiles, amphibians, and aquatic organisms by providing quality floodplain wetland and upland habitat.

The protection and restoration activities will indirectly benefit the public despite being conducted on private property that will not be open to the public. Cleaner water, increased wildlife populations, and an extended natural greenway will provide high-quality recreational opportunities for ecotourism, kayaking, bird watching, hunting, and fishing outside the project's property boundaries. This project directly addresses many impairments subjected to floodplains, including mitigating the transfer of dioxin contamination downstream by restoring floodplain function and maintaining vegetative cover of floodplain soils.

The Trustees would provide up to \$990,000 of funding toward the total project cost of \$1,084,208, which includes the cost of permanent easements (\$717,037), habitat restoration, and future stewardship of the properties (\$367,171). Ducks Unlimited is securing at least \$94,000 in matching funds and in-kind contributions for this project.

4.1.9 Saginaw Bay Sturgeon – Support, Monitoring, and Restoration of a State Threatened Species

This project would build capacity to support the long-term effort to restore Saginaw Bay's lake sturgeon population by providing funding for hatchery support, public education, and the proposed expansion and support of the Great Lakes Acoustic Observation System to more locations in the watershed. This project would be managed by The Conservation Fund and the Saginaw Bay Watershed Initiative Network who would in turn provide funding for these activities to additional partners.

The Conservation Fund and the Saginaw Bay Watershed Initiative Network are two of a broad array of partners that are working to reestablish lake sturgeon, a native species, in the Saginaw Bay watershed. Many groups are working together to remove dams and rebuild important spawning habitat for lake sturgeon. Agencies and groups in the Great Lakes states (Michigan, Ohio, Wisconsin, and New York), the Canadian province of Ontario, Native American tribes, the USFWS, and other non-profit organizations (Michigan Sea Grant, Sturgeon for Tomorrow, SBWIN, Michigan State University, and others) are all assisting. But, even with these combined efforts, lake sturgeon populations are still in need of additional assistance.

Lake sturgeon are considered threatened or endangered in seven of the eight Great Lakes states. Once the most prolific of all fish species in the Saginaw system, lake sturgeon populations were devastated by overharvest, and habitat destruction. In addition, being long-lived species that feed close to bottom sediments, sturgeon accumulate significant body burdens of contaminants and sturgeon species including lake sturgeon are known to

be sensitive to dioxin-like compounds (Chambers et al. 2012, Tillitt et al. 2017) and lampricides (Boogard et al. 2004). Today, the MDNR considers them to be a remnant non-spawning population in the system, and the Great Lakes' population remains at less than 1% of its historical level.

In 2017, partners began the yearly effort to stock lake sturgeon in the Saginaw system. Stocking is a practice where fish are raised in captivity before being released into rivers and streams, with the goal of establishing a self-sustaining, reproducing population. It may take several decades of stocking before lake sturgeon populations become self-sustaining. In 2021, USFWS biologists were able to capture juvenile sturgeon in Saginaw Bay that had been previously released in the Saginaw River as part of this recovery program, demonstrating the value of the effort to restore this species.

Acoustic monitoring allows biologists to detect acoustic tags placed in sturgeon, enabling biologists to track the distribution and movement of sturgeon. Fisheries biologists from multiple agencies and organizations have established the Great Lakes Acoustic Telemetry Observation System so that they can share data about multiple species from detection equipment being installed throughout the Great Lakes basin.

The Trustees would provide a total of up to \$300,000 of funding for this project to support hatchery operations, additional education and outreach, and further expansion of the Great Lakes Acoustic Telemetry Observation System in locations important for restoring sturgeon populations. This project builds on efforts to improve aquatic habitat and passage, such as installation of a fish passage structure at the Midland (Dow) Dam on the Tittabawassee River pursuant to the 2020 Tittabawassee River settlement. This structure is expected to provide spawning substrate for lake sturgeon and may also allow for their passage upstream under at least some flow conditions.

4.1.10 Smith's Crossing Pedestrian Bridge – Trail & Fishing Access

This project would provide recreational fishing access at the Smith's Crossing Bridge, an abandoned vehicular bridge that crosses the Tittabawassee River. Local organizations plan to convert the bridge to an active pedestrian bridge, incorporating a fishing pier into the design of the site. This bridge is located downstream of Midland and the Caldwell Boat Launch and immediately upstream and adjacent to one of the habitat restoration projects that Dow is implementing pursuant to the Tittabawassee River Settlement (the Tittabawassee River Floodplain Restoration and Bike Trail Project). The site would be accessible by the Great Lakes Regional Bay Trail; shoreline recreational fishing would be accessible by foot, bicycle, and by vehicle. Currently, this section of the Tittabawassee River has no public fishing access from upstream of the Dow Dam in Midland to downstream at Freeland Festival Park, a distance of nearly nine river miles.

The project would address natural resource services directly affected by the release of hazardous substances into the Tittabawassee River, namely the loss of fishing opportunity and nature-based observation, either within or immediately adjacent to a NRDAR project that protects and restores natural resources. Given that additional public traffic is expected in this area following the bridge conversion project and the Dow-implemented restoration

project, constructed shoreline fishing access in this location could direct shoreline foot traffic, resulting in access to natural resources as well as the protection of the riverbank and shoreline habitat from excessive trampling and erosion.

Because of unresolved issues that prevented the Trustees from fully evaluating this pre-proposal, the Trustees are not proposing to fund this project at this time. At the time of proposal evaluation, project proponents had not completed discussions with landowners where the shoreline fishing access might be constructed, so a location for a fishing pier has not yet been identified. The Trustees also have concerns about how a fishing pier at this location could be constructed and maintained with reasonable costs while being resistant to damage from variable flows, floods, and ice dams. The pre-proposal also did not identify an entity responsible for future maintenance and stewardship of the access site. Consequently, given the combination of resource values addressed by the proposed project with some significant feasibility concerns, the Trustees have chosen to provide an analysis of the proposed project in this Draft Supplemental Restoration Plan in the event that additional information is developed that would allow the Trustees to fully evaluate it and potentially provide funding for it in the future.

Table 4-1. List of restoration projects proposed for funding by the Tittabawassee and Saginaw River & Bay Trustee Councils, restoration categories with proposed initial funding types, and ranges of preliminary cost estimates.²³

Proposed Project	Restoration Categories	Preliminary Cost Estimate (<\$250,000)	Preliminary Cost Estimate (\$250-500k)	Preliminary Cost Estimate (\$500k-1M)
Crow Island State Game Area - Maxwell Trust Land Acquisition	Conservation Land Acquisition			X
South Riverfront Restoration, Midland	Riparian / Wetland Habitat Restoration, Natural Resource Recreation			X
Saginaw Bay Coastal Wildlands	Coastal Habitat Restoration, Natural Resource Recreation	X		
Saginaw River Headwaters Recreation Area – Restoration & Recreational Access Project	Riparian / Wetland Habitat Restoration, Natural Resource Recreation		X	
Thomas Township Invasive Species Management, Bank Feasibility Study	Riparian / Wetland Habitat Restoration, Natural Resource Recreation		X	
Bay City State Park Habitat Restoration & Maintenance	Coastal Habitat Restoration, Natural Resource Recreation		X	
Chippewa Nature Center - Habitat Restoration & Maintenance	Riparian / Wetland Habitat Restoration	X		
Tittabawassee River Floodplain Protection & Restoration	Conservation Easement, Riparian / Wetland Habitat Restoration			X
Saginaw Bay Sturgeon – Support, Monitoring & Restoration	Species of Special Concern Conservation		X	

²³ Several proposed projects in the preferred alternative provide initial funding for feasibility studies or early design phases. The Trustees may allocate additional funding to such projects for implementation in the future if the results of the initial phase do not significantly change the Trustees' evaluation of the projects using the evaluation criteria (e.g., cost/benefits). In addition, Trustees will continue to pursue other funding sources to maximize the impact of NRDAR funds through coordinating with response actions and encouraging the use of matching funds.

4.2 The No Action alternative

In addition to the consideration of a range of alternatives that may accomplish a proposed action, the National Environmental Policy Act of 1969 (42 U.S.C. §§4321-4370h) requires that federal agencies consider the outcomes associated with the implementation of a No Action Alternative. In this case, the No Action Alternative would forego the expenditure of remaining funds for the purpose of implementing restoration projects identified by stakeholders with an interest in the ecological condition of the Saginaw River and Bay. Similarly, the consideration of a Natural Recovery Alternative is mandated under the CERCLA (43 C.F.R. § 11.82(c)).

Under a No-Action Alternative, or Natural Recovery Alternative, no action would be taken to restore natural resources and services that were lost as a result of the release of hazardous substances into the Saginaw River and Bay watershed. Resources injured as a result of the release of hazardous substances may, in some cases, recover with passage of time, but the No Action Alternative would provide no relief for the losses incurred during the period of recovery. In the case of contaminants that persist in the environment, such as in this case, natural recovery may be prolonged. The No Action Alternative would not provide compensatory restoration for the interim losses to which the public is entitled under the law. Furthermore, there is no guarantee that natural recovery would return the injured natural resources to baseline condition. The No-Action Alternative would provide the most uncertain outcome regarding the future condition of injured resources and would leave the public uncompensated for interim losses. Accordingly, the Trustees determined that the No-Action / Natural Recovery Alternative would not serve the purpose and need discussed in Section 1.4, and therefore was not selected by the trustees as their preferred alternative.

4.3 Alternatives Considered But Not Analyzed Further

Not all project proposals met the eligibility requirements for NRDAR program funding or they ranked lower than projects included in the Trustees' Preferred Alternative. The Threshold Acceptance Criteria (Table 2-1) are intended to provide the benchmarks with which to determine eligibility of projects related to the requirement to restore, replace, or acquire the equivalent of injured natural resources or services injured by the release of contaminants. Projects considered to be ineligible for funding included those without clear or direct benefit to resources that would have been injured as a release of contaminants into the Saginaw Bay watershed, projects for which the feasibility was questionable or uncertain, projects likely to be funded or already the responsibility of another entity, or projects that were required to be implemented by law or permit such as those required as mitigation for an action. For example, one project involving a dam removal on the West Branch of the Tittabawassee River was removed from consideration when sufficient funding was secured from other sources.

Some projects that are not included in the Trustees Preferred Alternative but included elements similar to the projects within the Preferred Alternative, ranked in the lower tier of projects submitted relative to the criteria listed in Section 2.2.3. These projects were considered by the Trustees to lack sufficient resource benefit related to injured resources to include within the Trustees' Preferred Alternative. In the event that the Trustees consider additional projects in future rounds of funding, these projects may be revised and resubmitted and then would be reconsidered by the Trustees. If a future round of funding is announced, project proponents are encouraged to discuss their project with the Trustees, update the information for the project in

the Restoration Portal as needed, and consider modifying the project to better meet the objectives described in the NRDAR evaluation criteria.

Projects that ranked significantly lower than projects included in the Trustees' Preferred Alternative included projects that benefited only a single natural resource or natural resources service, projects for which the technical feasibility was uncertain or the cost to benefit ratios were considered to be prohibitively high, and projects for which the benefits to injured natural resources were uncertain or unclear. The following sections describe projects that tended to rank lower than the projects included in the Trustees' Preferred Alternative.

4.3.1 Projects Considered to be Ineligible for Funding

4.3.1.1 Restocking the Saginaw River

This proposal advocated for the restocking of baitfish species in the Saginaw River for the purpose of mitigating the impact of piscivorous birds, to support populations of piscivorous birds such as the bald eagle, and to bolster populations of sportfish in the Saginaw River.

The Trustees consulted a biologist in the Fisheries Division of the MDNR who indicated that they conduct regular assessments of fish populations in the Saginaw River watershed and at the present time supplementation of baitfish populations is not warranted by the data and would not be supported by the MDNR. The MDNR indicated that if a future need to supplement populations were identified, departmental funding may be available to meet this need.

4.3.1.2 Wallace Drive Culvert Replacement

The Wallace Drive Culvert provides access by vehicles and machinery to the interior diked area of the newly developed Thomas Township Nature Preserve. The project proponents proposed to replace the existing culvert with a wider box culvert or long span low profile arch structure.

The Trustees reviewed this project and conducted a site visit on May 2, 2022. The Trustees determined that replacing the culvert was unlikely to provide substantive ecological benefit. Fish have access to and from the Tittabawassee River on either side of the existing culvert, and the culvert elevation and size appear adequate for fish movement through it under most conditions. Given the lack of benefits to natural resources, the Trustees determined that the project was ineligible for funding using NRDAR restoration funding.

4.3.1.3 Mollusk Surveys in the Saginaw Bay Watershed

The Trustees received multiple proposals to conduct research projects related to the distribution of mollusks in Saginaw Bay watershed tributaries:

- Comprehensive Mussel (Native and Invasive) Survey to Inform Restoration;
- Lower Trophic Level Evaluation of the Tittabawassee and Saginaw River Watersheds Based on Historical Land Use and Contamination;

- Snails of the Influenced Areas of the Tittabawassee and Saginaw River Watersheds; and
- Snuffbox Tobacco River Assessment.

These proposals uniformly advocated for conducting baseline mollusk surveys in the Saginaw Bay watershed where restoration actions may occur.

The Trustees concur that mollusks, and in particular Unionid mussels, are among the State's most threatened faunal resources, and that these sorts of surveys have substantial value in characterizing the condition of resources throughout the State. The use of restoration funding is, however, intended to produce outcomes that lead to measurable improvement in the condition of resources affected by the release of hazardous substances. Because these proposals were predominately research related and without a component to improve the condition of these resources, the Trustees determined that these proposals did not meet the NRDAR eligibility criteria for funding.

4.3.1.4 Middlegrounds Green Space Restoration and Riverfront Trail

This project pre-proposal identified the Middleground Island area in Bay City as a site for contaminant remediation, removal of non-native and invasive plants, and installation of amenities such as trails and benches. The value of the area in terms of recreational amenities has received the attention of local conservation organizations such as the Saginaw Basin Land Conservancy. A trail system, The Michigan Sugar Trails, was completed on the island in 2021. In addition, The Trustees consulted Bay City officials to learn that the city has already begun to develop similar plans to improve the Middlegrounds Green Space area.

Given these other efforts, and that the landowner of this property (Bay City) has already begun to make plans to improve the property, the Trustees determined that this proposal would be ineligible for funding from the Trustee Councils.

4.3.2 Projects Not Considered Due to Ranking

4.3.2.1 Thomas Township Nature Preserve Expansion

This project proposed to develop recreational amenities on a 13-acre plot of land that lies to the north of the original 67-acre parcel of the Thomas Township Nature Preserve and across a canal that is connected to the Tittabawassee River. The Township proposed to construct a rustic trail system through the 13 acres, with fishing access on the Tittabawassee River. A constructed footbridge across the canal that separates the two properties would allow visitors to access the additional 13 acres. The Township also proposed managing non-native species and re-establishing native species in this area, and that part of the proposal is now incorporated in the Trustees' Preferred Alternative in combination with other invasive species management work proposed on other areas of the Nature Preserve.

The recreational access features proposed have significant feasibility challenges given the frequency of flooding, costs to build and maintain footbridges in this location, and expected difficulties in designing them in a manner that would allow them to receive the necessary permits. In addition, shoreline fishing access is currently planned on the adjacent 67-acre parcel in a location that will be more accessible for a greater portion of the year. Overall, the recreational aspects of the project did not score highly enough to be included in the Trustees' Preferred Alternative.

4.3.2.2 West Branch Tittabawassee River Dam Removal

The West Branch Tittabawassee River is a high-quality cold-water stream located within the greater Saginaw River Watershed. The proposed project was to remove an obsolete concrete dam located on private property. The dam blocks fish passage, disrupts hydrology, has altered stream channel geometry, and inhibits transport of sediment, wood, and other material through the river system.

The dam removal project and associated river restoration would reconnect 6.1 miles of high-quality headwater river in the Saginaw River Watershed, benefitting trout, freshwater mussels, and other native aquatic organisms. This dam is upstream from other barriers to the Great Lakes and so there are no concerns about invasive sea lamprey passage at this project location. The project would also reduce erosion and sediment inputs into the river channel, which would help protect exposed gravel from inundation by fine sediment.

The Trustees acknowledge that stream passage and connectivity projects like this one are of ecological value. This project, though within the Saginaw watershed, is well-removed from areas impacted by the release of hazardous substances related to either of the two settlements in the watershed. The Trustees also consulted the MDNR regarding this project and learned that sufficient funding from other sources has been obtained for this project, so the Trustees removed this project from further consideration.

4.3.2.3 Near Shore Habitat Restoration in Saginaw Bay – Preparatory Remediation Work Near Kawkawlin River

The proposed project included near-shore actions in Saginaw Bay, with the thought that these actions would facilitate the subsequent development of reef and marsh habitat in proximity to the mouth of the Kawkawlin River. The focus of this proposal was to complete the preparatory work necessary to eventually implement the habitat improvements of this project. Specifically, this NRDAR funding request was to remove sediment from the mouth of the Kawkawlin River and to remove abandoned bridge pilings that tend to accumulate floating debris and may serve as an impediment to safe navigation in the main channel of the river. The US Army Corps of Engineers – Detroit District conditionally committed 50% of the funds necessary for the preparatory work required to fully realize this component of the overall habitat project. The funding request to the Trustees was made to secure the remaining funds necessary for completion of the preparatory work and sediment removal.

