ROUGE RIVER AOC WAYNE COUNTY HABITAT RESTORATION

Project Funding Request: $6,500,000

Organization: Charter County of Wayne, Michigan

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Project Location: Dearborn/Westland/Livonia, Michigan
Wayne County
Congressional Districts: M11, M12, and M13
Zip Codes: 48124/48150/48185

Project Duration: October 2016 – October 2019

PROJECT ABSTRACT

The Rouge River watershed is a designated AOC under the Great Lakes Water Quality Agreement (GLWQA), and has three Beneficial Use Impairments (BUIs) associated with fish and wildlife habitat: Degraded Fish and Wildlife Populations, Degradation of Benthos, Loss of Fish and Wildlife Habitat. The Rouge River Advisory Council (RRAC), the Public Advisory Council (PAC) for the Rouge AOC, approved, in March 2016, a list of projects that need to be completed in order to remove the Rouge AOC habitat BUIs. As part of that list three activities/projects were considered as having significant impact on the removal of the BUIs. These are the Henry Ford Estate Dam Fishway, Rouge Oxbow Phase 3, and Nankin Lake Restoration. The result of these activities will reconnect 50 miles of the Rouge River and 108 additional miles of its tributaries to the Great Lakes system, over 40,000 cubic yards of fill and sediment removed, 4 acres of habitat, and 3 acres of invasive species control.

PROBLEM STATEMENT

Wayne County, on behalf of and in partnership with the Alliance of Rouge Communities (ARC), is requesting grant funding for Rouge River Area of Concern (AOC) Wayne County Habitat Restoration Projects as part of our efforts to delist the AOC. The Rouge River watershed is a designated AOC under the Great Lakes Water Quality Agreement (GLWQA), and has three Beneficial Use Impairments (BUIs) associated with fish and wildlife habitat: Degraded Fish and Wildlife Populations, Degradation of Benthos, Loss of Fish and Wildlife Habitat.

During the last century, the Rouge River has suffered from declining water quality and increased flood conditions, primarily due to increasing urbanization within the watershed. The flat river slope and the meandering channel could not pass the large flows associated with major precipitation events. Upstream urbanization continued to exacerbate this problem due to increased amounts of impervious surfaces culminating in floods within downstream local communities. Water quality in recent years, though, has improved since 1992 thanks to the federally-funded Rouge Project. For example, 89 of the 127 miles of the larger streams and tributaries in the watershed are now free from public health threats associated with uncontrolled combined sewer overflow discharges. Water quality improvement is exhibited by increased dissolved oxygen

levels needed to sustain fish and aquatic life. Increased populations and diversity of benthos, fish and wildlife have been measured along the river since 1999. Also, the U.S. EPA Office of Inspector General declared the Rouge Project "a blueprint for success" (EPA OIG report number 2002-P-00012). Wayne County helped organize and is an active member of the Alliance of Rouge Communities (ARC) to continue and sustain the Rouge AOC restoration efforts.

The ARC is the Rouge River Public Advisory Committee's (PAC) fiduciary and coordinating organization. Many of the previously completed reports [Ex: Habitat Delisting Targets (2008), Rouge River Delisting Strategy (2012), Upper Rouge Delisting Strategy (2012), and Rouge River BUI Report Card (2013)] listed project types, in addition to specific projects, that needed to be completed in the watershed to remove the Habitat BUIs and delist the AOC have been implemented by the ARC and Wayne County. The EPA, MDEQ, MDNR, RRAC, ARC and Wayne County staff began facilitating the development of the formal list for removal of the Habitat BUIs in 2015. This work resulted in the development of a final Rouge AOC Habitat list that was approved by the PAC/RRAC and submitted to MDEQ in March 2016. On that list were three projects that were considered by MDEQ, MDNR and EPA to be top priority projects:

- Henry Ford Estate Dam Fishway - Providing fish passage at the HFE Dam has been identified by the Rouge River Advisory Council (RRAC) as one of the highest priority projects within the watershed to address the habitat and population BUIs within the AOC as detailed in the *Delisting Targets for Fish & Wildlife Habitat & Population Beneficial Use Impairments for the Rouge River Area of Concern* (RRAC, 2008) (AOC document). Providing fish passage at the Henry Ford Estate Dam has also been identified, since 1998, by the Michigan Department of Natural Resources (MDNR) – Fisheries Division as one of the priority projects within the system for recovering of the fishery (DNR Fisheries Special Report Number 22 titled "Rouge River Assessment" (by Beam and Braunscheidel) prepared by the Michigan Department of Natural Resources- Fisheries Division in 1998).

- Rouge Oxbow Restoration Phase 3 - Floods within downstream local communities created tremendous financial impact and caused the communities to seek help from the federal government. A resulting flood control project was authorized by the Flood Control Act of 1962 to prevent flooding of the Dearborn/Melvindale area of the Rouge River. The project was completed in the mid-1970s. The resulting United State Army Corps of Engineers (USACE) concrete channel was hydraulically efficient and cost effective. Unfortunately, it destroyed much of the aquatic habitat (i.e. elimination of shoreline wetlands, submerged protective areas, shaded shoreline areas, etc.) and all but precluded the passage of most fish from the abundant Detroit River to the upper reaches of the Rouge River. In an effort to provide habitat, resting locations for migratory fish, recreational opportunities and restored wetland areas, Wayne County (MI) and The Henry Ford began to restore the Oxbow in 2002 and Phase 3 would make the last hydraulic connection and habitat improvements needed to complete this project.

- Nankin Lake Restoration Project - Over the years, Nankin Lake, an impoundment located in Livonia, MI along the Middle Branch of the Rouge River, has slowly filled in with sediment. Due to this buildup, the lake is shallow in many areas and has visible depositional areas and islands as a result, decreasing the total acreage of water and habitat present by approximately 1.5 acres. Sedimentation has also degraded shallow water habitat in the littoral zone. Invasion of phragmites and narrow-leaf cattail in shallow water habitat has further degraded the aquatic habitat. Overall, fish productivity and the carrying capacity of the lake have declined dramatically. Flow during storm events effects the impoundment and downstream habitats significantly. The ability to reduce damaging storm flows will significantly aid in creation and maintaining habitat in the Middle Rouge River. The project will restore the ecosystem functions the lake provides; including valuable spawning, nursery, and forage habitat for fishes and other aquatic species of all life stages.

Each of these projects involves Wayne County as a major landowner/partner and will provided benefit to many or all of the ARC members.

Relevance to Existing Restoration Plans and Priorities - The proposed project responds directly to multiple plans and priorities within the Rouge River AOC:

- The Rouge RAP Advisory Council's *2016 Rouge River Remedial Action Plan Habitat Projects List* identifies these activities as a top priority for delisting the Rouge River AOC.
- The Rouge River Watershed Management Plan, prepared by the ARC, recognizes river and lake habitat restoration as a key factor in the watershed's restoration.
- Activities respond to the *Great Lakes Regional Collaboration Strategy* focus on "Riverine Habitats and Related Riparian Areas" and its long-term goals including conservation of rivers and sustaining native/ migratory fish and aquatic biota/ wildlife.

Each of the three Rouge River AOC Wayne County Habitat Restoration Project activities is discussed below.

Henry Ford Estate Dam Fishway

This project activity will be a continuation of the existing Henry Ford Estate Fishway project currently being designed under a NOAA grant to the ARC with Wayne County as a sub-grant partner. This EPA grant will allow Wayne County to continue the partnership with the ARC to realize implementation of the Henry Ford Estate Fishway including development of construction contract bid documents, obtain Wayne County Permit Office construction and City of Dearborn SESC permits, provide for construction oversight services with Engineer of Record and complete fishway construction. Under the current NOAA grant to the ARC, the design and MDEQ permitting is being completed and will be completed in early 2017. Wayne County, an ARC member, will partner with the ARC through a sub-grant Interagency Agreement (IAA) for ARC staff to support construction contract bid document preparation, constractor selection and to provide construction oversight assistance. Through a competitive bid process, with ARC support, Wayne County will hire a contractor to construct the HFE Dam Fishway consistent with the NOAA grant design and according to the contract documents.

The current HFE Dam is located 8 miles upstream of the Rouge River's confluence with the Detroit River. It is the first dam on the 127-long Rouge River upstream of the Detroit River and the Great Lakes system. The result of the Fishway project will have a positive impact on an estimated 50 river miles and 108 miles of tributary stream for fish migration and reconnection to the Great Lakes. Fish passage at the HFE Dam will address three of the Rouge River AOC BUIs: Loss of Fish and Wildlife Habitat, Degradation of Fish and Wildlife Populations, and Degradation of Benthos. The fish passage project will also contribute to the GLRI Action Plan, Focus 4: Habitat and Wildlife Protection and Restoration. Specifically, the project will contribute to the following interim objective: "*By 2014, 3,000 miles of Great Lakes Rivers and tributaries will be reopened and the 500 barriers to fish passage will be removed or bypassed.* Establishment of the fish passage in the form of a natural by-pass channel will not only provide fish passage but provide improved substrate diversity within the river corridor and enhance stability of the dam.

The primary project goal is to restore and improve fish and wildlife habitat to promote healthy populations of desirable native fish, wildlife and benthos populations within the Rouge River Watershed. These objectives are:

- Construct passage around the HFE Dam and hydrologically reconnect approximately 50 miles of the Rouge River and 108 additional miles of its tributaries to the Great Lakes system, through a natural channel fishway.
- Provide for ancillary benefits at the project site (e.g., bank stabilization / erosion control, enhanced habitat and recreational use).
- Restore riparian corridor along both sides of the channel and along the west bank of the Rouge River.

- Control invasive species through implementation of integrated pest management strategies and best management practices.

In order to achieve these objectives a natural channel fishway will be constructed to design specifications and permit conditions to allow fish to bypass the Henry Ford Estate Dam. The project activity strives to not only pass a diversity of fish species at varying life stages in the most efficient manner possible over the widest range of flow conditions possible, but also to provide suitable aquatic habitat for many of the organisms that live in the river. The construction of this fish passage is simple and ecologically minded. It will achieve a good fit with the natural riverine floodplain aesthetics. Additionally, for the fishway's long-term sustainability, maintenance access will be constructed. Expected design elements will include:

- Channel slope of 0.8%.
- Channel length of 850 feet.
- 20-foot wide, 1.7 foot deep fishway channel with a two-stage flood channel
- Optimized passage characteristics (depth, velocity, discharge) during the spring migration season (March through May).
- Contain quality aquatic habitat for wildlife, aquatic insects, crayfish, and fish.
- The fishway channel will be constructed of native stone and cobble to roughen the channel and creates a naturalized appearance.
- A series of riffles and pools will be used to create deep water habitat, shorten high velocity flow fields, dissipate energy, and increase habitat diversity.
- The fishway channel banks and floodway over-bank areas and slopes will be planted with a variety of grasses, forbs, shrubs, and trees to establish native vegetation that provides habitat, shades the fishway, stabilizes the banks, and reduces flow velocity.

Outputs

- 50 Rouge River miles and 108 miles of Rouge tributary reconnected to Great Lakes
- 850 linear feet of natural channel fishway

Rouge Oxbow Restoration Phase 3

This project activity will be a continuation of the existing Oxbow Restoration Phase 3 Project implemented under a NOAA grant to the ARC with Wayne County as a sub-grant partner. This EPA grant will allow Wayne County to continue to partner with the ARC to implement the Oxbow Restoration Phase 3 Project including development of the construction contract bid documents, obtain Wayne County construction permit and City of Dearborn SESC permits, provide for construction oversight services from the Engineer of Record and complete Oxbow Phase 3 construction . Under the previous NOAA grant, to the ARC, the design and MDEQ permitting was completed for this project activity. Wayne County, an ARC member, will partner with the ARC through a sub-grant Interagency Agreement (IAA) for ARC staff to support construction contract bid document preparation and to provide construction oversight assistance. Through a competitive bid process, Wayne County will hire a contractor to construct the Oxbow Restoration Phase 3 Project consistent with NOAA grant design and according to the contract documents.

The Oxbow Restoration Phase 3 project has been identified as a priority project within the Rouge River Area of Concern (AOC) to address the habitat and population-related beneficial use impairments (BUIs) by the Rouge River Advisory Council (RRAC). BUIs within the AOC are detailed in the *Rouge River Area of Concern Beneficial Use Impairments*

Delisting Strategy (RRAC and ARC, 2011, revised, 2012), According to this report, numerous fish will benefit from the hydraulic reconnection of the Oxbow at The Henry Ford, including largemouth bass, bowfin and numerous sunfishes.

The primary objective of this project is to restore valuable fish habitat in a critical area within the Rouge River and to restore functioning riverine wetlands that have been lost due to channelization of the river. Secondary objectives include improvement of water quality and increased wildlife usage. To restore the historic flow characteristics and ecological functions of the severed oxbow, the northwest end of the oxbow will be hydraulically re-connected through an open channel to the mainstream Rouge River.

The *Delisting Targets for Fish & Wildlife Habitat & Population Beneficial Use Impairments for the Rouge River Area of Concern* (RRAC, 2008) described this portion of the Rouge River as heavily developed though it still retains a moderately intact riparian corridor in the reaches adjacent to The Henry Ford and Henry Ford Estate. This is due to the connection of the floodplain riparian corridor with the river. This floodplain function also provides opportunities for habitat enhancements.

The RRAC summarized impaired uses of this portion of the Main Branch as impaired or severely impaired for water contact, warm water fisheries, habitat degradation, aesthetics degradation, aquatic life and wildlife degradation and navigation. This construction project will directly address everything but water contact impairment. In particular, the project will restore habitat, improve warm water fisheries, aesthetics and aquatic and wildlife populations. The project will reconnect and restore valuable fish and wildlife habitat within the Rouge River and reconnect/restore functioning riparian wetlands that were lost due to the channelization of the river. The project will also improve water quality, increase floodplain storage, enhance education/interpretive opportunities, and provide passive recreation opportunities and economic development. The specific objectives of the proposed restoration project include:

- Promotion of spatial heterogeneity within and between created restored and enhanced ecological community types.
- Promotion of plant and animal species productivity and diversity within and between restored ecological community types.
- Enhancement of ecotones and connectivity between adjacent ecological community types
- The establishment of fundamental vegetation composition and structure of restored communities on a per stratum basis.
- Inclusion and enhancement of structural components (snags, hummocks, etc.) that may provide life requisites or microhabitats for plant and animal species reintroduction.
- Incorporate access to the created island to ensure opportunities for recreation, education and interpretation as well as general long-term maintenance access.

The Oxbow restoration which will result in: 1) the reconnection of the historic river channel through and to the existing concrete-lined and channelized segment of the Rouge River, 2) the restoration of adjacent forested floodplain that complements the existing oxbow restoration, and 3) passive recreation access and improved habitat interpretive education opportunities at the facility. Modifications to the riverbank include bioengineering techniques, riparian habitat creation, and slope stabilization. Of equal importance is construction of appropriate hydraulic structures at the oxbow channel inlet/outlet to withstand the high velocities associated with flood flows that will contain the 100-year storm while providing an open connection to the Rouge River. This includes breaching the existing earthen berm (behind the concrete-lined channel). The implementation of this project will restore a connection for benthic macro-invertebrates, amphibians, birds, fish and small mammals. Benefits to bass, channel catfish and bowfin will be provided by the development of the created lacustrine habitat.