Based on the available information, the Trustees could not adequately evaluate the feasibility and benefits of the project, in particular, the likelihood that sedimentation in the

river channel may require subsequent, repeated dredging of material. In addition, this request featured removal of infrastructure (bridge pilings), though likely a hazard to navigation, were not likely to provide notable ecological improvement with removal. Consequently, this project did not rank highly enough for inclusion within the Trustees' Preferred Alternative.

4.3.2.4 Dice Road Park and Trail

Thomas Township owns a small property along the Tittabawassee River at the intersection of Dice and River Roads and proposed to the Trustees to develop this 0.762-acre area into a park where visitors could enjoy the views along the riverbank, fish, and eventually walk along a trail that would connect to the proposed Great Lakes Bay Regional Trail System. The proposed work at the park was to include an overlook deck that could be used for fishing and observation, interpretive signage, picnic tables, and a small parking area. The proposed work also included invasive species removal and native plantings for pollinators.

Given the location of the proposed facility, traffic patterns, height of the riverbank, small area of ecological restoration for native species, and likely maintenance costs, the Trustees had concerns regarding the feasibility and cost relative to the likely benefits of the project. Consequently, the proposed project did not rank sufficiently high enough to be considered for funding in the Trustees' Preferred Alternative.

5.0. ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

Federal Trustees, in this case the BIA and the USFWS representing the Department of the Interior, are responsible under the National Environmental Policy Act of 1969 for conducting an analysis of the potential environmental impacts of a proposed federal action. An essential component of this process is the requirement for public involvement in the review of the Draft Supplemental Restoration Plan and analysis. This Draft Supplemental Restoration Plan is intended to provide the public and stakeholders the opportunity to provide review and comment to the Trustees regarding their Preferred Alternative. The Trustees intend to incorporate and report the results of public review in their Final Supplemental Restoration Plan.

There is effectively only one ‘Action Alternative’ considered in this Supplemental Restoration Plan and Environmental Assessment, which is the Trustees’ Preferred Alternative for Restoration. Notably, however, as discussed, in formulating this Action Alternative, the Trustees considered and evaluated a number of different project proposals and coordinated with a variety of stakeholders and project proponents to develop and refine the project proposals that now comprise the Preferred (or Action) Alternative described in this Plan. This Action Alternative is compared to the No Action Alternative. In developing this Environmental Assessment, the federal Trustees adhered to the procedural requirements of the NEPA and the CEQ regulations for implementing the NEPA (40 CFR §§ 1500-1508).²⁴

The following definitions will be used to characterize the nature of the various impacts evaluated within this Supplemental Restoration Plan:

Effects or Impacts. These terms, used synonymously, refer to changes to the human environment that are reasonably foreseeable and have a reasonably close causal relationship to a proposed action or alternative. Impacts are assumed to be within the federal agency’s statutory authority to prevent.

Reasonably foreseeable. This refers to impacts that occur at the same time and place as the proposed action but may include effects that occur later in time or are farther removed in distance from the action.

Reasonably close causal relationship. This refers to impacts that can be readily anticipated to result from the action but are generally not considered if they are “remote in time, geographically remote, or the product of a lengthy causal chain.”

Short-term and long-term impacts. The characteristics of impacts are determined on a case-by-case basis and do not refer to any rigid time period. In general, short-term impacts are those that would occur generally during the time required for initial implementation of a particular action or alternative. Long-term impacts are those that are more likely to be persistent or

²⁴ As stated above, since the Trustees received and evaluated project proposals, and began drafting project descriptions and analyses to be included in this Draft Supplemental Restoration Plan and Environmental Assessment prior to the May 20, 2022 effective date of CEQ’s final rule (87 FR 23453), the NEPA analysis contained herein was conducted in accordance with the NEPA regulations in place prior to May 20, 2022.

durable over substantial periods of time. These impacts, whether direct or indirect, would be those that typically occur on the scale of the project.

Minor, moderate, or major impacts. These relative terms are used to characterize the magnitude of an impact. Minor impacts are generally those that might be perceptible but, in their context, are not amenable to measurement. Moderate impacts are those that are more perceptible and, typically, more amenable to quantification or measurement. Major impacts are those that, due to their intensity (severity), have the potential to meet the thresholds for significance set forth in CEQ regulations (40 CFR § 1508.27), warranting greater attention for potential means for mitigation to fulfill the requirements of NEPA.

Adverse or beneficial impacts. An adverse impact is one having unfavorable or undesirable outcomes on the environment. A beneficial impact is one having positive outcomes on the environment. A single act might result in adverse impacts to one environmental resource and beneficial impacts to another resource. Similarly, an action may have temporary short-term adverse impacts, but long-term beneficial impacts to the human or natural environment.

Cumulative effect or impact. Cumulative effects are considered to be impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7). By definition, an action that is beneficial does not contribute adverse cumulative impact to the human environment. Cumulative impacts, beneficial or adverse, are evaluated at the scale of the affected environment, in this case the Saginaw Bay watershed.

The NEPA provides federal agencies with 10 benchmarks to be used in evaluating the significance of a federally funded or proposed action (40 CFR § 1508.27):

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if on balance the effect will be beneficial.
2. The degree to which the proposed action affects public health or safety.
3. Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.
4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.
5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.
6. The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.
8. The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.
9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.

10. Whether the action may result in a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

Within the Draft Supplemental Restoration Plan, the various resources or values that may be affected within the action area, such as riparian habitat, endangered species, or issues related to environmental justice, are evaluated as elements of the first NEPA significance criteria. The analysis considers impacts of the Trustees Preferred Alternative and the No Action Alternative. Impacts to listed species and consideration of cultural resources are summarized in separate sections. Cumulative impacts are addressed, and the chapter concludes with a summary that contrasts the Trustees' Preferred Alternative and the No Action Alternative.

5.1 Impacts of the Trustees' Preferred Alternative

For the purpose of this analysis, similar projects that comprise the Trustees' Preferred Alternative are grouped and analyzed collectively. Referring back to Table 4-1, the restoration projects are grouped by their respective restoration category: two projects fall within the category of *acquisition or easement*, four projects fall within the category of *riparian or wetland habitat restoration*, two projects address *coastal habitat restoration*, one project focuses on conservation of *species of special concern*, and one additional project that remains under consideration by the Trustees (Smith's Crossing Pedestrian Bridge, Section 4.1.10) is focused on *natural resource based recreation*.

Generally, the types of impacts that the Trustees anticipate across restoration projects within any particular category are similar to each other. For example, the projects within coastal habitats included in the Preferred Alternative would use similar techniques to treat non-native and invasive species and would be managed for similar objectives and values. Where one or more projects within a category would result in unique impacts, these impacts are identified and discussed with respect to the specific project.

The NEPA Significance Criteria are used to guide the evaluation of the impacts of the projects within the Preferred Alternative. Particular environmental resources, as well as cultural and social resources or values, that may be affected by the proposed action are analyzed as components of the first NEPA criteria. Impacts are scored on a scale that varies between -3 and +3. Adverse impacts are scored reflecting major adverse impact (-3), moderate impact (-2), and minor impact (-1). Beneficial impacts are similarly scored on a scale that varies between +1 and +3, reflecting minor beneficial impact (1), moderate beneficial impact (2), and major beneficial impact (3). No impact is scored as zero (0). Resources of import within the Saginaw Bay watershed are scored individually within the first category. The other nine criteria are similarly scored using these scales that reflect major, moderate, minor, or no impact. This scaled approach is used to evaluate short-term impacts, long-term impacts, and cumulative impact within each of the project categories.

Cumulative impact, as defined by the NEPA, evaluates the impact that any particular project category adds to similar impacts within the environment under consideration, which in this case consists of the lands and resources encompassed by the Saginaw Bay watershed. Consistent with this definition, cumulative impacts are scored on a scale that varies between -3 and +3 that reflects major adverse impact (-3), moderate adverse impact (-2), minor adverse impact (-1), no impact (0), minor beneficial impact (+1), moderate beneficial impact (+2), or major beneficial impact (+3).

A proposed action that does not produce significant short-term, long-term, or cumulative adverse impact results in a Finding of No Significant Impact. Typically, the Administrative Official for the federal agency responsible for the analysis subsequently issues a letter of concurrence, the Finding of No Significant Impact is issued, and no further analysis is necessary prior to implementation of the proposed action.

5.1.1 Land and Easement Acquisition

The Trustee Councils have proposed to fund two projects that include either land or easement acquisition. These two projects are the Crow Island State Game Area – Maxwell Land Trust Acquisition (Section 4.1.1) and the Tittabawassee River Floodplain Protection and Restoration Project (Section 4.1.8). The action under consideration is the funding for the acquisition of title or easement for the properties.

The [Crow Island State Game Area](#) lies within both Bay and Saginaw Counties; portions of the State Game Area occur both to the east and west of the Saginaw River, primarily within Zilwaukee Township. The parcel lies to the west of, and is bordered by, the Bay-Zil Rail Trail, a leg of the statewide Iron Belle Trail system. The 360-acre parcel lies within the Michigan Wildlife Action Plan's Great Lakes Marsh and Inland Emergent Wetlands priority area within the approved acquisition boundary for the Crow Island State Game Area.

The Tittabawassee River Floodplain Protection and Restoration Project would protect two private parcels within the Tittabawassee River floodplain by permanent conservation easement. Both properties lie within the acquisition boundary of the Shiawassee NWR in the vicinity of Shields, Michigan. Ducks Unlimited would hold permanent conservation easements and oversee stewardship of the properties that encompass 310 acres.

Because the action under consideration in this section is the acquisition of title or easement of these lands, the Trustees do not foresee notable short term beneficial impacts other than protection of ecologically important areas (Table 5-1, Criteria 1-3). Long-term, it is reasonably foreseeable that the conservation value of these lands will increase over time. In particular, the Maxwell Land Trust acquisition would be expected, under State ownership, to result in a land type conversion from row-crop agriculture, maintained by pumping and drainage, to a floodplain wetland habitat type. This would result in greater flood storage capacity in the watershed, filtration of surface runoff, reduction of agricultural inputs to the watershed in the immediate proximity to the Saginaw River, and significant benefit to species that utilize these habitats and the resources within these habitats (e.g., water, sediment, invertebrates, wildlife). This property borders the Bay-Zil Rail Trail and would provide natural resource based recreational value to users of the trail as well as to users of

the property. The Tittabawassee River Floodplain Protection and Restoration Project would provide similar habitat benefits, protecting a substantial block of riparian floodplain forest in proximity to portions of the Shiawassee NWR along the Tittabawassee River from development or conversion back to agricultural use.

Short-term, property tax values on these conservation lands may decline depending on current tax status. However, for state-owned conservations properties, the State of Michigan makes payments in-lieu of taxes that return revenues to counties to compensate for the loss of property tax revenues. It is also reasonably foreseeable that visitation to the Crow Island State Game Area would provide additional local economic benefit.

Table 5-1. Summary of adverse and beneficial impacts for the project category of Land Acquisition and Conservation Easements. Impact is defined as adverse (-) or beneficial and scaled as major (-3,3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.

Criteria	NEPA Significance Criteria - Land and Easement Acquisition	Short Term Impact	Long Term Impact	Cumulative Impact
1	Beneficial and adverse impacts. A significant effect may exist even if on balance the effect will be beneficial.			
	Water Resources & Water Quality	0	2	2
	Geologic Resources & Sediment Quality	0	1	1
	Air Quality	0	0	0
	Biologic Resources - Fish	0	1	1
	Biologic Resources - Aquatic Invertebrates	0	1	1
	Biologic Resources - Wildlife	0	2	2
	Biologic Resources - Federally Listed Species	0	1	1
	Biologic Resources - Vegetation / Habitat	0	2	1
	Recreation & Land Use	0	2	1
	Socioeconomic Considerations	0	1	1
	Environmental Justice	0	1	1
	Climate Resiliency	0	1	1
2	The degree to which the proposed action affects public health or safety.	0	2	1
3	Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.	1	2	2
4	The degree to which the effects on the quality of the human environment are likely to be highly controversial.	-1	0	0
5	The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.	0	0	0
6	The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.	0	0	0
7	Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.	0	0	0
8	The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.	0	0	0
9	The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.	0	0	0
10	Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	0	0	0

-3	Major Adverse Impact	-2	Moderate Adverse Impact	-1	Minor Adverse Impact	1	Minor Beneficial Impact	2	Moderate Beneficial Impact	3	Major Beneficial Impact
----	----------------------	----	-------------------------	----	----------------------	---	-------------------------	---	----------------------------	---	-------------------------

5.1.2 Riparian and Wetland Habitat Restoration

The Trustee Councils have proposed to fund five projects that fall within the category of Riparian and Wetland Habitat Restoration. The five projects are the South Riverfront Restoration, Midland, Michigan (Section 4.1.2), the Saginaw River Headwaters Rec Area – Restoration and Recreational Access Project (Section 4.1.4), the Thomas Township Invasive Species Treatment & Tittabawassee River Bank Stabilization Feasibility Study (Section 4.1.5), the Chippewa Nature Center – Habitat Restoration and Maintenance Project (Section 4.1.7), and a portion of the Tittabawassee River Floodplain Protection and Restoration Project (Section 4.1.8). The Trustees have proposed to fund these projects which would implement restoration actions in riparian and wetland habitats in the Saginaw Bay watershed.

The Saginaw River Headwaters Rec Area is located in the southern area of the City of Saginaw, bordered by the Saginaw River to the east, within the footprint of the former General Motors Malleable Iron Plant. Thomas Township is proposing restoration actions within the Thomas Township Nature Preserve property located to the north of Gratiot Rd along the west bank of the Tittabawassee River. The Chippewa Nature Center has requested a capacity grant for equipment to improve their ability to perform restoration work throughout the watershed. The South Riverfront Restoration, Midland, MI is a 37-acre restoration planned in an area along the west bank of the Tittabawassee River directly across from downtown Midland in the vicinity of the Poseyville Bridge. The Tittabawassee River Floodplain Protection and Restoration Project includes restoration of wetlands in the floodplain of the Tittabawassee River in Shields, Michigan.

The Trustees anticipate that all of these projects would involve the treatment of non-native and invasive species which would likely include the use of herbicides, the use of mechanical treatments such as mowing or the use of hand tools, and the use of prescribed fire. Similarly, riparian and wetland restoration projects would include the seeding or planting of native herbaceous species, shrubs, and trees appropriate to wetland and riparian habitats. With respect to climate change, re-establishment of diverse native plant communities would contribute to ecological resilience within the watershed.

The South Riverfront Restoration Project would result in the creation of wetland habitats that would require earth-moving, the construction of levees, trails, and access for future maintenance, and the planting of annuals to stabilize soils following construction. The Tittabawassee River Floodplain Protection and Restoration Project would involve some earth-moving and potential installation of water control structures in the floodplain. These projects would also involve the planting of native species and future control of invasive species to maintain ecological condition. In addition to re-establishing wetland habitats and supporting wetland-associated species, the construction of wetlands would provide additional flood storage in the watershed.

Both the Saginaw River Headwaters Rec Area Project and the Thomas Township Nature Preserve Project (pending results of the proposed feasibility study) may involve riparian bank stabilization. Bank stabilization techniques using native stone and plant materials are often referred to as ‘bio-engineering’ or ‘soft-engineering.’ Within large river systems such

as the Tittabawassee or Saginaw rivers, this approach to bank stabilization may include techniques such as placement of vegetated erosion control mats or blankets; installation of fabricated bio-logs on banks, contours, or slopes; planting of live stakes to revegetate slopes; planting of live ‘fascines’ which are bundles of stems planted within a trench; installation of brush mattresses; anchored tree revetments at the toe of bank slopes; installation of root wads anchored within bank slopes; the construction of crib walls of woody material; riprap with live stakes or the construction of gabions with live stakes; the placement of rock veins with live plantings that extend out into the stream bed; soft armored walls that include live stakes or planting; and, among other techniques, the terracing of slopes using various bio-engineered techniques. A manual of these techniques, and the circumstances that make one technique more advantageous than another depending on parameters such as bank slope and flow volume, is available from the [Mississippi Watershed Management Organization](#) (MWMO 2010). Prior to the use of any of these techniques, suitability would be reviewed and proposed implementation communicated to the Trustees within project workplans.

Of these projects, the South Riverfront Restoration, Midland, MI (Section 4.1.2) is a former industrial area characterized by hardened surfaces and the absence of natural features. Construction activities would include the excavation of asphalt and concrete surfaces, re-contouring of soils to create wetland features, construction of trails, and re-planting of native vegetation to establish wetland and riparian habitats. Treatment of non-native and invasive species with herbicides or by mechanical means, such as mowing, would likely occur during implementation and subsequent maintenance of the project.