The proposed activities involve connecting the northwest end of the Oxbow within to the Rouge River through the means of an open channel. The Oxbow is currently hydraulically connected to the Rouge River via an enclosed storm sewer pipe within the proposed project area. The project will include the removal of the pipe and excavation to create an open connection channel at the northwest end of the Oxbow. The proposed open channel connection will extend under Eagle Lane, a driveway that serves the Henry Ford. A bridge structure will be constructed over the proposed channel connection. Natural stone protection will be placed along the bottom of the proposed connecting channel and under the bridge structure. Native vegetation and structure habitat (such as bolder stones, logs) will be installed in and along the restored channel. There will be a portion of concrete channel that is removed as part of this project. A new concrete apron will installed at the channel opening to tie into the existing concrete channel at the Rouge River.

The project was designed to maximize benefits to fish and wildlife habitats, and provide a natural system, both in ecologic function and appearance. The connections to the river will be supplemented with bio-engineering techniques such as vegetated coverings. The proposed structures were designed to facilitate flow and flood storage requirements, while maximizing aquatic habitat improvements. Once connected to the Rouge River, approximately 2,700 linear feet of riverine habitat will be established as measured from the tie-in to the existing channel to the tie-in at the proposed outlet. Key components of continued restoration efforts include:

- Planting of upland forest "gaps" to provide connectivity with the upland and wetland habitat restoration areas.
- Removal of a portion of the Rouge River concrete channel lining and regrading of the shoreline to elevations that accommodate the effective planting and seeding of a transitional wetland, mesic meadow and a shrub dominated upland transition zone.
- Protect the exposed edge of the concrete channel against erosion and undermining by constructing an integral concrete thickened edge extending down several feet into the subgrade.
- Construction of a shoreline erosion protection structure(s) composed of stone riprap with strategically placed vegetation.
- Eradication of exotic and nuisance plant species throughout the project area.

The proposed bridge structure consists of pre-cast concrete elements, founded on a deep pile foundation. The aesthetics of the pre-cast structure was chosen to maintain consistency with the bridge at the southeast connection. As is common practice for the design of bridges carrying vehicular traffic in Michigan, the proposed bridge was designed according to the current edition of the Standard Specifications for the Design of Highway Bridges published by the American Association of State Highway and Transportation Officials (AASHTO). The footing pressure and pile load and bridge structure were designed using the Load Resistance Factor Design (LRFD) method.

The proposed vegetation will restore the native riparian zone plant communities from the upland forest edge to the aquatic zone. In addition, the proposed plantings locations were chosen with the intention to create a natural riparian corridor habitat that is expected to provide fish and wildlife habitat heretofore nonexistent in the channel's current condition. A measure of water quality benefits could be attributed to the introduction of the native plantings. The natural shoreline condition will extend the landscape development of The Henry Ford site to the edge of the Rouge River.

<u>Outputs</u>

- Reconnect oxbow to 20 Rouge River miles, 100 tributary miles and the Great Lakes
- 2,700 liner feet of naturalized oxbow reconnected
- 7,000 yards of debris and fill removed
- 280 liner feet of new channel
- 13 Habitat structures created

Nankin Lake Restoration Project

This project activity will design, permit and implement the Rouge River AOC's Nankin Lake Restoration priority project including development of invitation to bid documents for design & construction engineering (Engineer of Record) services, obtain MDEQ, Wayne County construction and City of Livonia SESC permits, develop invitation to bid documents for construction services and implement construction of the Nankin Lake Restoration. Wayne County will hire, through a competitive bid process, an engineering firm to provide design, permitting, contract documents, and construction oversight services. Wayne County will also hire, through a competitive bid process, a construction contractor to construct the Nankin Lake Restoration according to approved design, permit conditions and construction contract documents.

The Nankin Lake Restoration project has been identified as a priority project within the Rouge River AOC to address the habitat and population-related, and eutrophication and undesirable Algae beneficial use impairments (BUIs) as approved by the Rouge River Advisory Council (RRAC). This project would consist of the following restoration elements:

- Removal of sediments within Nankin Lake and the re-shaping of the reservoir basin morphology to create more open water area, shallow water habitats, littoral zone aquatic bed wetlands, structured drop-offs, sediment fore-bay, and over-wintering deep water habitat. This aquatic restoration project will improve fish spawning, nursery, and cover habitat; waterfowl habitat; and aquatic turtle habitat.
- A sediment fore-bay will be constructed the will allow for capture of sediment deposition from the river as it enters the lake. Thereby assisting in the protection of the lake habitat. The fore bay will also allow Wayne County a location that is able to be monitored and maintained when conditions require.
- Restoration of the aquatic benthic substrates, submerged and emergent aquatic vegetation, and riparian habitat. The addition of new substrates would include sandy gravels and cobbles in strategic locations that would provide spawning substrate, attachment points, and cover for fishes, aquatic insects, crustaceans, and other aquatic fauna. Native submerged, emergent, and floating aquatic vegetation will be planted in shallow water littoral zone areas around the lake to create lacustrine wetland habitat for waterfowl feeding, fish spawning and nursery habitat, and nutrient sequestration within the Nankin Lake.
- Woody debris in the form of felled trees along the shoreline and wood cribs placed offshore will increase habitat diversity and provide cover for forage fish and spawning fish, basking sites for waterfowl and turtles, and attachment surfaces for aquatic insects. In addition to wood debris, boulder clusters will be added off-shore to add cover for spawning fish that spawn in deeper water, cover for small fish, and feeding areas for adult fish.
- A 0.5-acre pike spawning and amphibian marsh will be constructed within the riparian woods along the south side of the lake off Nankin Lake Drive. The marsh will be a reproductive site for northern pike, yellow perch, black crappie, salamanders, frogs, and toads. The marsh will have a permanent surface water connection to allow fish to move between the marsh and lake. Given its location, the marsh would also offer an excellent opportunity for outdoor education. It would be planted with native shrubs and sedges. The riparian forest will provide shading that will limit the colonization of invasive species such as phragmites and narrow-leaf cattail.
- Native fish will be stocked to accelerate the restoration of a balanced game fish and forage fish assemblage within the lake following dredging and habitat construction. This would include stocking favorable sport fish species such as largemouth and smallmouth bass, various sunfish species, black crappie, northern pike, and channel catfish. Naturally occurring forage fish within the Rouge River would be stocked to create a strong and sustainable forage base for adult fish and wading birds.
- Invasive species management will be conducted within the current vegetative corridor (approximately 50-foot on the north and south shorelines). This corridor will be adjusted once field investigation of defined the corridor extent has been conducted. Native fruit- and nut-bearing shrubs and trees will be planted within an approximately 50-foot wide riparian corridor along the north and south sides of the lake to provide near shore habitat. Target invasive species include

buckthorn, honeysuckle, autumn and Russian olive, privet, Siberian elm, tree of heaven, and garlic mustard. In addition, dead ash will be harvested to create room for new native trees. Some dead ash and elm trees will be kept to provide snag habitat for birds, mammals, bats, and other animals that use them. Some dead ash trees will also be felled and left on the forest floor to provide habitat for small woodland mammals and salamanders.

- Improvements to pervious and impervious surfaces to reduce direct non-point source pollution to the lake. This may include vegetative upland buffers (no-mow zones), bioswales, and raingardens near the parking lots to collect and filter surface drainage.

Outputs

- ~35,000 cu. yds. of sediment removal
- Sediment Fore Bay
- An additional 1.5 acres of open water habitat
- 1 acre of deep water habitat (12-15 feet of water depth)
- 1 acre of sand/gravel/cobble fish spawning habitat
- 0.5-acre pike spawning and amphibian marsh
- 20 fish habitat structures (felled trees, boulder clusters, and wood cribs)
- 1 acre of littoral zone aquatic bed wetlands (planted with emergent, submergent, and floating-leaf plants)
- 3 acres of phragmites control
- 3,500 feet, 4 acres of riparian corridor habitat restoration

ROUGE RIVER AOC WAYNE COUNTY HABITAT RESTORATION OUTPUTS

As a result of this Rouge River AOC Wayne County Habitat Restoration Grant the overall outputs and outcomes to be expected are as follows:

Outputs

- 50 Rouge River miles and 108 miles of Rouge tributary reconnected to Great Lakes
- 1,100 liner feet of natural channels created
- 2,700 liner feet of naturalized oxbow reconnected to Rouge River
- 40,000 cu. yds. of sediment/fill removed
- 5 acres of habitat created (water, spawning, marsh, aquatic wetland)
- 30 habitat structures
- 5 acres of invasive species control
- 3,500 feet riparian corridor habitat restoration

Outcomes:

- Fish movement spawning and foraging in/out of oxbow, providing natural resting place and refuge on channelized portion of river.
- Provide for ancillary benefits at the project site (e.g., bank stabilization / erosion control).
- Control invasive species through implementation of integrated management strategies and best management practices.
- Lake improvements will aid in an increase in the macroinvertebrates population over time.
- Fish movement, spawning and foraging with in the Rouge River will be increased within the River due to HFE Fishway and Oxbow and within (and upstream of) the Nankin Lake (impoundment).

- Aid in the removal of three of the Rouge River AOC BUIs: Loss of Fish and Wildlife Habitat, Degradation of Fish and Wildlife Populations, and Degradation of Benthos.

LONG-TERM MAINTAINENCE

Wayne County and the ARC partners are committed to the long-term sustainability of these projects. Though all the projects are designed for low maintenance after the project is established (particularly the vegetation) long-term care will be required.

Two of the sites (Nankin and HFE Dam Fishway) are in Wayne County parkland and will be monitored and maintained as part of the Wayne County Parks services. The HFE Dam Fishway specifically has long-term access built into the project to allow for necessary long-term maintenance. The Nankin Restoration project design is anticipated to include a sediment fore bay to facilitate maintenance and the design and construction specifications will include identification of sediment fore bay/ sediment management activities needed to maintain the integrity of the project. Additionally, MDEQ, MDNR, Wayne County and the ARC have and will continue, for the foreseeable future, water quality monitoring for the Rouge. This will allow the agencies benefitting from these projects, including the ARC, MDEQ and MDNR, to monitor the conditions near and/or at these project sites to determine if change is occurring that would require an action response.

The Oxbow Phase 3 restoration was a unique ability for long-term maintenance as it is also part of The Henry Ford (THF) property. THF is the largest indoor/outdoor American history complex in the country, which hosts five venue attractions including, the Henry Ford Museum and Greenfield Village. The Henry Ford campus also includes Henry Ford Academy, a 500-student charter public high school. Previous Oxbow restoration phases have allowed THF to create Oxbow Island, which now includes a signed interpretative trail along its banks that can and is being used for a variety of public educational programs, including summer camps for youths, many of whom have had little experience with natural settings, and a living science laboratory for students of Henry Ford Academy. Additionally, in fall 2014, The Henry Ford updated its master plan with a section focused on the continued program planning for the Oxbow Island area. Therefore, the long-term maintenance of the Oxbow is included in THF's programming and master planning.

PROPOSED WORK

Wayne County, proposes in partnership with the ARC members and staff (Environmental Consulting & Technology, Inc.), the following task summaries in order to complete the Rouge River AOC Wayne County Habitat Restoration. Additionally, a detailed project schedule with associated subtasks is provided at the end of this project narrative.

Task 1. Grant Reporting/Administration/Public Outreach – Overall Grant/Projects

This task includes the following elements associated with the overall grant and projects that will be completed by primarily Wayne County with assistance from the ARC staff and Nankin Restoration Project engineering consultant:

Perform Grant Management Activities - Grant management services to assure compliance with terms and conditions of the grant will be provided.

EAGL Reporting - The Environmental Accomplishments in the Great Lakes (EAGL) semi-annual reporting will be prepared and submitted.

Coordinate with Partners – Wayne County will provide coordination between partners and stakeholders in the project. Throughout the process, active participation will be fostered among the stakeholders.

ARC IAA – Wayne County, as a member of the Alliance of Rouge Communities (ARC), will prepare an Interagency Agency Agreement (IAA) with the ARC as the Engineer of Record and NOAA design grant recipient to provide construction invitation to bid contract documents, contractor selection support and construction oversight for the continuation and implementation of the Oxbow Restoration Phase 3 and HFE Fishway projects.

Nankin Restoration Project Engineering Selection - Wayne County will advertise and administer the procurement process for design and engineering (field/design/construction oversight) services for activities associated with the Nankin Lake restoration.

Public Outreach - Throughout the process Wayne County and the ARC will work with the RRAC and reach out to the public to inform them of the proposed activities and to obtain input. There will a focused workshop for the interested public. The ARC will be posting information related to the all projects under this grant on the ARC web site, project status reports will be provided to RRAC, ARC committees and the full ARC membership, and informational flyers will be distributed to interested organizations and the public at large.

Final Report – A comprehensive final report summarizing all the activities conducted and outcomes achieved will be completed in draft form and submitted for review by EPA. Comments received will be incorporated into a final version for submittal.

Deliverables: Reporting and public meeting(s).

Task 2. Preliminary Engineering and Field Investigation – Nankin Lake Restoration

For the Nankin Lake Restoration project activity background data will be collected and reviewed. This information will be used as the base map for the design and will form the basis of the design decisions. This work will be completed primarily by the selected Nankin Lake Restoration engineering consultant with assistance from Wayne County.

The following data collection needs will be completed in order to develop the restoration design, allow for project permitting and provide baseline data for construction.

Health and Safety Plan (HASP) Development – A site specific health and safety plan will be developed for the project. Potential hazards will be identified, and steps will be outlined to reduce risk to employees and visitors to the site. The HASP will also detail steps for emergency response, including directions and a map to the nearest emergency room/urgent care.

QAPP Development - In accordance with federal requirements all environmental measurements undertaken in support of this project will be required to be conducted under a formal quality management protocol. A project specific QAPP will be prepared and submitted for review and approval prior to beginning any data collection activities. Primary data gathering will include field information for design of Nankin and post measurements of metric outputs.

Topographic and Bathymetric Survey - Elevation survey and bathymetry (water depth and sediment thickness) will be conducted with transects across the lake and the adjacent upland area. Surveys will also determine the existence and location of existing or abandoned structures (piers, pilings, retaining walls, moorings, etc.) or where any utilities exist in or adjacent to areas. These will be used to prepare the restoration plan design and to estimate sediment removal requirements and costs.