The Trustees anticipate minor, short-term, adverse impacts associated with soil erosion resulting from activities related to bank stabilization may occur (Table 5-2, Criteria 1). The Trustees believe that the implementation of best management practices required as elements of the state and local permitting process (such as the use of silt-fencing) are likely to minimize these adverse impacts. Long-term, the Trustees suggest that these projects will provide substantial benefit to multiple resources associated with functional riparian and wetland areas (Table 5-2, Criteria 1-3).

The use of herbicides in these cases would likely consist of application by backpack or ATV-mounted spray units. Because application may occur in the vicinity of wetland or riparian areas, only herbicides labeled for use under these circumstances would be used and best management practices would be used to minimize drift of herbicides. The Trustees anticipate that there will be temporary habitat loss with the transition from non-native species to more diverse native plant communities. Some non-target plant species within areas impacted by non-natives may be lost. Timing of herbicide use would be designed to maximize the efficacy of herbicide use with respect to the targeted invasive. Given the body of experience using these techniques within the proponent agencies, and the commitment to use best management practices, the Trustees anticipate that environmental impacts related to herbicide use would be minor and that impacts would be short-term. The use of herbicides would likely result in establishment of native plant communities with greater capacity to support native wildlife and pollinators, including the monarch butterfly, and provide a more visually appealing landscape for visitors to these project areas.

Table 5-2. Summary of adverse and beneficial impacts for the project category of Riparian and Wetland Habitat Restoration. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.

Criteria	NEPA Significance Criteria - Riparian and Wetland Restoration	Short Term Impact	Long Term Impact	Cumulative Impact
1	Impacts that may be both beneficial and adverse. A significant effect may exist even if on balance the effect will be beneficial.			
	Water Resources & Water Quality	0	1	1
	Geologic Resources & Sediment Quality	-1	1	1
	Air Quality	0	0	0
	Biologic Resources - Fish	0	1	1
	Biologic Resources - Aquatic Invertebrates	0	1	1
	Biologic Resources - Wildlife	0	2	1
	Biologic Resources - Federally Listed Species	0	1	1
	Biologic Resources - Vegetation / Habitat	0	2	1
	Recreation & Land Use	0	2	2
	Socioeconomic Considerations	1	2	1
	Environmental Justice	0	1	1
	Climate Resiliency	0	1	1
2	The degree to which the proposed action affects public health or safety.	0	1	1
3	Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.	0	2	2
4	The degree to which the effects on the quality of the human environment are likely to be highly controversial.	0	0	0
5	The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.	0	0	0
6	The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.	0	0	0
7	Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.	0	0	0
8	The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.	0	0	0
9	The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.	0	0	0
10	Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	0	0	0

-3	Major Adverse Impact	-2	Moderate Adverse Impact	-1	Minor Adverse Impact	1	Minor Beneficial Impact	2	Moderate Beneficial Impact	3	Major Beneficial Impact
----	----------------------	----	-------------------------	----	----------------------	---	-------------------------	---	----------------------------	---	-------------------------

5.1.3 Coastal Wetland Habitat Restoration

The Trustees have proposed to fund two projects that fall within the category of Coastal Habitat Restoration. The two projects are the Saginaw Bay Coastal Wildlands Project (Section 4.1.3) and the Bay City State Park - Habitat Restoration and Maintenance Project (Section 4.1.6). The Trustees have proposed to fund these projects which would implement restoration actions in Great Lakes Coastal Wetland habitats in the Saginaw Bay watershed.

The goal of the Coastal Wildlands Project is to provide readily accessible, high-quality natural areas that conserve coastal habitats while delivering recreational, ecological, and cultural value to area communities. This project would include comprehensive invasive species control and planting of native species in restoration areas. Recreational trail access would be constructed and maintained across the properties. These actions would likely involve tree felling; trail construction and maintenance by mowing; mechanical treatments to treat invasive species, herbicide use, and application of prescribed fire; and, installation of interpretive and cultural signage. A management plan would be developed to describe maintenance of the properties over the course of 10 years.

Similarly, the Bay City State Park - Habitat Restoration and Maintenance Project would focus on treatment of non-native and invasive species within the Bay City State Park which includes the Tobico Marsh. This project would be led by the Arenac Conservation District, a cooperator in the state's Cooperative Invasive Species Management Areas initiative ([CISMA](#)). Effort would focus on invasive species such as *Phragmites* and woody invasive species such as common buckthorn in bottomland forests. Treatments would include the use of herbicides, mechanical treatments, and the use of prescribed fire.

The Trustees anticipate minor, short-term, adverse impacts affecting air quality associated with the occasional use of prescribed fire to treat non-native and invasive species such as *Phragmites* or autumn olive (Table 5-3, Criteria 1). The use of prescribed fire on state properties requires the approval of a prescribed fire plan that identifies atmospheric conditions suitable for adequate smoke dispersal to minimize impacts to neighboring communities. As described above, the use of herbicides may result in temporary loss of habitats as project areas transition to more suitable and more visually appealing native habitats. Because climate change is likely to affect coastal ecosystems with fluctuation in water levels and changes in the patterns of ice cover, the establishment of native plant communities may provide some resilience to coastal habitats in the Great Lakes.

The body of experience that the proponents bring to the projects provides substantial certainty regarding both the prudent use of herbicides and prescribed fire. Because of the unique values of these habitats, the Trustees anticipate that these projects will provide substantial benefit to the resources associated with coastal habitats (Table 5-3, Criteria 1-3).

Table 5-3. Summary of adverse and beneficial impacts for the project category of Coastal Wetland Habitat Restoration. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.

Criteria	NEPA Significance Criteria - Coastal Habitat Restoration	Short Term Impact	Long Term Impact	Cumulative Impact
1	Impacts that may be both beneficial and adverse. A significant effect may exist even if on balance the effect will be beneficial.			
	Water Resources & Water Quality	0	1	1
	Geologic Resources & Sediment Quality	0	0	0
	Air Quality	-1	0	0
	Biologic Resources - Fish	0	2	1
	Biologic Resources - Aquatic Invertebrates	0	2	1
	Biologic Resources - Wildlife	0	2	1
	Biologic Resources - Federally Listed Species	0	1	1
	Biologic Resources - Vegetation / Habitat	0	2	1
	Recreation & Land Use	0	2	2
	Socioeconomic Considerations	1	2	1
	Environmental Justice	1	2	2
	Climate Resiliency	0	2	1
2	The degree to which the proposed action affects public health or safety.	0	2	1
3	Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.	0	2	2
4	The degree to which the effects on the quality of the human environment are likely to be highly controversial.	0	0	0
5	The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.	0	0	0
6	The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.	0	0	0
7	Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.	0	0	0
8	The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.	0	0	0
9	The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.	0	0	0
10	Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	0	0	0

-3	Major Adverse Impact	-2	Moderate Adverse Impact	-1	Minor Adverse Impact	1	Minor Beneficial Impact	2	Moderate Beneficial Impact	3	Major Beneficial Impact
----	----------------------	----	-------------------------	----	----------------------	---	-------------------------	---	----------------------------	---	-------------------------

5.1.4 Species of Special Concern

The Saginaw Bay Sturgeon – Support, Monitoring, and Restoration Project (Section 4.1.9) would support on-going efforts to restore lake sturgeon. The proposal includes financial support for the Black Lake Fish Hatchery, Cheboygan County, Michigan, operated by the MDNR and Michigan State University. The proposal would also expand monitoring efforts in Saginaw Bay by contributing to the Great Lakes Acoustic Telemetry Observation System ([GLATOS](#)). This system consists of an array of telemetry receivers placed on the bottom of Great Lakes waters to track the movement of fish that have been outfitted with transmitters. Adding to this system would improve the capacity of fisheries biologists to track movement of sturgeon with the goal of identifying habitat use and features that may be key to enhancing the effort to recover this species. This proposal would provide support to maintain an already substantial public outreach program to strengthen awareness of lake sturgeon restoration.

The project proponent for the Saginaw Bay Sturgeon – Support, Monitoring, and Restoration Project is The Conservation Fund in partnership with the Saginaw Bay Watershed Initiative Network. The sturgeon recovery program is an on-going effort that has already demonstrated the ability to successfully rear and transplant juvenile sturgeon into Saginaw Bay waters. Recently, fish from these efforts have been recaptured demonstrating the utility of the program.

Financial support is likely to provide immediate benefit in terms of program solvency and the ability to expand monitoring of program effort (Table 5-4, Criteria 1 and 3). The proposed project is largely administrative in nature in that the proposal is to financially support existing programs contributing to the recovery of the lake sturgeon. Given that the lake sturgeon is native to the Saginaw Bay watershed and unlikely to displace other native species, increased financial support for the rearing of lake sturgeon would be unlikely to result in adverse impact. Similarly, support for the placement of acoustic receivers on the bed of Lake Huron would result in negligible disturbance of the lakebed. Consequently, the Trustees anticipate no adverse impacts related to providing the proposed financial support for this program.

The Trustees' support of this program would also provide cultural and recreational benefits given the importance of lake sturgeon to Tribal Nations in the Great Lakes area and the popularity of the very limited recreational fishing seasons and locations for this species.

The Trustees believe that with the continued refinement and expansion of the program that the restoration effort would provide significant long-term benefit to the lake sturgeon (Table 5-4, Criteria 1 and 3) and contribute to achieving sustainability of this species in the Saginaw Bay watershed.

Table 5-4. Summary of adverse and beneficial impacts for the project category of Species of Special Concern. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.

Criteria	NEPA Significance Criteria - Species of Special Concern	Short Term Impact	Long Term Impact	Cumulative Impact
1	Impacts that may be both beneficial and adverse. A significant effect may exist even if on balance the effect will be beneficial.			
	Water Resources & Water Quality	0	0	0
	Geologic Resources & Sediment Quality	0	0	0
	Air Quality	0	0	0
	Biologic Resources - Fish	2	2	2
	Biologic Resources - Aquatic Invertebrates	0	0	0
	Biologic Resources - Wildlife	0	0	0
	Biologic Resources - Federally Listed Species	0	0	0
	Biologic Resources - Vegetation / Habitat	0	0	0
	Recreation & Land Use	0	0	0
	Socioeconomic Considerations	1	1	1
	Environmental Justice	1	2	2
	Climate Resiliency	0	0	0
2	The degree to which the proposed action affects public health or safety.	0	0	0
3	Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.	1	2	2
4	The degree to which the effects on the quality of the human environment are likely to be highly controversial.	0	0	0
5	The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.	0	0	0
6	The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.	0	0	0
7	Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.	0	0	0
8	The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.	0	0	0
9	The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.	0	0	0
10	Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	0	0	0

-3	Major Adverse Impact	-2	Moderate Adverse Impact	-1	Minor Adverse Impact	1	Minor Beneficial Impact	2	Moderate Beneficial Impact	3	Major Beneficial Impact
----	----------------------	----	-------------------------	----	----------------------	---	-------------------------	---	----------------------------	---	-------------------------

5.1.5 Natural Resource Based Recreation

Two projects considered for funding incorporate features that are designed to provide recreational fishing access to the public. The Saginaw River Headwaters Rec Area Project (Section 4.1.4) would provide an Americans with Disabilities Act (ADA) accessible fishing pier immediately south of the Center Street Bridge in south Saginaw. Pending additional information regarding project feasibility, project proponents for the Smith's Crossing Bridge Project (Section 4.1.10) have proposed to enhance the rehabilitation of the Smith's Crossing Pedestrian Bridge by adding a fishing pier on the Tittabawassee River within approximately two miles of the urban Midland area.

The Saginaw County Parks and Recreation Commission serves as the project proponent for the Saginaw Rivers Headwaters Rec Area Project. The project area consists of an abandoned industrial site, or brownfield area, formerly known as the General Motors Malleable Iron facility. The Commission has taken on management of the facility with the goal of developing the site for recreational and ecological values. Recent management includes the construction of an entrance and parking lot, an accessible trail system, and a pilot project to control *Phragmites* on the site. The Rec Area encompasses one mile of Saginaw River frontage. The newly constructed parking lot and trail system would provide access to the river within ¼ mile of the parking lot. Given these considerations, the Commission has proposed to construct an ADA accessible fishing pier at the site.

The [Great Lakes Regional Trail](#) organization serves as the project proponent for the Smith's Crossing proposal, in partnership with the Saginaw Bay Watershed Initiative Network, Midland Area Community Foundation, and the Midland County Road Commission. The proponents have requested funding for the construction of a fishing pier. The larger project also includes the restoration of the bridge and connection to the Great Lakes Bay Regional Trail. This fishing access would be the only public access pier from the Dow Dam in Midland to Festival Park in Freeland, a distance of approximately nine river miles.

Given the propensity for seasonal flooding that occurs within the watershed, the Trustees believe that this will require hardened structures in both cases that would be anchored within the riverbed or riverbank immediately adjacent to the river. Additional construction of trails or walkways would be minimal and likely to consist of constructed connection to existing trails or walkways. State and local permitting processes will require the proponents to implement best management practices to reduce erosion and sedimentation associated with construction of the fishing pier. The Trustees anticipate that some erosion or movement of sediment may occur during construction. Given the relatively small scales of these projects and the certainty that best management practices would be implemented, the Trustees believe that these adverse impacts are likely to be minor (Table 5-5, Criteria 1). It is unlikely that construction of additional access to existing walkways would result in any additional impact to soils or wildlife habitats as these project areas both consist of sites where soils have been substantially disturbed with the historic construction of infrastructure.

There is some probability that freshwater mussels may occur at these sites. These resources are addressed below in Section 5.3.

Table 5-5. Summary of adverse and beneficial impacts for the project category of Natural Resource Based Recreation. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.

Criteria	NEPA Significance Criteria - Natural Resource Based Recreation	Short Term Impact	Long Term Impact	Cumulative Impact
1	Impacts that may be both beneficial and adverse. A significant effect may exist even if on balance the effect will be beneficial.			
	Water Resources & Water Quality	0	0	0
	Geologic Resources & Sediment Quality	-1	0	0
	Air Quality	0	0	0
	Biologic Resources - Fish	0	0	0
	Biologic Resources - Aquatic Invertebrates	0	0	0
	Biologic Resources - Wildlife	0	0	0
	Biologic Resources - Federally Listed Species	0	0	0
	Biologic Resources - Vegetation / Habitat	0	0	0
	Recreation & Land Use	0	2	2
	Socioeconomic Considerations	1	2	2
	Environmental Justice	1	1	1
	Climate Resiliency	0	0	0
2	The degree to which the proposed action affects public health or safety.	0	1	1
3	Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.	0	2	2
4	The degree to which the effects on the quality of the human environment are likely to be highly controversial.	0	0	0
5	The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.	0	0	0
6	The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.	0	0	0
7	Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.	0	0	0
8	The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.	0	0	0
9	The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.	0	0	0
10	Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	0	0	0

-3	Major Adverse Impact	-2	Moderate Adverse Impact	-1	Minor Adverse Impact	1	Minor Beneficial Impact	2	Moderate Beneficial Impact	3	Major Beneficial Impact
----	----------------------	----	-------------------------	----	----------------------	---	-------------------------	---	----------------------------	---	-------------------------

5.2 Impacts of the No-Action Alternative

Substantial natural resource injury occurred as a result of the release of contaminants into the waters of the Tittabawassee and Saginaw rivers. The regulations that govern the NRDAR process direct the Trustee Councils to act in the public interest to restore, replace, or acquire the equivalent of natural resources injured as a result of the release of hazardous substances.

Under the No-Action Alternative, no action would be taken to restore natural resources and their associated services that were lost as a result of the release of hazardous substances into the Tittabawassee and Saginaw rivers, whereas funds were designated for this purpose in the Consent Decree with Dow and the existing restoration plans for both cases, all of which were previously reviewed by the public.

The No-Action Alternative does not meet the purpose and need for restoring injured natural resources or their related ecological or recreational services that have been impacted by the release of environmental contaminants. This is a fundamental consideration required of the Trustee Councils with respect to the NRDAR process.

On-going response actions led by the EPA continue in certain sections of the Tittabawassee River. The natural attenuation of contaminants may also result in reduction in the level of contamination in the Saginaw Bay watershed. It is possible that the condition of particular natural resources may improve over time without intervention in the Saginaw Bay watershed. The No-Action Alternative, however, would not compensate the public for the loss of natural resources or the loss of their associated services during that period of recovery, even though there are funds available for that purpose. Other restoration actions described in the existing restoration plans for both cases would continue to be implemented. In this case, the No Action Alternative would not serve the interests of the public in the Saginaw Bay watershed that use or benefit from natural resources and natural resource-related services such as flood storage, fishing, or wildlife watching.

Moreover, in the absence of restoration effort, it is reasonably foreseeable that the condition of particular resources, such as wetland and coastal habitats, would degrade with the continued impact of non-native and invasive species. Continued dominance by non-native and invasive species, such as *Phragmites*, would have indirect effects such as the displacement of native vegetation, diminished habitat value for waterfowl and wading birds, and diminished value as nursery habitat for native fishes. Non-native species have obvious adverse impacts related to recreational and cultural value of wetland and coastal habitats, which in turn has socioeconomic impacts.

Therefore, in consideration of the above, the Trustees have concluded that the No Action Alternative would be inconsistent with the Trustees' mandate to restore natural resources injured by the release of contaminants into the waters of the Saginaw Bay watershed.