Hydrologic Analysis

Hydrologic variance, or the fluctuation of the water surface, with the Middle Rouge River is an important factor in the design of the Nankin Lake restoration project. To analyze the hydrology of Nankin Lake, evaluation of the magnitude and frequency of discharges that have occurred through Nankin Lake will be made. Long-term discharge records measured at the nearest USGS gaging station on the Middle Branch of the Rouge River will be utilized. Those discharges will be scaled to the project site based on watershed area and land type to more accurately represent inflow and outflow at Nankin Lake. To determine water surface elevations, field surveys of the water surface of Nankin Lake will be performed. The surveyed water surface elevations, as well as the scaled discharges at the time of the surveys, will be utilized to estimate a relationship between discharge and water surface elevation. With that relationship, and the long-term discharge records from the USGS gaging station, the frequency of a range of water surface elevations in Nankin Lake will be estimated.

Wetland Delineation/Vegetative Mapping - Professional wetland scientists and ecologists will conduct a field survey of the site. The survey will determine wetland community types and quality. Site hydrology and soil characteristic will also be evaluated to determine if positive indicators exist for wetland conditions as well as the overall quality of the wetlands. Habitat assessment will include the identification of invasive species, the habitat value for the anticipated wildlife species that use the wetlands and the overall health of the wetlands. The jurisdictional limits of any existing wetlands will be established using accepted methodologies by both state and federal regulatory agencies. This will also allow regulatory agencies to verify the wetland limits, as necessary. As part of the wetland evaluation process, the lake conditions will be reviewed to identify potential wetland enhancement and restoration opportunities.

Geotechnical Investigation - Up to 10 (ten) soil borings will be performed along the shoreline with each extending to a depth of 5-10 feet below grade. This information will be used in the design of the near-shore and shoreline habitats. Soil samples will be visually classified. Moisture content tests, unit weight determinations and unconfined compressive strength tests will be performed on representative cohesive soil samples. Loss on Ignition Tests (LOI) will be performed on samples suspected to contain organic content. Sieve analysis will be performed on representative samples of existing granular material.

Sediment Analysis - Surficial sediment samples within the water body will be collected. Sediment samples will be collected in sediment deposition zones based on selected outfall locations, inlet/outlet locations and accessibility. Field observation of the sediment characteristics will be noted and the location GPS'ed for mapping purposes. The samples will be processed and analyzed for chemical oxygen demand (COD), total organic carbon (TOC), nutrients, grain size, water content and contaminants (if required). The purpose of the sediment evaluation will be to characterize the chemical characteristics for evaluation of potential disposal alternatives for the soils (in-lake, upland, fill or at a Class II sanitary landfill). The samples will be analyzed based on the State of Michigan protocol for dredge characterization which includes metals, volatile and semi-volatile compounds, and PCB scans. The toxicity characteristic leaching procedure (TCLP) will be run on samples that initial analysis results indicate that TCLP is required under the State of Michigan MDEQ dredging protocol. Additionally, the sediment evaluation will provide data to aid in the restoration plan to determine design elements or plans to prevent the intrusion of existing sediments in excavation areas or into the lake post construction.

Threatened & Endangered Species (T&E) - Since all federal agency grant programs require at least a programmatic environmental assessment that must consider potential impacts to federally and state-listed T&E plant and animal species, T&E information will be collected. The Michigan Natural Features Inventory (MNFI) maintains a continuously updated natural heritage database that provides a comprehensive source of existing data on Michigan's endangered, threatened, or otherwise significant plant and animal species, natural plant communities, and other natural features, referred to as "element occurrences." Records in the database indicate that a qualified observer has documented the presence of T&E

species or special natural features. The absence of records in the database for a particular site does not preclude the potential presence of T&E species or special natural features; it may mean that the site has not yet been surveyed or that element occurrence observations have not yet been reported to MNFI. Furthermore, the U.S. Fish and Wildlife Service (USFWS) publishes a county distribution list of federally listed threatened, endangered, proposed, and candidate species. This list indicates the potential for T&E species to be present within the county. However, unlike the MNFI database, this list does not necessarily indicate documented presence of T&E species. Other species and unique natural features may be present that have not been recorded in the MNFI database or listed by the USFWS. The only way to obtain a definitive statement on the status of T&E species or special natural features is to have a competent biologist perform a complete field survey. The project area (i.e., potential disturbance limits) will be visited by qualified ecologists and evaluated for suitable T&E species habitat and potential presence of listed species that occur within a 1.5-mile radius of the project site (based on the MNFI database and the USFWS Wayne County species list). Only those T&E species that have the potential to be impacted by the proposed project, based on physical site characteristics, will be targeted for field surveys.

Fish - Biological monitoring for fish assemblages in the study area will be conducted to aid in establishing the design criteria for the fish habitats. Fish will be collected using pulsed DC electroshocking (60 Hz) using a GPP5.0 (Smith-Root, Inc., Vancouver, WA). GPP settings will be determined in the field based on ambient water conductivity, but will likely consist of using 220V power at 20-40% output (4-7 amps). Each area of the lake will be sampled in 15 minute electroshocking units until the lake has been sampled. During each sampling unit, stunned fish will be netted from the water and placed in holding tanks supplied with fresh water from the Rouge River. Following each sampling unit (i.e., 15 minute interval), collected fish will be identified to the species level, measured to the nearest mm (total length TL), and subsequently live-released into the Rouge River. The total time from capture to release will not exceed 30 minutes to reduce handling stress. To obtain sufficient collection data for analyses and provide a representative assemblage structure, a minimum of 30 fish per primary species (when feasible) will be collected within each reach. Several commonly reported metrics will be used to describe the baseline fish: species richness and abundance; catch per unit effort; and size-frequency distributions will be calculated.

Deliverables: HASP, Nankin Base Map, Geotechnical Memorandum, Soil Characterization Summary, T&E Summary

Task 3. Design/Permitting - Nankin Lake Restoration

This task will include modeling as required, development of construction design plans, technical specifications, and construction cost estimating and will be completed primarily by the selected Nankin Lake Restoration engineering consultant with assistance from Wayne County.

During the design phase of the project, plans will be advance to 30% design drawings, with additional engineering, planning, design refinement/modifications, stakeholder collaboration, and Technical Team review and feedback. Following this review, the design drawings produced will be advanced to 50% design for review and then to 95%. Final plans and specifications will be developed following the last review. This task will include the completion of the construction contract documents, to be used for bidding by incorporating funding entity requirements (such as signage, etc.) or any other requirements. The design will take into account the technical needs as follows:

Lake Configurations - Designs will be developed for the lake reconfiguration. Alternatives will be evaluated according to their costs, environmental impacts, and the benefits in wetland restoration, fish habitat creation, hydrologic analysis, and water quality improvement. Lake improvements will take into account the desire to limit invasive plant species and ineffective wildlife habitat. The restoration design dredged material, disposal options will be identified within the options available from the test results previously gathered and current regulations

Fisheries Restoration - Information collected from the fisheries evaluation will be used to create, reconstruct or enhance fisheries habitat necessary for the development and continuance of a healthy warmwater fish population. The fish habitat designs may include creation of spawning and nursery habitat, creation of deep-water areas for over wintering: and such as would be as determined by the targeted fish species. Planting of certain warmwater fish species will be conducted to promote balanced fish populations and hinder the establishment of nuisance fish species during the post restoration period. Consultation with the MDNR Fisheries Division will be conducted.

Wetland/Habitat Restoration - Designs will be developed to restore habitat in the lake to meet the appropriate wildlife habitat and user needs for the lake. The restoration designs will include, but are not limited to: restore the open water portion of the lake to an acceptable condition; restore and create wetlands at appropriate locations and near the stabilized lake shoreline; create wildlife and fish habitat; improve the health of the lake by providing diverse native plant species; and, an improved aesthetic component.

Additionally, this task will include permitting services with the intended purpose of obtaining the Joint Application Permit from the MDEQ. The following activities will be completed as part of this task:

- Prepare a pre-application meeting package with pre-application meeting fee and work with the County to schedule a site meeting and project review meeting with MDEQ Division staff. The purpose of a formal pre-application meeting is to review statutory permitting requirements.
- A Joint Application for Permit will be completed, including all necessary attachments. Quantities of cuts and fills in wetlands, streams, and floodplains will be calculated from the design drawings and tabulated. Basis of Design Report detailing the final design will be prepared (Supporting data, analyses, computations, and modeling will be presented in a concise format. Periodic communication with District permitting staff will allow dialogue on design before the Joint Permit Application is submitted. This will include project partner meetings which will allow for exchange of ideas, discussion of concepts and concerns culminating in the development of a prudent, feasible, and permittable project design upon completion. This process will help ensure that a permittable project is designed and will facilitate the permitting process.

Deliverables: MDEQ Permit and 95% Plans & Technical Specifications

Task 4. Contract Documents and Contractor Selection (Henry Ford Estate Dam Fishway, Oxbow restoration Phase 3 and Nankin Lake Restoration)

The design plans and technical specifications developed under Task 3 for Nankin Lake Restoration and previously under the NOAA Grants for the HFE Fishway and Oxbow restoration Phase 3 will be finalized in the contract bid documents. Wayne County Permit Office application package will be prepared and submitted. All Wayne County contractual front end specifications will be developed and all EPA grant requirements will be addressed and incorporated (signage, Davis Bacon, etc.).

QAPPS for HFE Dam Fishway and Rouge Oxbow Phase 3 will be completed under this task. Primary data gathering will include field information for post measurements of metric outputs.

Wayne County, will administer the contractor bidding processes, including issuing the bid packages, and selection of the construction contractors, and contracting with the chosen contractor. The ARC , as Engineer of Record, for the continuing HFE Fishway and Oxbow Restoration Phase 3 Projects and the competitively procured Nankin Lake Restoration engineering consultant, as Engineer of Record, for the new Nankin Lake Restoration Project will assist the bidding

processes by conducting the pre-bid meetings, answering questions/providing clarifications to bidders, drafting addendum as needed, evaluating bids submitted and providing a recommendation to Wayne County for contractor selection. This task will include the following subtasks to aid the in the procurement of qualified contractors for each of the construction projects.

- Prepare a Pre-Bid Meeting agenda;
- Prepare for a Pre-Bid Meeting, to include a site field trip;
- Respond to questions for clarification on the contract documents;
- Prepare, as needed, Addendum for the bid process;
- Review/analysis of Contractor's bids;
- Provide Engineer's Recommendation for contractor selection; and
- Budget vs. Bid analysis and site recommendations;

Deliverables: Contract Bid Documents, Advertisement for Bid, Bid Tabulation, and Construction Contractor Contract

4.1 – Henry Ford Estate Dam Fishway – Contract bid documents finalization, Wayne County Permit Office construction permitting, City of Dearborn SESC permitting and a QAPP for the Henry Ford Estate Dam Fishway will be completed. This task will be completed by Wayne County and the ARC. .

4.2 – Rouge Oxbow Phase 3 – Contract bid documents finalization, bidding process, contractor selection, Wayne County Permit Office construction permitting, City of Dearborn SESC permitting and a QAPP for the Rouge Oxbow Phase 3 will be completed. This task will be completed by Wayne County and the ARC. .

4.3 – Nankin Lake Restoration – Contract bid documents finalization, bidding process, contractor selection, construction permitting, City of Livonia SESC permitting for the Nankin Lake Restoration will be completed. This task will be completed by Wayne County and the competitively procured Nankin Lake Restoration engineering consultant.

Task 5. Construction/Construction Oversight (Henry Ford Estate Dam Fishway, Oxbow Restoration Phase 3 and Nankin Lake Restoration)

The contractor selected will complete the construction in accordance with the construction documents under Wayne County's administration. The ARC , as Engineer of Record, for the HFE Dam Fishway and Oxbow Restoration Phase 3 Projects will provide construction oversight with Wayne County during construction for those projects. The engineering consultant for the new Nankin Lake Restoration Project will provide construction oversight with Wayne County during construction for this third priority habitat project. Quantitative and qualitative measures will be employed to track progress in both project implementation and to assess project results.

Field Engineering Oversight Services

This will include all functions and activities necessary to provide the oversight necessary so that all materials provided and work performed is in conformance with the project plans and specifications. The functions and activities of this task include those typically associated with a project of this nature, including:

- Prepare for and conduct a Pre-Construction site inspection and meeting;
- Respond to inquiries and /or requests for information;
- Attend bi-weekly construction site meetings;
- Review and approve shop drawings and submittals;

- Assist in resolution of issues that arise during construction of the project;
- Provide daily on-site oversight at intervals appropriate to the various stages of construction in order to observe the contractor's activities to verify that the progress and quality of the project is being constructed in conformance with the project plans and specifications;
- Verify that the contractor uses equipment and methods approved in or specified by the contract;
- Inspect materials to be used in the work, verifying they meet the project specifications;
- Verify that the contractor complies with all contract requirements related to the protection of utilities, property, and the environment;
- Verify that the contractor complies with all permit requirements as they pertain;
- Conduct review of all soil erosion and sedimentation control devices for proper maintenance and effectiveness as placed;
- Coordinate project testing services with the Contractor and the testing company;
- Provide design engineering, specification and design drawing development when changes or modifications to the project plans are necessary;
- Conduct site walks with the Contractor to develop the project "punch list" and for updating of those items;
- Conduct an inspection to determine if the work is substantially complete for acceptance as it relates to the contract documents and time; and
- Field Reports will be completed on a daily basis for days visited.

Construction Administration

Contract administration tasks typically associated with a project of this nature, included:

- Review proposals/claims and make recommendations related to contract modifications, extra work, extra compensation, and/or extensions of contract time;
- Process and maintain records for contract modifications and/or work order;
- Review and approve or make recommendations on Contractor construction estimates;
- Generate Monthly Construction Progress Summaries;
- Track and maintain status of miscellaneous submittals and Requests for information;
- Review and balance all pay item quantities;
- Provide complete project documentation and files, specifically as they relate to correspondence, meeting minutes, submittals, contract modifications, work orders, material certifications, test reports, and interim progress estimates; and
- Review Contractor's final submission of "as-builts" plans for compliance with the specifications and the work complete.

Deliverables: Construction As-builts for each of the three priority habitat projects.

5.1 – Henry Ford Estate Dam Fishway –Construction activities will be completed by the contractor selected by Wayne County under Task 4. Construction oversight activities will be completed by Wayne County and, tARC , as Engineer of Record for the Henry Ford Estate Dam Fishway Project.

5.2 – Rouge Oxbow Phase 3 –Construction activities will be completed by the contractor selected by Wayne County under Task 4. Construction oversight activities will be completed by Wayne County and ARC , as Engineer of Record for the Rouge Oxbow Phase 3 Project.

5.3 – Nankin Lake Restoration –Construction activities will be completed by the contractor selected by Wayne County under Task 4. Construction oversight activities will be completed by Wayne County and the selected Nankin Lake Restoration engineering consultant, as Engineer of Record for the Nankin Lake Restoration Project..

BUDGET NARRATIVE
ROUGE RIVER AOC WAYNE COUNTY HABITAT RESTORATION

Wayne County has developed a realistic budget commensurate with project needs. Budget figures are based upon the previous/current design efforts (HFE Fishway and Oxbow) or previous lake restoration efforts in the area (Nankin). We are providing the information in summary form for the overall grant as well as broken down for each of the Rouge AOC listed sub-projects to provide a greater understanding of where and how the money is to be spent. The total grant cost is $6,500,000.