Table 5-6. Summary of adverse and beneficial impacts associate with the implementation of a No Action Alternative. Impact is defined as adverse (-) or beneficial and scaled as major (-3, 3), moderate (-2, 2), or minor (-1, 1). No foreseeable impact is indicated as a zero (0). Impacts are color-shaded and color shade varies with the degree of impact.

Criteria	NEPA Significance Criteria - No Action Alternative	Short Term Impact	Long Term Impact	Cumulative Impact
1	Impacts that may be both beneficial and adverse. A significant effect may exist even if on balance the effect will be beneficial.			
	Water Resources & Water Quality	0	0	0
	Geologic Resources & Sediment Quality	0	0	0
	Air Quality	0	0	0
	Biologic Resources - Fish	0	-1	-1
	Biologic Resources - Aquatic Invertebrates	0	-1	-1
	Biologic Resources - Wildlife	0	-1	-1
	Biologic Resources - Federally Listed Species	0	0	0
	Biologic Resources - Vegetation / Habitat	0	-2	-2
	Recreation & Land Use	0	-2	-1
	Socioeconomic Considerations	0	-1	-1
	Environmental Justice	0	0	0
	Climate Resiliency	0	-1	-1
2	The degree to which the proposed action affects public health or safety.	0	0	0
3	Unique characteristics of the area such as cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.	0	-1	-1
4	The degree to which the effects on the quality of the human environment are likely to be highly controversial.	0	0	0
5	The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.	0	0	0
6	The degree to which the action may set a precedent for future actions with significant effects or represents a decision about a future action.	0	0	0
7	Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.	0	0	0
8	The degree to which the action may adversely affect, cause loss or destruction of significant scientific, cultural, or historical resources.	0	0	0
9	The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical.	0	0	0
10	Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.	0	0	0

-3	Major Adverse Impact	-2	Moderate Adverse Impact	-1	Minor Adverse Impact	1	Minor Beneficial Impact	2	Moderate Beneficial Impact	3	Major Beneficial Impact
----	----------------------	----	-------------------------	----	----------------------	---	-------------------------	---	----------------------------	---	-------------------------

5.3 Consideration of Species Listed Under the Endangered Species Act

Within the Saginaw Bay watershed, species that are designated as federally threatened or endangered, proposed for listing, or candidates for listing under the Endangered Species Act, include two bird species, two species of bats, one species of snake, two species of mussels, one butterfly species, and two species of flowering plants (Section 3.5.6).

Federally Listed Birds. The two listed bird species that may occur within the watershed include the piping plover and the red knot. The red knot is a rare seasonal migrant; the piping plover is known to occur in habitats within the Tawas Point State Park along the Lake Huron shoreline in Iosco County, Michigan. No activities are proposed in proximity to Tawas Point State Park. The red knot uses large areas of exposed sediments as habitat, which, among the sites of the proposed actions, may only occur within the Bay City State Park. Activities proposed here would occur in wetland areas dominated by non-native and invasive species (*Phragmites*) that would be unsuitable for the red knot. Therefore, the Trustees anticipate that with implementation of the Preferred Alternative, no effect would occur to either the piping plover or the red knot. In fact, implementation of the Preferred Alternative, and subsequent maintenance actions, is likely to result in areas of additional suitable habitat becoming available for the red knot within the Bay City State Park, particularly with fluctuation of water levels in Lake Huron.

Federally Listed Bats. Two species of *Myotis* bats, listed under the Endangered Species Act, may occur within the Saginaw Bay watershed. These include the Indiana bat and the northern long-eared bat. Management of these species has largely focused on hibernacula (caves) or maternal roosting habitats. Maternal roosting habitat varies, and may include the use of structures, but maternal roosts may be predominated by the use of large, decadent trees, frequently of the elm, ash, or cottonwood type, within riparian areas with substantial exposure to sunlight. Maternal roosting and foraging habitat may occur within the areas of the following projects within the Preferred Alternative (Table 4-1): Maxwell Trust Land Acquisition, Tittabawassee Floodplain Protection and Restoration, South Riverfront Restoration, Thomas Township Invasive Species management, Saginaw River Headwaters Rec Area, Chippewa Nature Center Saginaw Bay Watershed Restoration, Saginaw Bay Coastal Wildlands, and Bay City State Park. The Trustees anticipate no actions (e.g., tree removal or the use of prescribed fire) that would impact these habitat types. Moreover, to enhance the certainty of retention of these habitat features, the Trustees will communicate to project proponents relevant conservation measures for the identification and management of maternal roosting habitat.

The foraging habits of these two species differs substantially. The Indiana bat takes prey largely by hawking while foraging in proximity to forest edges, with an affinity for riparian corridors. The northern long-eared bat takes prey by both hawking and gleaning while foraging primarily under forest canopies. In both cases, certain of the proposed activities may improve foraging habitats while conserving trees that may provide roosting habits for these species.

In the case of the Saginaw Rivers Headwaters Rec Area, tree planting that emphasizes flowering species would occur along the Tittabawassee River corridor. In the other projects listed above, treatment of non-native understory shrubs such as common buckthorn and shrub honeysuckles may result in diverse native forest understories that support a more diverse insect fauna, improving bat foraging habitat. Consequently, the Trustees anticipate that the Preferred Alternative is likely to benefit the Indiana bat and the northern long-eared bat.

Eastern Massasauga Rattlesnake. Once widely distributed throughout the lower peninsula of Michigan, the eastern massasauga rattlesnake is listed as threatened under the Endangered Species Act. The eastern massasauga also occurs in the southeastern upper peninsula of Michigan within Mackinac County.

This species is uniquely associated with a variety of wetland habitats consisting of open wetlands such as prairie fens in southern Michigan; eastern massasauga in northern Michigan may be associated with open wetlands and lowland cedar swamps. Key habitat features include open early successional areas that provide basking habitat, comparatively high water tables associated with hibernacula, and topographic features that provide varied elevations between lowland and upland habitats. Habitats in Michigan have been modeled and characterized as either occupied (Tier 1) or suitable, but unoccupied (Tier 2).

Of the projects within the Trustees' Preferred Alternative, only the Saginaw Coastal Wildlands Project is likely to harbor suitable habitat for the eastern massasauga. The Saginaw Coastal Wildlands Project consists of multiple parcels of Great Lakes Coastal Wetland habitat that are owned by either the Saginaw Chippewa Indian Tribe of Michigan or the Saginaw Basin Land Conservancy. A number of these properties occur within Arenac County, which is within the historic range of the massasauga: the Saginaw River Delta (Roney property) owned by the Saginaw Chippewa Indian Tribe of Michigan; and the Saginaw, Standish, and Wah Sash Kah nature preserves owned by the Saginaw Basin Land Conservancy. The Pinconning Nature Preserve and portions of the Wah Sash Kah Nature Preserve occur within Bay County, now considered to be outside the range of the eastern massasauga.

The eastern massasauga has not been identified as occurring within any of the properties, despite regular visits by biologists and others who might have observed the species if present (Troy Techlin, Saginaw Chippewa Indian Tribe of Michigan, pers. comm. August 24, 2021; Zachary Branigan, Saginaw Basin Land Conservancy, pers. comm., August 24, 2022). None of the properties have been identified as either Tier 1 or Tier 2 habitat for the eastern massasauga.

Effects to the eastern massasauga, if present, would be likely to consist of disturbance associated with the movement of personnel and equipment across the properties. Given the minimal probability that the eastern massasauga occurs within the project area, adverse effects to the eastern massasauga are considered to be discountable. It may be reasonable to suggest that with the removal of dense woody invasive species, suitable basking habitat in proximity to wetland areas may be created as a result of the proposed action, benefitting the species.

Federally Listed Mussel Species. Two federally listed species of mussels may occur in waters or tributaries to waters in proximity to proposed actions within the Trustees' Preferred Alternative. These include the federally endangered northern riffleshell and the federally endangered snuffbox mussel.

The northern riffleshell is a medium sized sexually dimorphic mussel, light yellow to olive green, associated with riffles and runs of mainstem streams that harbor areas of fine to coarse gravels. Only in Bay County are there historic records of occurrence for the northern riffleshell in proximity to any of the proposed actions that comprise the Trustees' Preferred Alternative. The Saginaw Headwaters Rec Area Project area (Section 4.1.4) occurs adjacent to the Saginaw River, immediately downstream of the Center Street Bridge along the west bank of the river.

The project area lies within the historic range of this species in Bay County. This is a relatively low-gradient section of the Saginaw River that is occasionally affected by seiche events where winds out of the northeast force the waters of Lake Huron upstream to this area of the river. Because of the characteristics of flows in this portion of the river, bottom substrates are predominated by sands and organic sediments that are atypical of the sort of gravel and cobble substrates used by the northern riffleshell.

The snuffbox is also a medium sized mussel, triangular in shape, yellowish with numerous broken green rays, distinguished by a beak with double-looped growth rings. The snuffbox is associated with sand, gravel, or cobble substrates that occur within swift small to medium-sized rivers. The Smith's Crossing Pedestrian Bridge Project (Section 4.1.10) would occur within Midland County along the Tittabawassee River, within the historic range of this species. This project area occurs approximately two miles downstream of the City of Midland and further downstream of the Dow dam in Midland. The Tittabawassee is a relatively large river at this location that lacks the flow characteristics and cobble and gravel substrate associated with the presence of snuffbox. Substrates at this location are predominated by sands that are unsuitable as habitat for the snuffbox.

Because these two project areas lack the substrates and flows that characterize suitable habitat for these species and given that there are no current records of occurrence at these locations, the Trustees believe that the Preferred Alternative would have no effect to either of the two endangered species of mussels within the watershed. However, state listed mussels, characterized as 'Group 2' assemblages, may occur at these two project sites. The Trustees would assist project proponents, as part of project planning, with facilitating review by the appropriate state agencies to ensure conservation of species at these two sites, should they occur within the project area.

The Monarch Butterfly. The monarch butterfly is currently a candidate for listing under the Endangered Species Act. On December 15, 2020, the USFWS announced that listing of the monarch butterfly was warranted but precluded by other higher priority listing decisions. A listing decision may be issued in 2024 pending review of the status of the species.

The monarch butterfly is uniquely associated with milkweeds (*Asclepias* spp.). Eggs, larvae, and pupal stages are associated with milkweed; larvae feed solely on these plants. Adult monarch butterflies depend on the nectar of flowering plants. The multi-generational migration of the monarch butterfly is dependent upon habitats that provide both milkweed as a substrate for larvae and flowering plants that provide nectar for adults.

Habitats that provide these features consist of early successional areas characterized by native flowering plants with a component of milkweed species. Within the Trustees' Preferred Alternative, two project areas prominently feature early successional habitats. The Saginaw Headwaters Rec Area Project (Section 4.1.4) provides substantial areas of old-field habitats dominated by non-native grasses. The Saginaw Coastal Wildlands Project (Section 4.1.3) features areas with inclusions of coastal lakeplain prairie habitats.

In both project areas, proponents have proposed to treat non-native and invasive species (*Phragmites*, turf grasses, woody invasive species) and to establish native plant communities that would provide habitat for early successional birds and pollinators. Actions planned on these properties would be similar to the conservation measures described within the Landowner Guide - Nationwide Candidate Conservation Measures for Monarch Butterfly on Energy and Transportation Lands (USFWS 2022). Consequently, the Trustees believe that the Preferred Alternative would benefit the monarch butterfly.

Flowering plants. Flowering plants that may occur within the Saginaw Bay watershed that are listed under the Endangered Species Act include the Pitcher's thistle and the eastern prairie fringed orchid. The Pitcher's thistle is uniquely associated with coastal dune habitats. The eastern prairie fringed orchid is associated with wet prairies or bog habitats, which would include areas of lakeplain prairie within the Saginaw Bay watershed.

None of the project areas within the Trustees' Preferred Alternative feature coastal dune habitats that would support the Pitcher's thistle. While coastal beaches do occur within the Bay City State Park, the beaches are largely managed for their recreational value (Section 4.1.6) and there is no known presence of Pitcher's thistle at this site or throughout Bay County (Higman and Penskar 1999). Consequently, the Trustees believe that implementation of the Preferred Alternative would have no effect to the Pitcher's thistle.

The eastern prairie fringed orchid is a robust orchid associated with wet prairies and bogs and within the Saginaw Bay watershed may be most commonly found within lakeplain wet prairie and lakeplain wet-mesic prairie habitat types (Penskar and Higman 2000). The orchid may grow to a height of 1 m, with flowers that occur on a terminal stalk and are three-parted, creamy white, with a prominent lower fringe (Penskar and Higman 2000).

Like other North American orchids, the lifecycle of the eastern prairie fringed orchid is either complex or obscure. Threats to the species include habitat conversion, habitat loss due to successional advancement in the absence of fire, habitat degradation due to non-native and invasive species, and exploitation in the form of collection (USFWS 1999). The eastern prairie fringed orchid appears to be adapted to disturbance, and may be uniquely adapted to persist in areas with dynamic disturbance regimes. Disturbance regimes that may benefit the orchid may take the form of fire, drought, flooding, or ice scour. The historic suppression of fire is likely to have substantially contributed to loss of habitat for the orchid by allowing the encroachment of woody vegetation into lakeplain prairie habitats.

Within proximity to Saginaw Bay, this orchid is recently known from Bay, Huron, Saginaw, and Tuscola counties. The eastern prairie fringed orchid has not yet been observed within the properties that comprise the Saginaw Coastal Wildland Project (Section 4.1.3; Z. Branigan, pers. comm.), though lakeplain prairie habitats do occur within the project area. The eastern prairie fringed orchid does occur within another property managed by the Conservancy, the Sand Point Nature Preserve, Huron County, Michigan. The maintenance of lakeplain prairie and conservation of the eastern prairie-fringed orchid is a management objective of the Saginaw Basin Land Conservancy at this site.

Management objectives for the Coastal Wildlands properties are consistent with the conservation of the eastern prairie fringed orchid. Maintenance of the habitat in which this

species occurs is dependent on management intervention including the control of invasive species and managed use of fire to maintain lakeplain prairie habitats. Because the species is unknown within the project area, and because management objectives are consistent with the conservation of the eastern prairie fringed orchid, the Trustees believe that effects to the orchid are discountable.

5.4 Consideration of Cultural Resources

The Saginaw Bay watershed is an important area for historical and cultural resources. Historically the Anishinabek peoples, comprised of three tribes, the Bode'wadmi (Potawatomi), the Odawa (Ottawa), and the Ojibwe (Chippewa), inhabited the Great Lakes region. Of these tribes, the Chippewa, now represented by the Saginaw Chippewa Indian Tribe of Michigan, historically occupied an area that encompasses the Saginaw Bay watershed.

With the advent of European colonization, the physical and cultural landscape was substantially altered by the early fur trade, the white pine (*Pinus strobus*) lumber industry, continued conversion and loss of native plant communities with the development of mechanized agriculture, and then subsequent industrialization of the region which was driven in part by the use of the Great Lakes and associated waterways as the avenues of commerce.

Particularly with respect to the riparian resources within the watershed, there is a significant likelihood of the discovery of cultural and historical artifacts. Consequently, the Trustees have developed a Discovery Plan ([Appendix E](#)). The Discovery Plan was developed collaboratively by the Trustees, including the Saginaw Chippewa Indian Tribe of Michigan and its Tribal Historic Preservation Officer.

The intent of the Discovery Plan is to:

“...assist Natural Resource Damage Assessment and Restoration (NRDAR) Trustees and the agencies, organizations, or contractors implementing restoration projects (Implementing Entities) to meet the requirements of the “*Protection of Historic Properties*” regulations ([36 CFR Part 800](#)). This guidance takes into account archaeological and cultural resources as part of planning process for construction activities and provides guidance should archaeological or cultural resources be discovered during construction activities.”

This guidance is intended to inform the implementation of restoration projects funded by the NRDAR Trustee Councils for the Saginaw River & Bay and the Tittabawassee River.

The Discovery Plan contains guidance for project proponents that describes actions to take prior to implementation, steps to take upon the discovery of cultural and historical resources, additional steps to take in the event that human remains are discovered, and then concludes with a listing of the relevant points of contact within the region. The Discovery Plan will be appended to all project workplans prior to the delivery of funding to implement restoration actions supported by the Trustee Councils.

5.5 Cumulative Impacts of the Preferred Alternative

The Council on Environmental Quality, the agency responsible for the development of regulations guiding implementation of the NEPA, defines cumulative impacts as

“the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions (40 CFR § 508.7).”

In short, cumulative impacts are those impacts that for any one particular project may appear insignificant, but when added to other past, present, and future similar project-related impacts within a defined area, such as the Saginaw Bay watershed, may, in fact, be substantial.

One of the best, and most relevant examples in the Saginaw Bay watershed, would be the consideration of the loss of wetland habitats. If a project were to result in the loss of wetland habitat, even in the event that the loss were minimal, such as the loss of a 0.1-acre area of hydric soils, it would be necessary to acknowledge how this might contribute to the historic loss of wetlands in the watershed (which are historically substantial). Moreover, the regulations governing the consideration of cumulative impacts requires that agencies look beyond their own planned actions to consider historic impacts, other present impacts, and future planned actions that may impact a particular resource in a given geographic area.