Overall Grant Summary	
Wayne County	
Total Personnel Cost	$ 97,312
Total Fringe @ 137%	$ 133,317
Total Overhead @ 42%	$ 96,864
Travel (Federal rate, current $0.54/mile)	$ 4,287
Supplies	$ -
Equipment	$ -
Total Wayne County Cost	$ 331,780
Contractual Costs	
Nankin Lake Engineering Services	$ 514,400
Construction Contractor - HFE Fishway	$ 1,536,520
Construction Contractor - Oxbow	$ 1,309,300
Construction Contractor - Nankin	$ 2,265,000
Total Contractual	$ 5,625,220
Other	
ARC Partner Services	$ 543,000
Total Grant Cost Requested	$ 6,500,000

Summary Of Cost By AOC Project	Henry Ford Estate Dam Fishway	Rouge Oxbow Phase 3	Nankin Lake Restoration	Total
Wayne County				
Total Personnel Cost	$ 34,848	$ 19,008	$ 43,456	$ 97,312
Total Fringe @ 137%	$ 47,742	$ 26,041	$ 59,535	$ 133,317
Total Overhead @ 42%	$ 34,687	$ 18,921	$ 43,255	$ 96,864
Travel (Federal rate, current $0.54/mile)	$ 1,406	$ 1,331	$ 1,550	$ 4,287
Supplies	$ -	$ -	$ -	$ -
Equipment	$ -	$ -	$ -	$ -
Total Wayne County Cost	$ 118,683	$ 65,301	$ 147,796	$ 331,780
Contractual Costs				
Nankin Lake Engineering Services		$ -	$ 514,400	$ 514,400
Construction Contractor - HFE Fishway	$ 1,536,520			$ 1,536,520
Construction Contractor - Oxbow		$ 1,309,300		$ 1,309,300
Construction Contractor - Nankin			$ 2,265,000	$ 2,265,000
Total Contractual	$ 1,536,520	$ 1,309,300	$ 2,779,400	$ 5,625,220
Other				
ARC Partner Services	$ 296,000	$ 247,000		$ 543,000
Total Project Cost	$ 1,951,203	$ 1,621,601	$ 2,927,196	$ 6,500,000

Description of Costs - Wayne County

Personnel

Federal Share: $97,312 - Wayne County is requesting federal funding for travel to oversee the grant, field coordination, design/permitting, bidding/contractor selection, and Wayne County Construction requirements. This is the total for all three of the Wayne County Rouge AOC listed projects.

Fringe Benefits

Federal Share: $133,317 - Wayne County is requesting federal funding for travel to oversee the grant, field coordination, design/permitting, bidding/contractor selection, and Wayne County Construction requirements. This is the total for all three of the Wayne County Rouge AOC listed projects.

Indirect (Overhead) Charges

Federal Share: $96,864 - Wayne County is requesting federal funding for travel to oversee the grant, field coordination, design/permitting, bidding/contractor selection, and Wayne County Construction requirements. This is the total for all three of the Wayne County Rouge AOC listed projects.

Travel

Federal Share $ 4,287- Wayne County is requesting federal funding for travel to oversee the grant, field coordination, design/permitting, bidding/contractor selection, and Wayne County Construction requirements. This is the total for all three of the Wayne County Rouge AOC listed projects.

Supplies

Federal Share: $0.00 - Wayne County is not requesting federal funding for supplies.

Equipment

Federal Share: $0.00 - Wayne County is not requesting federal funding for equipment.

Wayne County's Cost Breakdown is as shown in the following table:

Wayne County Costs		Task 1: Grant Reporting/ Administration/Public Outreach		Task 2: Preliminary Engineering & Field Investigation Nankin Lake		Task 3: Design/ Permitting - Nankin Lake		Task 4.1: Contract Documents/ Contractor Selection - HFE Fishway		Task 4.2: Contract Documents/ Contractor Selection - Oxbow Phase 3		Task 4.3: Contract Documents/ Contractor Selection - Nankin Lake		Task 5.1: Construction/Construction Oversight - HFE Fishway		Task 5.2: Construction/Construction Oversight - Oxbow Phase 3		Task 5.3: Construction/Construction Oversight - Nankin Lake		Totals	
WC Staff Labor	Rates	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost
Chief Engineer	$53	40	$2,120	8	$424	8	$424	8	$424	8	$424	8	$424	8	$424	8	$424	8	$424	104	$5,512
Chief Parks	$50	60	$3,000	16	$800	40	$2,000	8	$400		$0	8	$400	60	$3,000		$0	60	$3,000	252	$12,600
Engineer 6	$43	260	$11,180	60	$2,580	80	$3,440	80	$3,440	80	$3,440	40	$1,720	100	$4,300	80	$3,440	120	$5,160	900	$38,700
Tech Project Coordinator	$35	100	$3,500	60	$2,100	60	$2,100	40	$1,400	40	$1,400	40	$1,400	100	$3,500	40	$1,400	120	$4,200	600	$21,000
Environmental Specialist	$29		$0	40	$1,160		$0		$0		$0		$0	400	$11,600	40	$1,160	60	$1,740	540	$15,660
Permits Staff	$30		$0	8	$240	32	$960	12	$360	12	$360		$0		$0	32	$960	32	$960	128	$3,840
			$0		$0		$0		$0		$0		$0		$0		$0		$0	0	$0
Total Personnel Cost		460	$19,800	192	$7,304	220	$8,924	148	$6,024	140	$5,624	96	$3,944	668	$22,824	200	$7,384	400	$15,484	2524	$97,312
Total Fringe @	137%		$27,126		$10,006		$12,226		$8,253		$7,705		$5,403		$31,269		$10,116		$21,213		$133,317
Overhead @	42%		$19,709		$7,270		$8,883		$5,996		$5,598		$3,926		$22,719		$7,350		$15,412		$96,864
Travel (Federal rate, current $0.54/mile)			$1,000		$500										$1,006		$1,031		$750		$4,287
Supplies																					$0
Equipment																					$0
TOTAL COST			$ 67,635		$ 25,081		$ 30,033		$ 20,273		$ 18,927		$ 13,273		$ 77,818		$ 25,881		$ 52,859		$ 331,780

Description of Cost - Contractual

Contractual

Federal Share: $5,625,220

- Wayne County will procure engineering services for the Nankin Lake Restoration project.
- Wayne County will procure construction contractors for the Henry Ford Estate Dam Fishway, the Rouge Oxbow Phase 3 and the Nankin Lake Restoration projects.

Details for these contractual costs are presented in the following summaries and detailed anticipated cost tables.

Nankin Lake Engineering Services

Wayne County, will procure engineering services for the Nankin Lake Restoration AOC project. The Nankin Lake engineering consultant staff will provide the field investigation, design, permitting, construction contract document finalization, bidding assistance, construction oversight, and assistance with QAPP and public involvement.