In the case of actions planned as elements of the Trustees' Preferred Alternative, *the Trustees anticipate no adverse impacts to relevant resources in the Saginaw Bay watershed*. To the contrary, the Trustees anticipate that the actions proposed within the proposed Preferred Alternative would enhance the condition of resources, and in some case add to the inventory of functional ecological resources in the Saginaw Bay watershed. Proposed actions related to wetland habitats described within this Draft Supplemental Restoration Plan would be consistent with this description of actions likely to benefit an ecological resource.

Given that there is a substantial likelihood that outcomes associated with the actions within the Trustees Preferred Alternative would produce beneficial outcomes, there *would be no incremental contribution to adverse cumulative impact to the resources considered*.

Considering wetlands as an example, the Trustees anticipate that additional wetland areas will be added in the watershed as an outcome of the South River Front Restoration Project and the Tittabawassee River Floodplain and Restoration Project. Indirectly, with the Maxwell Land Trust Acquisition, the Michigan Department of Natural Resources would, in the foreseeable future, convert drained agricultural fields to a wetland complex, resulting in over 300 acres of wetland creation.

Coastal wetland habitat condition would also likely improve as result of implementation of the Coastal Wildlands Project and Bay City State Park - Habitat Restoration and Maintenance Project. These examples demonstrate that the projects within the Trustees' Preferred Alternative are intended and likely to result in beneficial ecological outcomes.

5.6 Summary of the Alternatives Analysis

The Trustees evaluated the impacts of the No-Action Alternative and the Trustees' Preferred Alternative. The analysis was structured using the 10 NEPA significance criteria which are intended to be benchmarks that clarify the extent to which a given proposed action may affect

the human environment. The analysis is summarized below with respect to the purpose and need for restoration, short-term impacts, long-term impacts, and cumulative impacts.

Purpose and Need for Restoration

- a) The No Action Alternative does not meet the directive to restore resources or services injured or lost as a result of the release of contaminants as required in the Consent Decree with Dow and as provided for in the existing restoration plans of the two Trustee Councils.
- b) The Trustees' Preferred Alternative does meet the purpose and need for restoration; the projects considered represent those that best met the Trustees' restoration criteria.

Short-term Impacts

- a) The No Action Alternative would have no short-term, adverse or beneficial, impact to relevant resources in the Saginaw Bay watershed.
- b) Short-term adverse impacts associated with the Trustees' Preferred Alternative include the generation of smoke with the use of prescribed fire and some erosion associated with the construction of fishing piers and other soil movement associated with wetland restoration and shoreline re-contouring. Given that the use of prescribed fire requires documented burn plans that evaluate smoke dispersal potential, and that best management practices associated with erosion control would be used, the Trustees believe these impacts to be minor and unlikely to produce significant impacts.
- c) Short-term beneficial impacts associated with the Trustees' Preferred Alternative include the protection of unique areas, economic contribution to conservation effort by area organizations, and contributions to environmental justice with area investment.

Long-term Impacts

- a) The No Action Alternative would result in continued propagation and distribution of non-native species, diminishing the ecological value of numerous natural resources in the Saginaw Bay watershed and indirectly negatively impacting the area both socioeconomically and culturally.
- b) Long-term impacts associated with the Trustees Preferred would include the addition of wetlands to the watershed, improved ecological condition of wetland and coastal habitats, additional recreational opportunity in under-served areas, support for at-risk species, and contribution to environmental equity.

Cumulative Impacts

- a) The No Action Alternative would contribute adverse cumulative impact to resources affected by the distribution and abundance of non-native species in the watershed.
- b) The Trustees' Preferred Alternative would contribute no adverse cumulative impact to resources in the Saginaw Bay watershed. Outcomes of planned restorations would provide long-term benefits by addressing ecological condition, recreational opportunity, at-risk species, and environmental equity.

6.0. LIST OF PREPARERS, AGENCIES, AND PERSONS CONSULTED

6.1 Preparers

Clark D. McCreedy, U.S. Fish and Wildlife Service, East Lansing, MI

Lisa L. Williams, U.S. Fish and Wildlife Service, East Lansing, MI

6.2 Agencies and Persons Consulted

The following is list of those entities with whom the preparers of this document consulted during its preparation.

Federal Agencies

U.S. Fish and Wildlife Service, East Lansing, MI

Bureau of Indian Affairs, Albuquerque, NM

State Agencies

Michigan Department of Environment, Great Lakes, and Energy

Michigan Department of Natural Resources

Michigan Department of Attorney General

Tribes

Saginaw Chippewa Indian Tribe of Michigan

Local Agencies, Non-Governmental Organizations, and Others

See [Appendix C](#), which includes people who were notified of the opportunity to provide comment to the two Trustee Councils with the release of their respective draft restoration plans. This would have also included those individuals to whom the Trustees provided notices of meetings in which they participated to inform the public of the restoration planning process.

7.0. REFERENCES

- Albert, D.A. 1995. Regional landscape ecosystems of Michigan, Minnesota, and Wisconsin: a working map and classification. Gen. Tech. Rep. NC-178. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 255 pp.
- Albert, D.A. and P.J. Comer. 2008. Atlas of Early Michigan's forests, grasslands, and wetlands: an interpretation of the 1816-1856 General Land Office surveys. Michigan State University Press, Lansing, MI.
- Albert, D.A., S.R. Denton, and B.V. Barnes. 1986. Regional Landscape Ecosystems of Michigan. School of Natural Resources, The University of Michigan, Ann Arbor.
- Albert, D.A., D.A. Wilcox, J.W. Ingram, and T.A. Thompson. 2005. Hydrogeomorphic classification for Great Lakes coastal wetlands. J. Great Lakes Res. 31 (Supplement 1): 129-146.
- Andresen, J.A. 2012. Historical climate trends in Michigan and the Great Lakes Region. International Symposium on Climate Change in the Great Lakes Region: Decision Making Under Uncertainty. Michigan State University, East Lansing, MI. 15-16 March, 2007.
- Arthur, J.W., T. Roush, J.A. Thompson, F.A. Puglisi, C. Richards, G.E. Host, and L.B. Johnson. 1996. Evaluation of watershed quality in the Saginaw River Basin. U.S. Environmental Protection Agency, Duluth, MN.
- ATS. 2006. Remedial Investigation Work Plan. Tittabawassee River and Upper Saginaw River and Floodplain Soils, Midland, Michigan. Volume 1 of 2. Prepared by Ann Arbor Technical Services, Inc., Ann Arbor, MI, for The Dow Chemical Company, Midland, MI.
- Beeton, A.M., S.H. Smith, and F.H. Hooper. 1967. Physical Limnology of Saginaw Bay, Lake Huron. September. Technical Report No. 12. Great Lakes Fishery Commission, Ann Arbor, MI.
- Boogaard, M. A., T. D. Bills, and D. A. Johnson. 2003. Acute toxicity of TFM and TFM/niclosamide mixture to selected species of fish, including lake sturgeon (*Acipenser fulvescens*) and mudpuppies (*Necturus maculosus*), in laboratory and field exposures: Journal of Great Lakes Research 29, Supplement 1: 529-541.
- Buchanan, J., S. Chorbajian, A. Dominguez, B. Hartleben, B. Knoppow, J. Miller, C. Schulze, C. Seiter, and Y. Chang. 2013. Restoring the Shiawassee Flats, Estuarine Gateway to Saginaw Bay. M.S. Thesis, School of Natural Resources & Environment, University of Michigan, Ann Arbor. 184 pp.
- Carver, E. and J. Caudill. 2007. Banking on Nature 2006: The Economic Benefits to Local Communities of National Wildlife Refuge Visitation. U.S. Fish and Wildlife Service, Division of Economic, Washington, D.C. 382 pp.
- Chambers R.C., D.D. Davis, E.A. Habeck, N.K. Roy, and I. Wirgin. 2012. Toxic effects of PCB126 and TCDD on shortnose sturgeon and Atlantic sturgeon. Environ Toxicol Chem. 31: 2324-37.

- Collingsworth, P.D., D.B. Bunnell, M.W. Murray, Y.C. Kao, Z.S. Feiner, R.M. Claramunt, B.M. Lofgren, T.O. Höök, and S.A. Ludsins. 2017. Climate change as a long-term stressor for the fisheries of the Laurentian Great Lakes of North America. *Reviews in Fish Biology and Fisheries*, pp.1-29.
- Dunton, E. 2018. Shiawassee National Wildlife Refuge. Habitat Management Plan. December 2018. 122 pp.
- Eichenlaub, V.L., J.R. Harman, F.V. Nurnberger, and H.J. Stolle, 1990. *The Climatic Atlas of Michigan*. Univ. of Notre Dame Press, Notre Dame, IN.
- Environment and Climate Change Canada (ECCC) and the U.S. Environmental Protection Agency (U.S. EPA). 2018. *Lake Huron Lakewide Action and Management Plan, 2017-2021*. Cat. No. En164-56/2018E-PDF. ISBN 978-0-660-25841-6.
- Fales, M., R. Dell, M.E. Herbert, S.P. Sowa, J. Asher, G. O'Neil, P.J. Doran, and B. Wickerham. 2016. Making the leap from science to implementation: Strategic agricultural conservation in Michigan's Saginaw watershed. *J. Great Lakes Res.* 42: 1372-1385.
- Farrand, W.R. and D.L. Bell. 1982. Quaternary Geology of Michigan. Dept. of Geological Sciences, University of Michigan. Geological Survey Division, MDEQ and Division Geographic Information Services Unit, Resource Mapping and Aerial Photography, MDNR (cited in Newman 2011).
- Fiedler, D.G. and M.V. Thomas. 2014. Status and trends of the fish community of Saginaw Bay, Lake Huron 2005-2011. Fisheries Division, Fisheries Report 03, Michigan Department of Natural Resources, Lansing, MI. 54 pp.
- Fielder, D. G., J. S. Schaeffer, and M. V. Thomas. 2007. Environmental and ecological conditions surrounding the production of large year classes of walleye (*Sander vitreus*) in Saginaw Bay, Lake Huron. *Journal of Great Lakes Research*. 33 (Supplement 1):118-132.
- Fitting, J.E. 1970. *The Archaeology of Michigan: A Guide to the Prehistory of the Great Lakes Region*. American Museum of Natural History, The Natural History Press, Garden City, New York. 274 pp.
- Foehl, H.M., and I.M. Hargreaves. 1964. *The Story of Logging the White Pine in the Saginaw Valley*. Bay City, MI. Red Keg Press.
- Glick, P., J. Hoffman, M. Koslow, A. Kane, and D. Inkley. 2011. *Restoring the Great Lakes' Coastal Future: Technical Guidance for the Design and Implementation of Climate-Smart Restoration Projects*. National Wildlife Federation, Ann Arbor, MI.
- Heitmeyer, M. E., C. M. Aloia, E. M. Dunton, B.J. Newman, and J.D. Eash. 2013. Hydrogeomorphic evaluation of ecosystem restoration and management options for Shiawassee National Wildlife Refuge. Prepared for U. S. Fish and Wildlife Service, Region 3. Greenbrier Wetland Services Report 13- 07, Blue Heron Conservation Design and Printing LLC, Bloomfield, MO.
- Higman, P.J. and M.R. Penskar. 1999. Special plant abstract for *Cirsium pitcheri*. Michigan Natural Features Inventory, Lansing, MI. 3 pp.

- Kling, G.W., K. Hayhoe, L.B. Johnson, J.J. Magnuson, S. Polasky, S.K. Robinson, B.J. Shuter, M.M. Wander, D.J. Wuebbles, D.R. Zak, R.L. Lindroth, S.C. Moser, and M.L. Wilson. 2003. *Confronting Climate Change in the Great Lakes Region: Impacts on our Communities and Ecosystems*. Union of Concerned Scientists, Cambridge, Massachusetts, and Ecological Society of America, Washington, DC. 92 pp.
- Mandrak, N.E. 1989. Potential invasion of the Great Lakes by fish species associated with climatic warming. *J. Great Lakes Res.* 15: 306-316.
- Mason, L.A., C.M. Riseng, A.D. Gronewald, E.S. Rutherford, J. Wang, A. Clites, S.D.P. Smith, and P.B. McIntyre. 2016. Fine-scale spatial variation in ice cover and surface temperature trends across the surface of the Laurentian Great Lakes. *Climatic Change*. 10.1007/s10584-016-1721-2.
- Michigan Department of Environmental Quality (MDEQ). 2008. Michigan Department of Environmental Quality Biennial Remedial Action Plan Update for the Saginaw River/Bay Area of Concern. Office of the Great Lakes, Great Lakes Management Unit, Michigan Department of Environmental Quality, Lansing, MI.
- Michigan Department of Environmental Quality (MDEQ). 2012. Stage 2 Remedial Action Plan for the Saginaw River/Bay Area of Concern. Office of the Great Lakes, Great Lakes Management Unit, Michigan Department of Environmental Quality, Lansing, MI.
- Michigan Department of Natural Resources (MDNR). 1994a. A Biological Survey of the Tittabawassee River and Selected Tributaries, Gladwin, Midland and Saginaw Counties, September 11–October 7, 1992.
- Michigan Department of Natural Resources (MDNR) 1994b. Saginaw River/Bay Remedial Action Plan Draft Surface Water Quality Division Biannual Report Volume 2: Appendices. Michigan Department of Natural Resources, Lansing.
- Mississippi Watershed Management Organization (MWMO). 2010. A Guide to Bank Restoration Options for Large River Systems: Part II Bioengineering Installation Manual MWMO Watershed Bulletin 2010-3. 95 pp.
- Mortsch, L., J. Ingram, A. Hebb, and S. Doka (eds.). 2006. Great Lakes Coastal Wetland Communities: Vulnerability to Climate Change and Response to Adaptation Strategies. Final report submitted to the Climate Change Impacts and Adaptation Program, Natural Resources Canada. Environment Canada and the Department of Fisheries and Oceans, Toronto, Ontario. 251 pp. + appendices.
- Myers, B.J., A.J. Lynch, D.B. Bunnell, C. Chu, J.A. Falke, R.P. Kovach, T.J. Krabbenhoft, T.J. Kwak, and C.P. Paukert. 2017. Global synthesis of the documented and projected effects of climate change on inland fishes. *Reviews in Fish Biology and Fisheries*, pp.1-23.
- Nalepa, T.F., D.L. Fanslow, M.B. Lansing, and G.A. Lang. 2003. Trends in the benthic macroinvertebrate community of Saginaw Bay, Lake Huron, 1987 to 1996: responses to phosphorus abatement and the zebra mussel, *Dreissena polymorpha*. *Journal of Great Lakes Research*, 29(1), pp.14-33.

- Newman, B.J. 2011. Water Resource Inventory and Assessment Report – Shiawassee National Wildlife Refuge. Bloomington, MN: Region 3, United States Fish and Wildlife Service.
- Penskar, M.R. and P.J. Higman. 2000. Special plant abstract for *Platanthera leucophaea* (eastern prairie fringed-orchid). Michigan Natural Features Inventory, Lansing, MI. 3 pp.
- Public Sector Consultants (PSC). 2002. Targeting environmental restoration in the Saginaw River/Bay area of concern (AOC): 2001 remedial action plan update. Final Report prepared for the Partnership for the Saginaw Bay Watershed. 82 pp.
- Sarhadi, A., and E.D. Soulis. 2017. Time-varying extreme rainfall intensity-duration-frequency curves in a changing climate, *Geophys. Res. Lett.* 44: 2454–2463.
- Schrouder, K.S., R. N. Lockwood, and J. P. Baker. 2009. Tittabawassee River Assessment. Ann Arbor, MI. Michigan Department of Natural Resources. Special Report 52, 2009. Available at <http://www.michigan.gov/dnr/0,1607,7-153-10364-200853--,00.html>.
- Selzer, M.D., B. Joldersma, and J. Beard. 2014. A reflection on restoration progress in the Saginaw Bay watershed, *J Great Lakes Res* 40 (Supplement 1): 192-200.
- Siersma, H.M.H., C.J. Foley; C.J. Nowicki; S.S. Qian; D.R. Kashian. 2014. Trends in the distribution and abundance of *Hexagenia* spp. in Saginaw Bay, Lake Huron, 1954–2012: Moving towards recovery? *J Great Lakes Res.* 40 (Supplement 1): 156-167.
- Stow, C.A., J. Dyble, D.R. Kashian, T.H. Johengen, K.P. Winslow, S.D. Peacor, S.N. Francoeur, A.M. Burtner, D. Palladino, N. Morehead, D. Goassiaux, Y. Cha, S.S. Qian, and D. Miller. 2014. Phosphorus targets and eutrophication objectives in Saginaw Bay: 35-year assessment. *J. Great Lakes Res.* 40: 4-10.
- Tillitt, D.E., J.A. Buckler, D.K. Nicks, J.S. Candrl, R.A. Claunch, R.W. Gale, H.J. Puglis, E.E. Little, T.L. Linbo, and M. Baker. 2017. Sensitivity of lake sturgeon (*Acipenser fulvescens*) early life stages to 2,3,7,8-tetrachlorodibenzo-*P*-dioxin and 3,3',4,4',5-pentachlorobiphenyl. *Environ Toxicol Chem*, 36: 988-998.
- The Nature Conservancy. 2017. Great Lakes Inform: Frankenmuth Fish Passage Project <https://greatlakesinform.org/projects-and-progress/1270>.
- Tulbure, M.G. and C.A. Johnston. 2010. Environmental conditions promoting non-native *Phragmites australis* expansion in Great Lakes coastal wetlands. *Wetlands* 30: 577-587.
- U.S. Army Corps of Engineers (USACE). 2004. 2004 Phase II Report Final Dredged Material Management Plan Study. July 2004 Upper Saginaw River, Michigan.
- U.S. Army Corps of Engineers (USACE). 2007. Annual Report/Contract Dredging Report – Saginaw River (1963-2006). Detroit District, Project Operations Section. January 8, 2007.
- U.S. Army Corps of Engineers (USACE). 2020. <https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Information-2/Water-Level-Data/>, accessed 6/12/2020.
- U.S. Environmental Protection Agency (USEPA) 2010. Level III and IV Ecoregions of EPA Region 5 Map (revision of Omernik, 1987). U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory, Corvallis, OR. Available at <https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-epa-region>.

- U.S. Fish and Wildlife Service (USFWS). 2001. Shiawassee National Wildlife Refuge Comprehensive Conservation Plan and Environmental Assessment. Region 3, U. S. Fish and Wildlife Service, Milwaukee, WI. 198 pp. Available: <https://www.fws.gov/midwest/planning/shiawassee/ccp/fullccp.pdf>.
- U.S. Fish and Wildlife Service (USFWS). 2008. Birds of Conservation Concern 2008. U.S. Fish and Wildlife Service, Arlington, VA. 93 pp.
- U.S. Fish and Wildlife Service. 1999. Eastern Prairie Fringed Orchid (*Platanthera leucophaea* (Nuttall) Lindley) Recovery Plan. US FWS, Bloomington, MN. 63 pp.
- U.S. Fish and Wildlife Service (USFWS). 2022. IPaC Information and Planning and Consultation (website). Accessed July 22, 2022.
- U.S. Fish and Wildlife Service (USFWS). 2020. Final Restoration Plan / Environmental Assessment For the Tittabawassee River System Natural Resource Damage Assessment. U.S. Fish and Wildlife Service, Michigan Ecological Services Field Office, Lansing, MI. 196 pp.
- U.S. Fish and Wildlife Service (USFWS). 2021. Final Restoration Plan & Environmental Assessment for Use of Remaining Funds - 1998 Saginaw River and Bay Settlement. U.S. Fish and Wildlife Service, Michigan Ecological Services Field Office, Lansing, MI. 163 pp.
- U.S. Fish and Wildlife Service (USFWS). 2022. Landowner Guide. Nationwide Candidate Conservation Agreement for Monarch Butterfly on Energy and Transportation Lands. U.S. Fish and Wildlife Service. 20 pp.
- Wang, J., X. Bai, H. Hu, A. Clites, M. Colton, and B. Lofgren. 2012. Temporal and spatial variability of Great Lakes Ice cover, 1973-2010. J. Climate 25: 1318-1329.
- Westjohn, D.B. and T.L. Weaver. 1996. Hydrogeologic framework of Mississippian Rocks in the central lower peninsula of Michigan. U.S. Geological Survey Water Investigations Report 94-4246, Lansing, MI. 46 pp. (cited in Newman 2011).
- Whitehead, J.C., P.A. Groothuis, R. Southwick, and P. Foster-Turley. 2006. Economic Values of Saginaw Bay Coastal Marshes with a Focus on Recreational Values. Southwick Associates, Fernandina Beach, FL. 76 pp.
- Whitehead, J.C., P.A. Groothuis, R. Southwick, and P. Foster-Turley. 2009. Measuring the benefits of Saginaw Bay coastal marsh with revealed and stated preference methods. J. Great Lakes Res. 35: 430-437.
- Wires, L.R., S. J. Lewis, G. J. Soulliere, S. W. Matteson, D. V. "Chip" Weseloh, R. P. Russell, and F. J. Cuthbert. 2010. Upper Mississippi Valley / Great Lakes Waterbird Conservation Plan. A plan associated with the Waterbird Conservation for the Americas Initiative. Final Report submitted to the U. S. Fish and Wildlife Service, Fort Snelling, MN.
- Wuebbles, D. J., et al., 2019: An Assessment of the Impacts of Climate Change on the Great Lakes. Environmental Law and Policy Center, 70 pp., Available at elpc.org/gclimatechange/.

8.0. APPENDICES

8.1 Appendix A-1: Press Release for Restoration Pre-proposals

U.S. Fish and Wildlife Service

News Release

Great Lakes Region

5600 American Boulevard West Bloomington, Minnesota 55437

Nov. 4, 2021



Media Inquiries:

Georgia Parham, USFWS, 812-334-4261, Ext. 203 georgia_parham@fws.gov

John Pepin, Michigan DNR, 906-226-1352, pepinj@michigan.gov

Hugh McDiarmid, Michigan EGLE, 517-230-7724, mcdiarmidjr@michigan.gov

Frank Cloutier, Saginaw Chippewa Indian Tribe of Michigan, 989-775-4076,
fcloutier@sagchip.org

Funding available for natural resource restoration in the Saginaw Bay watershed

The Tittabawassee River and the Saginaw River and Bay Natural Resource Trustee Councils are jointly announcing the availability of funding for restoration projects to be implemented in the Saginaw Bay watershed, including in and along the Tittabawassee and Saginaw rivers. This funding is derived from two sources, a 2020 settlement with The Dow Chemical Company and a 1998 settlement with General Motors and others for natural resource damages. The two Trustee Councils will provide approximately \$5.7 million to fund restoration projects, in addition to projects already specified in the two settlements.

The Trustees are asking people to submit pre-proposals that the Trustee Councils will then screen and evaluate for their merit relative to restoration project criteria. The criteria that the Trustees will use to evaluate restoration proposals are described within the respective restoration plans for the Tittabawassee River and the Saginaw River and Bay. A web-based application portal will be used to collect project ideas from the public and other stakeholders as pre-proposals. Access to the application portal, the restoration plans and a summary of the criteria to be used to evaluate pre-proposals may be found at a website for the Tittabawassee River.

Restoration project pre-proposals must be submitted by Dec. 31, 2021. Following evaluation of the pre-proposals submitted, the Trustees will jointly develop a restoration plan that includes proposed restoration projects that rank highly based on the Trustees' criteria. The Trustees will then release a draft of this restoration plan, with specific projects proposed for funding, for public review and comment in mid- to late 2022. The Trustees will evaluate public comments and respond to them as they finalize the restoration plan. Funding for projects selected in the final restoration plan will likely be available in 2023 and may require full proposals or scopes of work be submitted to the Trustee agency administering the funding for each project.

Restoration projects must provide some benefit to the natural resources that were injured as a result of the release of contaminants at issue in one of the relevant court settlements. The

contaminants at issue in the two settlements are dioxins and furans in the Dow settlement and polychlorinated biphenyls in the General Motors settlement. Restoration projects may also improve public use or enjoyment of those natural resources, if they meet the requirement that they also benefit the relevant injured natural resources. Projects anywhere in the Saginaw Bay watershed may be eligible for funding, but projects most closely linked to the areas in and around the Tittabawassee River, downstream of Midland, the Saginaw River and Saginaw Bay that were more impacted by contaminants will tend to rank higher. Examples of appropriate projects that address injuries to natural resources may be found within the respective restoration plans for these two cases: the Tittabawassee River Restoration Plan and the Saginaw River and Bay Restoration Plan.

The Natural Resource Trustees represent the public to accomplish the mission of restoring, rehabilitating, replacing or acquiring the equivalent natural resources, and the services those natural resources provide, that have been injured from the release of hazardous substances. The Natural Resource Trustees for the Tittabawassee River and the Saginaw River and Bay include the State of Michigan, acting through the Michigan Department of Environment, Great Lakes, and Energy, the Michigan Department of Natural Resources, and Michigan Department of Attorney General; the United States Department of the Interior, acting through U.S. Fish and Wildlife Service and the Bureau of Indian Affairs; and the Saginaw Chippewa Indian Tribe of Michigan.

If you have questions about this opportunity, you may contact Lisa Williams, U.S. Fish and Wildlife Service, at t.river.nrda@fws.gov, using “Tittabawassee – Saginaw RFP” in the subject line of your communication.

###

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. We are both a leader and trusted partner in fish and wildlife conservation, known for our scientific excellence, stewardship of lands and natural resources, dedicated professionals and commitment to public service.

For more information on our work and the people who make it happen, visit [fws.gov](https://www.fws.gov).

8.2 Appendix A-2: Request for Proposals Instructions

Stakeholders were directed to the following information that was made available on the Tittabawassee River Natural Resource Damage Assessment and Restoration webpage. A link to the project application portal is found within the section below entitled “How do I submit a pre-proposal?”

Funding available for natural resource restoration in the Saginaw Bay watershed

The Tittabawassee River and the Saginaw River and Bay Natural Resource Trustee Councils are jointly requesting pre-proposals for restoration projects to be implemented in the Saginaw Bay watershed. Priority will be given to projects that benefit the natural resources most impacted by the release historically of hazardous substances into the Tittabawassee River and the Saginaw River and Bay.

Pre-proposals must be submitted by Dec. 31, 2021.

What types of projects will be considered?

Projects must provide benefits to natural resources in the Saginaw Bay watershed. Many types of projects that benefit fish, wildlife and their habitats will be considered. These include, but are not limited to, the following types of projects:

- Restoring, enhancing or preserving wetland habitats, including within floodplains and coastal wetlands.
- Restoring, enhancing or preserving upland habitats, including forests, islands and lake-plain prairie.
- Restoring rivers and streams through adding natural structure, reducing channelization, reconnecting rivers to their floodplains and improving habitat along the banks.
- Removing barriers to fish movement from undersized culverts and dams.
- Enhancing native plant species and controlling invasive species.
- Increasing recreational opportunities in conjunction with natural habitat enhancements.

What types of projects will not be considered?

- Projects located outside the Saginaw Bay watershed
- Projects within the Saginaw Bay watershed that do not benefit natural resources injured by the release of hazardous substances
- Projects that are solely focused on recreation and do not include ecological benefits

Who can submit project pre-proposals?

Anyone is welcome to submit a pre-proposal whether they have the capacity to implement the project themselves or not. If a project idea fits well with the Trustees’ goals and objectives, we can work with local, state, federal or tribal units of government, tribes and inter-tribal consortia, nonprofit organizations or private entities to implement a project.

What range of funding is available?

The Trustees have \$5.7 million available and intend to select a suite of projects to benefit multiple natural resources, so individual pre-proposals for Natural Resource Damage Assessment and Restoration (NRDAR) funding should not exceed \$1 million. Matching contributions are not required but will be considered when evaluating overall benefits of the proposed use of NRDAR funding.

How do I submit a pre-proposal?

Pre-proposals can be submitted online here. The online form asks for a project description, estimated costs and NRDAR funding needed. The portal also allows those submitting project pre-proposals to place a pin for the location on an interactive map. Applicants will also be able to upload a concept drawing or design plan if they would like. The online form then provides opportunities to describe project benefits and cost effectiveness, sustainability of project benefits, connections to other activities and conservation plans, and any special regulatory considerations. The online form has additional details on these project aspects.

How will pre-proposals be evaluated?

- The Trustees have published general screening and project evaluation criteria in their restoration plans, and these criteria are very similar:
 - Tittabawassee River System Natural Resource Damage Assessment Restoration Plan, with criteria described in Section 5.1
 - Saginaw River and Bay Restoration Plan, with criteria described in Chapter 3
- The general screening criteria the Trustees use are yes/no questions about a project:
 - Will it comply with applicable laws and regulations?
 - Does it address resources injured by hazardous substances?
 - Is it technically feasible?
- The Trustees will rank projects based on evaluation criteria described in the restoration plans, which include the following:
 - Focus on areas closest to past contamination and on benefits to priority trust resources.
 - Benefits are measurable and likely from cost-effective, reliable methods.
 - Consistency with natural resource policies and regional planning.
 - Consideration of completed or anticipated response actions.
 - Provision of a large range of benefits to natural resources and a diverse public.
 - Benefits are sustainable over time, including being resilient to foreseeable results of climate change.

Can I see what other pre-proposals have been submitted?

Yes. The Trustees have created a map of the pre-proposals for restoration projects that shows the locations, titles, and descriptions of the projects as submitted.

Please note that the Trustees have not reviewed the descriptions of the submitted projects for accuracy and any opinions about the potential impacts of the submitted projects are those of the submitters and do not represent the views of the Trustees or their respective state and federal agencies or the Saginaw Chippewa Tribe. The Trustees will be evaluating the submitted pre-proposals after December 31, 2021, and presenting the results of their evaluation in a Draft Restoration Plan for public review and comment in mid- to late 2022.

Who can I contact if I have additional questions?

For more information on the two NRDAR restoration plans and current projects you can visit the Tittabawassee River System NRDAR website and the Saginaw River and Bay NRDAR website. For specific questions, you may contact Lisa Williams, who serves as the administrative lead for the Tittabawassee Trustee Council, by email at t.river.nrda@fws.gov or by phone at 517-256-0231.

8.3 Appendix A-3: Application Portal Instructions and Fields

The application portal for restoration pre-proposals began with a block of instructions followed by fields to be filled out by the applicant. Applicants were able to save and return to their application at a later time if needed. An interactive map provided applicants the ability to identify a project location within the Saginaw Bay watershed. Each of the entry fields within the online application, listed below, were prefaced by instructions or explanatory notes. Proposals were provided a unique identifier to enable an alternate means to reference each proposal.

Pre-proposal instructions provided within the application portal included:

PRE-PROPOSAL APPLICATION FOR RESTORATION PROJECTS IN THE SAGINAW BAY WATERSHED

Overview

Funding for restoration projects is available from two settlements for damages to natural resources from the release of hazardous substances within the Saginaw Bay watershed. The Natural Resource Trustees for these two settlements are working together to solicit pre-proposals for restoration actions that focus on restoring or enhancing ecological services in aquatic, riparian, and upland habitats within the Saginaw Bay watershed, with priority given to projects that benefit the natural resources that were most impacted by the release of hazardous substances into the Tittabawassee River and the Saginaw River and Bay. More information on the criteria that the Trustees will use to select projects is available at the Trustees' Restoration Funding site. The Trustees have \$5.7 million available and intend to select a suite of projects, so individual pre-proposals for Natural Resource Damage Assessment and Restoration (NRDAR) funding should not exceed \$1 million. Matching contributions are not required but will be considered when evaluating overall benefits of the proposed use of NRDAR funding.

Instructions:

1. Complete the form below.
2. This is a pre-proposal, so the space provided is limited. Please briefly address the questions in each of the following sections with as much detail as practical.
3. Pre-proposals will be evaluated against established NRDAR restoration criteria available at Trustees' Restoration Funding site.
4. Please see the Trustees' Restoration Funding site for more information on eligible projects and the overall funding process.
5. Questions on the application should be directed to t.river.nrda@fws.gov or you may call Lisa Williams of the U.S. Fish and Wildlife Service at 517-256-0231.
6. Please do not include any confidential or proprietary information as these submittals will become part of a public record.
7. Pre-proposal applications must be entered no later than 12/31/2021 to be considered in this funding process.

Fields within the online application included:

- Project Title
- Applicant Name
- Company, non-profit organization, agency or other entity affiliation, if applicable
- Address
- City
- State
- Zip Code
- Phone
- E Mail
- Project Partners
- Total Estimated Project Cost
- NRDAR Funding Request
- Other Funding Amount On Hand Or Anticipated And Source Of Funding
- Describe Any In-Kind Contributions
- Proposed Project Dates
- Start Date
- Completion Date
- Project Description
- Project Location and Scale
- Project Location (interactive map)
- Methods / Feasibility
- Please Provide Concept Drawings Or Design Plans If They Are Available (Document Upload)
- Benefits and Cost Effectiveness
- Sustainability of Project Benefits
- Connection to On-going Activities
- Consistency with Conservation Planning
- Special Regulatory Considerations
- Has this project previously been proposed for other grant funding?
- Is this project required by any regulatory program or legal agreement?

8.4 Appendix B: Stakeholder Restoration Project Proposals

Project Proposal	Contact & Affiliation	Restoration Category	Funding Request
Maxwell Trust land purchase (360 acres), Crow Island State Game Area, Bay and Saginaw Counties	Jeremiah Heise, Michigan Dept. of Natural Resources	Conservation land acquisition	\$1,000,000
South Riverfront Restoration – Poseyville Bridge/Downtown Midland, Tittabawassee River.	Karen Murphy, Midland Parks and Recreation	Natural resource recreation	\$1,000,000
Saginaw Bay Coastal Wildlands	Trevor Edmonds, Saginaw Basin Land Conservancy	Coastal habitat restoration, natural resource recreation	\$65,000
Saginaw River Headwaters Rec Area – comprehensive Phragmites Eradication	Brian Keenan-Lechel, Saginaw County Parks and Recreation	Coastal habitat restoration, natural resource recreation	\$100,000
Invasive Species Management along Tittabawassee River	Lynda Thayer, Thomas Township	Riparian habitat restoration, non-native species control	\$100,000
Habitat Restoration and Maintenance - Bay City State Recreation Area	Gedaliah Krasner, Arenac Conservation District	Coastal habitat restoration, non-native species control	\$360,000
Restoration of Floodplains, Forested Wetlands and Open Grasslands within the Saginaw Bay Watershed	Tom Lenon, Chippewa Nature Center	Habitat restoration, Coastal habitat restoration	\$118,000
Tittabawassee River Floodplain Protection and Restoration	Ducks Unlimited, Stevens Family Farm, 6200 Club	Riparian forest floodplain protection, wetland restoration	\$990,000

Saginaw River Headwaters Rec Area – Shoreline Restoration and Fishing Pier Installation	Brian Kenan-Lechel, Saginaw County Parks and Recreation	Coastal habitat restoration, natural resource recreation	\$200,000
Saginaw Bay Sturgeon – Support, Monitoring and Restoration of this State Threatened Species	Michael Kelly, The Conservation Fund / Saginaw Bay Watershed Initiative Network	Species of special concern restoration and management	\$300,000
Fishing Access at the Smith’s Crossing Pedestrian Bridge	Mike Kelly, Great Lakes Bay Regional Trail	Natural resource recreation	\$100,000
Tittabawassee River Bank Stabilization	Lynda Thayer, Thomas Township	Riparian habitat restoration	\$450,000
Thomas Township Nature Preserve Expansion	Lynda Thayer, Thomas Township	Habitat restoration, natural resource recreation	\$200,000
West Branch Tittabawassee River Dam Removal	Josh Leisen, Huron Pines	Riparian habitat restoration, aquatic passage	\$239,405
Nearshore Habitat Restoration in Saginaw Bay - Preparatory Remediation Work Near Kawkawlin River	Glenn Rowley, Bangor Township	Dredging, removal of infrastructure	\$600,000
Dice Road Park and Trail	Lynda Thayer, Thomas Township	Natural resource recreation	\$100,000
Restocking the Saginaw River	Jason Courier	Fish stocking	\$50,000
Wallace Drive Culvert Replacement	Lynda Thayer, Thomas Township	Riparian habitat restoration, aquatic passage	\$500,000

Comprehensive Mussel (native and invasive) Survey to Inform Restoration	Daelyn Woolnough, Central Michigan University	Monitoring, research	\$300,000
Lower trophic level evaluation of the Tittabawassee and Saginaw River Watersheds based on historical land use and contamination	Daelyn Woolnough, Central Michigan University	Monitoring, research	\$200,000
Snails of the influenced areas of the Tittabawassee and Saginaw river watersheds	Daelyn Woolnough, Central Michigan University	Monitoring, research	\$100,000
Snuffbox Tobacco River assessment	Daelyn Woolnough, Central Michigan University	Monitoring, research	\$80,000
Middlegrounds Green Space Restoration & Riverfront Trail	Marcie Holman	Contaminant removal	\$1,000,000

Total \$8,152,405

8.5 Appendix C: Local Agencies, Non-Governmental Organizations, and Others Consulted

This table includes people who provided comments to the Trustees on the 2016 Programmatic Restoration Plan, the Draft Supplemental Plan, or in meetings and correspondence since the publication of that document and people to whom the Trustees have provided notices of meetings and availability of documents. The table is organized by the category of Organization Type.

Name	Agency or Organization	Organization Type
Jim Luke	US Army Corps of Engineers	Federal Agency
Charlie Uhlarik	US Army Corps of Engineers	Federal Agency
Tony Friona	US Army Corps of Engineers	Federal Agency
Julie Sims	National Oceanic and Atmospheric Administration	Federal Agency
Diane Russell	US Environmental Protection Agency	Federal Agency
Colleen Moynihan	US Environmental Protection Agency	Federal Agency
Scott Simmons	US Fish and Wildlife Service	Federal Agency
Eric Dunton	US Fish and Wildlife Service	Federal Agency
Michelle Vanderhaar	US Fish and Wildlife Service	Federal Agency
Jim Hazelman	US Fish and Wildlife Service	Federal Agency
Rachael Pierce	US Fish and Wildlife Service	Federal Agency
Doug Gorby	US Fish and Wildlife Service	Federal Agency
Jim Boase	US Fish and Wildlife Service - Alpena FWCO	Federal Agency
Erik Rodriguez	Saginaw Chippewa Indian Tribe of Michigan	Tribal Government
Frank Cloutier	Saginaw Chippewa Indian Tribe of Michigan	Tribal Government
Tim Davis	Saginaw Chippewa Indian Tribe of Michigan	Tribal Government
Amanda Armbruster	Michigan Department of Environment, Great Lakes, and Energy	State Agency
Charlie Bauer	Michigan Department of Environment, Great Lakes, and Energy	State Agency
Bretton Joldersma	Michigan Department of Environment, Great Lakes, and Energy	State Agency
Mike Jury	Michigan Department of Environment, Great Lakes, and Energy	State Agency
Mike Van Loan	Michigan Department of Environment, Great Lakes, and Energy	State Agency
Mike Pennington	Michigan Department of Environment, Great Lakes, and Energy	State Agency
Dave Fielder	Michigan Department of Natural Resources	State Agency
Jeff Jolley	Michigan Department of Natural Resources	State Agency
Glenn Rowley	Bangor Township Supervisor	Local Government
Dana Muscott	Bay City Manager	Local Government
Kathleen Newsham	Bay City Mayor	Local Government
Terry Moulthane	Bay City Zoning	Local Government

Name	Agency or Organization	Organization Type
Jim Barcia	Bay County Executive	Local Government
Nick Tomczak	Beaver Township Supervisor	Local Government
Terry Spencer	Charter Township Supervisor	Local Government
Laura Ogar	Environmental Affairs & Community Development	Local Government
Ronald Campbell	Frankenlust Township Supervisor	Local Government
Mark Galus	Fraser Township Supervisor	Local Government
James Dubay	Garfield Township Supervisor	Local Government
Laura Reynolds	Gibson Township Supervisor	Local Government
Terri Close	Hampton Township Supervisor	Local Government
Samuel Davidson	Kawkalin Township Supervisor	Local Government
David Schabel	Merritt Township Supervisor	Local Government
Bradley Kaye	Midland City Manager	Local Government
Maureen Donker	Midland Mayor	Local Government
Michael Haanda	Mt. Forest Township	Local Government
Sharon Stalsberg	Pinconning Township Supervisor	Local Government
Robert Pawlak	Portsmouth Township Supervisor	Local Government
Tim Morales	Saginaw City Manager	Local Government
Brian Keenan-Lechel	Saginaw County Parks & Recreation	Local Government
James Wickman	Saginaw Township Manager	Local Government
Timothy Braun	Saginaw Township Supervisor	Local Government
Bob Weise	Thomas Township Supervisor	Local Government
John Corriveau	Thomas Township	Local Government
Will Butterfield	Williams Township Supervisor	Local Government
James Plant	Williams Township Trustee	Local Government
Dawn Hergott	Arenac Conservation District	Local Government
John Burk	Bay Conservation District	Local Government
Katie Volmering	Huron Conservation District	Local Government
John Sanders	Iosco Conservation District	Local Government
Karen Thurlow	Midland Conservation District	Local Government
Nadene Berthiaume	Saginaw Conservation District	Local Government
Melissa Higbee	Shiawassee Conservation District	Local Government
Mike Boike	Tuscola Conservation District	Local Government
Brad Jensen	Huron Pines Resource Conservation & Development	Local Council
Jim Hergott	Saginaw Bay Resource Conservation & Development	Local Council

Name	Agency or Organization	Organization Type
Jonathon Jarosz	Heart of the Lakes Conservancy	Land Conservancy
Mike Levalley	Chippewa Watershed Conservancy	Land Conservancy
Elan Lipschitz	Little Forks Conservancy	Land Conservancy
Zachary Branigan	Saginaw Basin Land Conservancy	Land Conservancy
Mary Fales	The Nature Conservancy	NGO
Matt Herbert	The Nature Conservancy	NGO
Rich Tuzinsky	The Nature Conservancy	NGO
Laura Ogar	Partnership for the Saginaw Bay Watershed	NGO
Michael Kelly	The Conservation Fund / Saginaw Watershed Initiative Network	NGO
Mary Bohling	Michigan Sea Grant	NGO
Nick Tereck	Friends of the Shiawassee River	NGO
Tim Cook	Cook Family Foundation	NGO
Kali Rush	Ducks Unlimited	NGO
Jason Hill	Ducks Unlimited	NGO
Dane Cramer	Ducks Unlimited	NGO
Sharon Schneider	Michigan Sea Grant	NGO
Diane Fong	Bay Area Community Foundation	NGO
Rebecca Fedewa	Flint River Watershed Coalition	NGO
Dawn Hergott	Saginaw Bay CISMA	NGO
Laura Ogar	Bay County Environmental Affairs	NGO
Niruban Balachandran	C.S. Mott Foundation	NGO
Tracy Gilles Koch	Kawkalin River Watershed Association	NGO
Terry Miller	Lone Tree Council - MEC	NGO
Meaghan Gass	MSU Extension/Sea Grant	NGO
Mailing list	Friends of the Shiawassee NWR	NGO
Dennis Pilaske	Chippewa Nature Center	NGO
Gail Philbin	Sierra Club	NGO
Conan Smith	Michigan Environmental Council	NGO
Amy Trotter	Michigan United Conservation Clubs	NGO
Gail Gruenwald	Tip of the Mitt Watershed Council	NGO
Patrick Craig	Saginaw Field and Stream Club	NGO
Bill Vander Zouwen	Pheasants Forever - Michigan	NGO
Ben Beaman	Pheasants Forever - Michigan	NGO

Name	Agency or Organization	Organization Type
Bill Fischer	Pheasants Forever - Michigan	NGO
Todd Konechne	The Dow Company	Industry

8.6 Appendix D: Coordination and Consultation - Authorities

This Appendix provides a review of the primary applicable laws and regulations that guide decisions related to the Trustees' restoration actions. Restoration projects need to comply with federal, state, tribal, and local laws and regulations. There are also several permitting requirements associated with many of these laws and regulations, and the Trustees along with project proponents need to coordinate across these programs so that all restoration project implementation and monitoring is compliant with applicable laws and regulations. The Executive Branch of the United States has recently issued multiple Executive Orders relevant to environmental analyses conducted by federal agencies, including orders related to environmental justice, tribal consultation, climate change, and the environment. In addition, the Secretary of the Department of Interior has also issued Secretarial Orders relevant to the NEPA process.

The Trustees will require project proponents to fully coordinate with local units of government to ensure compliance with local requirements, including carefully considering relevant local plans and complying with applicable ordinances. Relevant local plans could include shoreline and growth management plans. Relevant ordinances could include erosion control, zoning, construction, noise, and wetlands.

The Trustees describe below their consideration of the authorities that direct the effort of the Trustee Councils to improve the transparency, efficiency, and relevance of their environmental analyses.

Clean Water Act

The Clean Water Act (CWA), 33 U.S.C. §§ 1251 et seq., is the principal law governing pollution control and water quality of the nation's waterways. Section 404 of the CWA (33 U.S.C. § 1344) prohibits the discharge of dredged or fill material into all waters of the United States, including wetlands, both adjacent and isolated, without a permit. The State of Michigan has assumed from the EPA the authority to regulate the placement of fill material in waterways and wetlands under provisions of Section 404(g)(1) of the CWA (33 U.S.C. § 1344(g)(1)). However, since Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403) does not provide for similar transfer to states, the U.S. Army Corps of Engineers (USACE) retains Section 404 jurisdiction within those waters that are navigable waters of the U.S. and their adjacent wetlands. The discharge of any fill materials must comply with state water quality standards consistent with Sections 301, 307, and 401 of the Clean Water Act (33 U.S.C. §§ 1311, 1317, and 1341). The EGLE/USACE Joint Permit Application package covers permit requirements pursuant to state and federal rules and regulations for construction activities where the land meets the water and including wetlands (EGLE, 2020). It is intended to prevent duplication of state and federal regulations. The application covers activities on or for areas regulated by Michigan's Natural Resources and Environmental Protection Act (MCL 324.101 et seq.). Project proponents will be required to submit permit applications and receive the necessary permits prior to implementing proposed projects.

Rivers and Harbors Act

The Rivers and Harbors Act (33 U.S.C. §§ 401 *et seq.*) regulates the development and use of navigable waterways within the United States. Section 10 of the Act prohibits unauthorized obstruction or alteration of navigable waters. It gives USACE the authority to regulate discharges of fill and other materials into such waters. Actions that require Section 404 CWA permits are also likely to require permits under Section 10 of this Act, and permits may be required for some of the in-water work at the restoration projects included in the Trustees' Preferred Alternative.

Coastal Barrier Resources Act

The Coastal Barrier Resources Act of 1982 (PL 97-348, Oct. 18, 1982) was enacted to regulate the actions of the federal government in areas considered to be undeveloped coastal habitats. The Coastal Barrier Improvement Act of 1990 (PL 101-591, Nov. 16, 1990) reauthorized and amended the Coastal Barrier Resources Act, expanding the authority of the Act to include undeveloped coastal barriers within the Great Lakes, among other areas. This collection of coastal areas is referred to as the Coastal Barrier Resources System (16 U.S.C. §§ 3501 *et seq.*). Reauthorization of the Act also made provision for a new category of coastal barrier referred to as an "otherwise protected area." These areas are comprised of conservation or recreation areas such as national wildlife refuges, state and national parks, local conservation areas, and private conservation areas. Portions of the Michigan Islands National Wildlife Refuge are included in this system of coastal barriers.

Comprehensive Environmental Response, Compensation and Liability Act

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. §§ 9601 *et seq.*, provides a legal framework for addressing injuries to the nation's natural resources resulting from releases of hazardous substances. The CERCLA, also known as the Superfund Act, establishes liability for injury to, destruction of, loss of, or loss of use of natural resources caused by the release of hazardous substances and authorizes recovery of natural resource damages for such injuries. Natural resource trustees are responsible, under CERCLA, for restoring, rehabilitating, replacing, or acquiring the equivalent of natural resources injured by hazardous substance releases and losses of services provided by those natural resources.

The CERCLA provides authorization to EPA to seek the cleanup of uncontrolled or abandoned hazardous waste sites, as well as emergency response related to releases of pollutants and contaminants into the environment. The CERCLA provides authorization to the Trustees to seek the restoration of ecological resources injured, destroyed, or lost as a result of the releases of pollutants and contaminants into the environment.

Endangered Species Act

The Endangered Species Act of 1973, as amended (16 U.S.C. §§ 1531–1544, ESA) provides for the conservation of endangered and threatened species of fish, wildlife, and plants. The ESA provides for the conservation of ecosystems upon which these species depend and provides a program for identification and conservation of these species. Federal agencies are required to ensure that any actions are not likely to jeopardize the continued existence of a

federally listed threatened or endangered species. Federally listed endangered, threatened, and candidate species potentially occurring at or near the proposed project sites are listed in Table 3-1 in this document. Potential effects and measures to avoid or minimize adverse effects to those species are discussed in Section 3.5.6. Section 7 of the ESA requires that federal agencies proposing an action consult with USFWS if the proposed action may affect endangered and threatened species or destroy or adversely modify designated critical habitat.

Executive Order 11514 – Protection and Enhancement of Environmental Quality

This Executive Order 11514 (March 5, 1970), which was amended in part by Executive Orders 11541 (July 1, 1970) and 11991 (May 24, 1977), directs federal agencies to monitor, evaluate, and control their activities in order to protect and enhance the quality of the nation's environment; to inform and seek the views of the public about these activities; to share data gathered on existing or potential environmental problems or control methods; and to cooperate with other governmental agencies. The release of this Draft Supplemental Restoration Plan and the types of projects envisioned under the Trustees' Preferred Alternative are consistent with the goals of this order. This Draft Supplemental Restoration Plan is the product of intergovernmental cooperation and will protect and enhance the environment. The restoration planning process has provided and continues to provide the public with information about, and opportunities to comment on, restoration efforts in the Saginaw Bay watershed.

Executive Order 11988 - Floodplain Management

This order, issued by President Carter on May 24, 1977, requires each federal agency to provide opportunity for early public review of any plans or proposals for actions in floodplains, in accordance with Section 2(b) of Executive Order 11514, as amended, including the development of procedures to accomplish this objective.

Executive Order 11990 – Protection of Wetlands

This order, issued by President Carter on May 24, 1977, and amended by Executive Order 12608 (September 9, 1987), requires each federal agency to provide opportunity for early public review of any plans or proposals for new construction in wetlands, in accordance with Section 2(b) of Executive Order 11514, as amended, including the development of procedures to accomplish this objective. The Trustees will work with permitting agencies to ensure that projects minimize any wetlands impacts and that all necessary permits are obtained.

Executive Order 12898 - Environmental Justice

This order, issued by President Clinton on February 11, 1994, and amended by Executive Orders 14008 (January 27, 2021) and 14082 (September 12, 2022), requires each federal agency to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. In the past, the United States emphasized the importance of incorporating environmental justice review in the analyses conducted by federal agencies under NEPA and of developing mitigation measures that avoid disproportionate environmental effects to minority and low-income populations.

The Trustees have not identified any disproportionate adverse impacts to human health or environmental effects of implementation of the restoration projects on Native Americans or minority or low-income populations and believe that these projects will be beneficial to communities in the Saginaw Bay watershed.

Executive Order 12962 – Aquatic Systems and Recreational Fisheries

This Executive Order, amended by Executive Order 13474 (September 26, 2008), directs federal agencies to, among other things, foster and promote restoration that benefits and supports viable, healthy, and sustainable recreational fisheries. The restoration projects in the Preferred Alternative would benefit aquatic systems, recreational fish species and their prey.

Executive Orders 13007 & 13175 – Indian Sacred Sites and Consultation and Coordination with Indian Tribal Governments

Executive Order 13007 describes federal policy for accommodating sacred Indian sites. This Executive Order requires federal agencies with statutory or administrative responsibility for managing federal lands to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religions' practitioners; (2) avoid adversely affecting the physical integrity of such sacred sites; and (3) maintain the confidentiality of these sacred sites. Executive Order 13175 exists to (1) promote regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications; (2) strengthen the United States government-to-government relationships with Indian tribes; and (3) reduce the imposition of unfounded mandates upon Indian tribes. This Supplemental Restoration Plan has been developed in collaboration with the Saginaw Chippewa Indian Tribe of Michigan, which serves as a Trustee for both the Tittabawassee and the Saginaw River and Bay NRDA cases.

Executive Order 13112 – Invasive Species

The purpose of Executive Order 13112, amended by Executive Order 13751 (December 5, 2016), is to prevent the introduction of invasive species, provide for their control, and minimize the economic, ecological, and human health impacts that invasive species cause. No invasive species will be intentionally introduced by any restoration project included in the Trustees' Preferred Alternative. In addition, these projects are required to follow best management practices to avoid such introduction and to follow rigorous monitoring plans to document invasive species on the project sites.

Executive Order 13990 - Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis

This Executive Order directs federal agencies to “immediately commence work to confront the climate crisis.” Wherever possible, the Trustees will ensure that climate-related considerations have been integrated into restoration project design.

The Trustees will require project proponents to fully coordinate with local units of government to ensure compliance with local requirements, including carefully considering relevant local plans and complying with applicable ordinances. Relevant local plans could include shoreline and

growth management plans. Relevant ordinances could include erosion control, zoning, construction, noise, and wetlands.

Executive Order 14008 – Tackling the Climate Crisis at Home and Abroad

This Executive Order directs federal agencies, including those of the Department of Interior to:

“implement a Government-wide approach that reduces climate pollution in every sector of the economy; increases resilience to the impacts of climate change; protects public health; conserves our lands, waters, and biodiversity; delivers environmental justice...”

Wherever possible, the Trustees will ensure that climate-related considerations have been integrated into restoration project design.

Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA), 16 U.S.C. § 661 et seq., requires the USFWS and National Marine Fisheries Service to consult with other state and federal agencies in a broad range of situations to help conserve fish and wildlife populations and habitats in cases where federal actions affect natural water bodies. As required by the FWCA, the USFWS is in close coordination with all of the agencies in the Trustee Councils on all aspects of the two NRDA cases represented in this Draft Supplemental Restoration Plan.

Information Quality Guidelines

Information disseminated by federal agencies to the public after October 1, 2002, is subject to information quality guidelines developed by each agency pursuant to Section 515 of Public Law 106-554, December 21, 2000, 114 STAT. 2763, that are intended to ensure and maximize the quality of such information (i.e., the objectivity, utility, and integrity of such information). This Draft Supplemental Restoration Plan is an information product covered by the information quality guidelines established by DOI for this purpose. The information collected herein complies with applicable guidelines.

Michigan Natural Resources and Environmental Protection Act

The Michigan Natural Resources and Environmental Protection Act, Public Act 451 of 1994, as amended (NREPA) is in place to:

“protect the environment and natural resources of the state; to codify, revise, consolidate, and classify laws relating to the environment and natural resources of the state; to regulate the discharge of certain substances into the environment; to regulate the use of certain lands, waters, and other natural resources of the state; to protect the people's right to hunt and fish; to prescribe the powers and duties of certain state and local agencies and officials; to provide for certain charges, fees, assessments, and donations; to provide certain appropriations; to prescribe penalties and provide remedies; and to repeal acts and parts of acts.”

The parts of NREPA that may apply to certain proposed restoration projects include, but are not limited to, the following: Part 31, Water Resources Protection; Part 91, Soil Erosion and Sedimentation Control; Part 301, Inland Lakes and Streams; Part 303, Wetlands Protection;

Part 315, Dam Safety; and Part 365, Endangered Species Protection. Project proponents will be required to submit permit applications and receive the necessary permits prior to implementing proposed projects.

National Environmental Policy Act

The National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4321 et seq., is the Nation's premier environmental statute that ensures that every American has the right and opportunity to contribute to the planning of federal decisions that may affect the human environment. The National Environmental Policy Act affirms the obligation of government agencies to engage the public in the decision-making process and to disclose the effects of federal decisions.

National Environmental Policy Act analyses, typically considered in terms of negative impact or harm, consists of a consideration of significance criteria, direct effects, indirect effects, and the cumulative effects of a proposed action. Direct effects are those "which are caused by the action and occur at the same time and place" (40 C.F.R. § 1508.1(g)(1)). Indirect effects are "caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 C.F.R. § 1508.1(g)(2)). Cumulative effects are effects on the environment that result from the incremental impacts or effects of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 C.F.R. § 1508.1(g)(3)).

National Historic Preservation Act

The National Historic Preservation Act of 1966 (NHPA), as amended, 16 U.S.C. §§ 470 et seq. is intended to preserve historical, cultural, and archaeological resources that may be affected by federal activities or work supported by federal funding. Among other considerations, the NHPA created the President's Advisory Council on Historic Preservation and the National Register of Historic Places. Projects, such as the restoration actions described within this Draft Supplemental Restoration Plan, are subject to what is known as the Section 106 review process. In the case of the two Trustee Councils that have developed this Draft Supplemental Restoration Plan, prior to implementation, information regarding the proposed projects is assembled by the administrative trustee for the respective Trustee Council, and the Section 106 review of the projects is conducted by the Regional Historic Preservation Officer of, in this case, the USFWS.

Perhaps more importantly, the two Trustee Councils have adopted what is known as a 'discovery plan.' A discovery plan details the responsibilities of all parties in the event that historic, archaeological, or cultural resources are discovered during the implementation of any particular restoration action. The text of the Discovery Plan adopted by the Trustee Councils is included in this document as Appendix E.

Presidential Memoranda – Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-based Policy Making

This January 27, 2001 Presidential Memorandum directs agencies of the federal government to make evidence-based decisions guided by the best available science and data. This

memorandum affirms and builds upon the principle of scientific integrity delivered in the March 9, 2009 Presidential Memorandum – Scientific Integrity.

The restoration criteria used by the Trustees and the analysis reported here have been intended to ensure that these emphases on scientific integrity and transparency in the decision-making process have been met.

Presidential Memorandum - Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment

This November 3, 2015 Presidential Memorandum emphasizes the importance of mitigating adverse impacts to land, water, wildlife, and other ecological resources. It stresses the need for clear and consistent approaches to avoid and minimize adverse impacts to natural resources and to provide for compensatory mitigation. Federal agencies are directed:

“to avoid and then minimize harmful effects to land, water, wildlife, and other ecological resources (natural resources) caused by land- or water-disturbing activities, and to ensure that any remaining harmful effects are effectively addressed, consistent with existing mission and legal authorities. Agencies shall each adopt a clear and consistent approach for avoidance and minimization of, and compensatory mitigation for, the impacts of their activities and the projects they approve.”

This memorandum also provides direction to environmental planning efforts such as this one:

“Large-scale plans and analysis should inform the identification of areas where development may be most appropriate, where high natural resource values result in the best locations for protection and restoration, or where natural resource values are irreplaceable.”

The Trustees believe that the restoration criteria used to prioritize restoration projects in this Supplemental Restoration Plan encompasses the areas of emphasis communicated in this memorandum.

Secretarial Order 3398 - Revocation of Secretary’s Orders Inconsistent with Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis

In this April 16, 2021 Secretarial Order, the Secretary of the Department of the Interior revoked previous Secretarial Orders inconsistent with the Department’s mission to protect public health and the environment and the use of science to address climate change. In effect, this Secretarial Order provided that is the policy of the Department to use the best available science as a guide to, among other things, bolster resilience to the impacts of climate change.

The Trustees have carried forward in this analysis the emphasis on ecological resiliency that has been addressed in the restoration plans previously published by the Tittabawassee and Saginaw River & Bay Trustee Councils. The issue of ecological resiliency is an issue that is central to addressing the anticipated impacts of climate change.

Secretarial Order 3399 - Department-Wide Approach to the Climate Crisis and Restoring Transparency and Integrity to the Decision-Making Process

In this April 16, 2021 Secretarial Order, the Secretary of the Department of the Interior provided direction to the Department's Bureaus to prioritize actions that address climate change. This Order also provides guidance related to the use of science in the decision-making process and clarifies Departmental policy related to the public transparency of decision-making by the Department's Bureaus and Offices. This Order also relates these directives to the requirements of the NEPA process. This Supplemental Restoration Plan was developed to meet the requirements of this Order, in addition to fulfilling the obligations related to public engagement in the decision-making process which is fundamental to the NEPA process.

8.7 Appendix E: Saginaw River & Bay Trustee Council Discovery Plan

Discovery Plan for Saginaw River & Bay Restoration Projects Saginaw River & Bay Trustee Council

This Discovery Plan has been developed to assist Natural Resource Damage Assessment and Restoration (NRDAR) Trustees and the agencies, organizations, or contractors implementing restoration projects (Implementing Entities) to meet the requirements of the "*Protection of Historic Properties*" regulations ([36 CFR Part 800](#)). This guidance takes into account archaeological and cultural resources as part of planning process for construction activities and provides guidance should archaeological or cultural resources be discovered during construction activities. This guidance is intended to inform the implementation of restoration projects funded by the NRDAR Trustees for the Saginaw River & Bay.

This Plan was created in accordance with the requirements found in "Protection of Historic Properties" regulations issued by the Advisory Council on Historic Preservation, the Native American Graves Protection and Repatriation Act (NAGPRA) regulations in [43 CFR Part 10](#), and [Part 761 of Michigan's Natural Resources and Environmental Protection Act of 1994](#) (Public Act 451, NREPA).

The Discovery Plan addresses the treatment of inadvertently discovered archaeological and cultural resources such as artifacts and earthworks, and the discovery of human remains, burial sites, and funerary objects.

Before Construction Begins

During the planning stage of construction activities that will involve earth moving activities, the NRDAR Trustees and Implementing Entities should consider the following steps:

- 1) Clearly identify the area of potential effects that could be impacted by construction activities.
- 2) Review available historic archaeological survey documents(s) covering the area of potential effects. The [Hinsdale Archeological Atlas](#) lists known archaeological features in Michigan (<https://quod.lib.umich.edu/g/genpub/1265156.0001.001?view=toc>).
- 3) Where there is a possibility that archaeological or cultural resources may be present at a site, consult with a local Tribal Historic Preservation Officer to identify the type, character, and probability of discovery of archaeological or cultural resources.
- 4) Project managers should provide training to onsite construction personnel regarding this Discovery Plan. Personnel implementing restoration actions should be able to identify their respective roles in implementing the Discovery Plan.
- 5) Where there is a possibility that archaeological or cultural resources may be present at a site, tribal representatives will be invited to the site to provide training for field personnel, including heavy equipment operators, on how to identify cultural artifacts, archaeological resources, or human remains along with potential grave markers. This training should include an overview of the procedures outlined below.

- 6) Where there is a possibility that archaeological or cultural resources may be present at a site, designate an Archaeological Monitor that will observe ground-disturbing construction activities.

Discovery of Archaeological Resources During Construction

If archaeological or cultural resources are identified during project construction, the Implementing Entity will ensure that the following steps are implemented. The discovery of human remains is addressed in the section that follows.

- 1) If the Archaeological Monitor or any member of the construction crew believes that they have encountered archaeological or cultural materials, construction activities within the immediate area of the discovery will be halted and the discovery will be protected from further disturbance. The immediate area shall be defined as roughly 30 to 50 feet from the discovery location, depending on the physical features of the affected area. Protection of the discovery site shall include a demarcation of the area by temporary fencing such as construction barrier fencing (or similar materials).
- 2) In the event of a discovery, the Implementing Entity's Project Manager will be notified immediately, and they will contact the NRDAR Trustee Case Manager. The Implementing Entity's Project Manager, or their designee, will notify the State Historic Preservation Officer and the Tribal Historic Preservation Officer in the event of discovery of likely cultural resources.

These notifications, along with notice to the NRDAR Trustee Case Manager identified for the project, will take place within 12 hours (same day) of a discovery.

- 3) The Archaeological Monitor will prepare field notes describing the object(s). For objects other than human remains, sketches of the objects should be prepared. If it is possible to do so without further disturbing the objects, a ruler or tape measure may be used to obtain measurements and provide scale to use in field notes and sketches. No photographs should be taken.
- 4) In order to ensure the protection, preservation, and respectful treatment of any discovered objects, pursuant to applicable law, the nature and location of any discovery shall remain confidential. Only those persons and entities identified in the Discovery Plan shall be notified or given information about the discovery.
- 5) The Implementing Entity will secure the area of the discovery, protect it from the elements, and secure it as directed by the State Historic Preservation Officer and the Tribal Historic Preservation Officer, as appropriate. Should suspected theft of artifacts occur, the project manager will report the theft to the State Historic Preservation Officer, County Sheriff, and Tribal Historic Preservation Officer, as appropriate, within 12 hours (same day) of the discovery of the disappearance.
- 6) The Implementing Entity will consult with and follow an approved course of action for the resumption of construction activities developed with the County Sheriff, State Historic Preservation Officer, and the Tribal Historic Preservation Officer if cultural resources have been identified.

Additional Procedures for Human Remains

- 1) In the case of the discovery of human remains, those remains must be treated with the utmost respect. If the Archaeological Monitor is not present at the time of discovery, the onsite supervisor will be responsible for stopping excavation work within the immediate area. The immediate area shall be defined as roughly 30 - 50 feet around the discovery but will depend on the physical features of the affected area. Protection shall include a demarcation of the area by construction barrier fencing (or similar materials) and may include covering the area with a secured tarp or plastic sheeting.
- 2) If human remains are discovered, the County Sheriff, State Historic Preservation Officer, Tribal Preservation Officer, and the NRDAR Case Manager, will be notified immediately (as soon as possible) by the Project Manager.
- 3) Human remains should not be touched, moved, photographed, or disturbed in any way until the State Historic Preservation Officer, Tribal Historic Preservation Officer, and the local County Medical Examiner have made a determination as to the forensic or non- forensic nature of the remains. The determination of the disposition of any remains or funerary objects will be made by the representatives of the respective authorities, as appropriate.
- 4) The Implementing Entity and the NRDAR Case Manager will consult with and follow an approved course of action for the re-initiation of construction activities developed with the County Sheriff, State Historic Preservation Officer, and the Tribal Historic Preservation Officer, as appropriate, if human remains or funerary objects have been identified.

CONTACT LIST

Points of contact should be identified for each project where earth moving activities may occur in areas where archaeological resources or artifacts, or human remains, may be encountered.

Implementing Entity

Project Manager

Construction Manager

NRDAR Case Manager – Saginaw River & Bay Trustee Council

Clark D. McCreedy, Contaminant Specialist
US Fish and Wildlife Service
2651 Coolidge Road, Suite 101
East Lansing, MI 48823
clark_mccreedy@fws.gov
517-351-8273

State Archaeologist - Michigan State Historic Preservation Office

Brian Grennell, Cultural Resource Management Coordinator
Michigan Historical Center
300 North Washington Square
Lansing, Michigan 48913
517-335-2721
grennellb@michigan.gov

Stacy Tchorzynski, Archaeologist
Michigan Department of Natural Resources
Michigan Library and Historical Center
820 W Washtenaw St.
Lansing, Michigan 48915
TchorzynskiS@michigan.gov
517-335-2591

Saginaw Chippewa Tribal Historic Preservation Officer

Marcella L. Hadden, Tribal Historic Preservation
Officer Tribal Historic Preservation Office
6050 E. Broadway
Mt. Pleasant, MI 48858
mlhadden@sagchip.org
989-775-4751

Saginaw County Law Enforcement

William L. Federspiel, Saginaw County Sheriff
311 S. Harrison
Saginaw, MI 48602
wfederspiel@saginawcounty.com
989-790-5456

Saginaw County Medical Examiner c/o
Michigan Institute for Forensic Science &
Medicine 4707 McLeod Drive East
Saginaw MI 48604
989-341-5077
forensics@mifsm.org