Subtotal - $514,400. The details associated with this subtotal cost are provided in the following table:

Nankin Engineering Costs		Task 1: Grant Reporting/ Administration/ Public Outreach		Task 2: Preliminary Engineering & Field Investigation - Nankin Lake		Task 3: Design /Permitting - Nankin Lake		Task 4.1: Contract Documents/ Contractor Selection - HFE Fishway		Task 4.2: Contract Documents/ Contractor Selection - Oxbow Phase 3		Task 4.3: Contract Documents/ Contractor Selection - Nankin Lake		Task 5.1: Construction/ Construction Oversight - HFE Fishway		Task 5.2: Construction/ Construction Oversight - Oxbow Phase 3		Task 5.3: Construction/ Construction Oversight - Nankin Lake		Totals	
Professional Services	Rates	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost
Principal Scientist/Engineer	$210	8	$1,680	40	$8,400	160	$33,600		$0		$0	24	$5,040		$0		$0	160	$33,600	392	$82,320
Sr. Level Scientist/Engineer	$175	40	$7,000	40	$7,000	160	$28,000		$0		$0	40	$7,000		$0		$0	160	$28,000	440	$77,000
Mid-level Scientist/Engineer	$140	80	$11,200	180	$25,200	600	$84,000		$0		$0	100	$14,000		$0		$0	600	$84,000	1560	$218,400
Jr. Level Scientist/Engineer	$105	24	$2,520	120	$12,600	100	$10,500		$0		$0	40	$4,200		$0		$0	600	$63,000	884	$92,820
Sr. Administration	$95	24	$2,280		$0	40	$3,800		$0		$0		$0		$0		$0		$0	64	$6,080
Administrative Support	$65		$0		$0	40	$2,600		$0		$0	32	$2,080		$0		$0	40	$2,600	112	$7,280
Labor Totals		176	$24,680	380	$53,200	1100	$162,500	0	$0	0	$0	236	$32,320	0	$0	0	$0	1560	$211,200	3452	$483,900
Expenses:																					
Mileage (Federal rate, current $0.54/mile)			$250		$1,500		$500												$3,250		$5,500
Topographic/Bathymetric					$15,000																$10,000
Geotechnical Analysis					$10,000																$7,500
Lab Analysis					$7,500														$2,500		$5,500
Field Equipment (ponar, sampling, flagging, flow, etc.)					$3,000																$2,000
Permit Fees					$500		$1,500														
Expense Total			$250		$37,500		$2,000		$0		$0		$0		$0		$0		$5,750		$30,500
TOTAL COST			$24,930		$ 90,700		$164,500		$ -		$ -		$ 32,320		$ -		$-		$ 216,950		$ 514,400

Henry Ford Estate Dam Fishway Construction Contractor

Wayne County, as project site landowner for the Henry Ford Estate Dam Fishway will hire a construction contractor to conduct the Fishway construction and habitat improvements. The table below provides a breakdown of the preliminary construction cost estimate.

Subtotal - $1,536,520. The details associated with this subtotal cost are provided in the following table:

HFE Dam Fishway Implementation

Construction Cost Estimate

Item	Description	Unit	Quantity	Unit Price	Price
1	Mobilization	LS	1	$ 70,000.00	$ 70,000.00
2	Construction Staking/Surveying	LS	1	$ 7,500.00	$ 7,500.00
3	Traffic Control	LS	1	$ 5,000.00	$ 5,000.00
4	Construction Access	LS	1	$ 25,000.00	$ 25,000.00
5	Water Control/ Dewatering	LS	1	$ 10,000.00	$ 10,000.00
6	Soil Erosion and Sedimentation Control	LS	1	$ 5,000.00	$ 5,000.00
7	Clearing, Grubbing, and Trimming	LS	1	$ 50,300.00	$ 50,300.00
8	Channel Excavation	CY	10000	$ 40.00	$ 400,000.00
9	Riprap	CY	1000	$ 90.00	$ 90,000.00
10	Bank Restoration	LF	1700	$ 100.00	$ 170,000.00
13	Upstream Structure	LS	1	$ 7,500.00	$ 7,500.00
14	Downstream Structure	LS	1	$ 7,500.00	$ 7,500.00
19	Erosion Control Blanket	SY	4000	$ 10.00	$ 40,000.00
20	Native Seed	AC	3	$ 2,000.00	$ 6,000.00
22	Plugs	EA	1122	$ 10.00	$ 11,220.00
23	Shrubs	EA	200	$ 75.00	$ 15,000.00
24	Trees	EA	154	$ 500.00	$ 77,000.00
25	Habitat Structures	EA	20	$ 1,000.00	$ 20,000.00
26	Permanent Maintenance Access Structure	LS	1		$ 365,000.00
	Foundation	LS	1	$ 65,000.00	
	Structure	LS	1	$ 300,000.00	
27	Permanent Maintenance Access Path	LF	1000	$ 35.00	$ 35,000.00
28	Site Restoration	LS	1	$ 10,000.00	$ 10,000.00
29	As-Built Survey and Drawings	LS	1	$ 3,500.00	$ 3,500.00
30	Vegetation Maintenance	MON	6	$ 1,000.00	$ 6,000.00
Allowances					
30	Unforeseen Site Conditions	LS	1	$100,000.00	$ 100,000.00
	Total Construction Estimate				$ 1,536,520.00

Rouge Oxbow Phase 3 Construction Contractor

Wayne County, as partial project site landowner for the Rouge Oxbow Phase 3 will hire a construction contractor to conduct the Oxbow construction and habitat improvements. The table below provides a breakdown of the preliminary construction cost estimate.

Subtotal - $1,309,300. The details associated with this subtotal cost are provided in the following table:

Rouge Oxbow Phase 3 Restoration Implementation

Construction Cost Estimate

Item	Description	Unit	Quantity	Unit Price	Price
1	Mobilization	LS	1	$ 57,000.00	$ 57,000.00
2	Construction Staking/Surveying	LS	1	$ 5,000.00	$ 5,000.00
3	Traffic Control	LS	1	$ 1,500.00	$ 1,500.00
4	Temporary Coffer Dam Construction and Dewatering	LS	1	$ 40,000.00	$ 40,000.00
5	Soil Erosion and Sedimentation Control	LS	1	$ 5,000.00	$ 5,000.00
6	Site Preparation and Demolition	LS	1	$ 5,000.00	$ 5,000.00
7	Clearing, Grubbing, and Trimming	LS	1	$ 5,000.00	$ 5,000.00
8	Channel Excavation	CY	7000	$ 50.00	$ 350,000.00
9	Engineered Fill	CY	350	$ 45.00	$ 15,750.00
10	Geotextiles	SY	360	$ 7.00	$ 2,520.00
11	Riprap	CY	550	$ 90.00	$ 49,500.00
12	Concrete Apron	LS	1	$ 10,000.00	$ 10,000.00
12	Foundation Piles	LF	1650	$ 75.00	$ 123,750.00
14	Precast Structure	LS	1	$ 256,000.00	$ 256,000.00
15	Pile Cap	CY	65	$ 1,600.00	$ 104,000.00
16	Guardrail				
	Bridge	LF	90	$ 550.00	$ 49,500.00
	Approach	LF	200	$ 225.00	$ 45,000.00
	Split rail	LF	60	$ 110.00	$ 6,600.00
17	HMA	SY	450	$ 25.00	$ 11,250.00
18	Aggregate Materials	CY	120	$ 30.00	$ 3,600.00
19	Erosion Control Blanket	SY	2000	$ 10.00	$ 20,000.00
20	Low Profile Prairie Seed	AC	0.35	$ 1,500.00	$ 525.00
21	Sedge Meadow Seed	AC	0.05	$ 1,500.00	$ 75.00
22	Plugs	EA	610	$ 10.00	$ 6,100.00
23	Shrubs	EA	41	$ 75.00	$ 3,075.00
24	Trees	EA	8	$ 500.00	$ 4,000.00
25	Structural Habitat - Logs	EA	3	$ 1,000.00	$ 3,000.00
26	Structural Habitat - Boulders	EA	10	$ 1,000.00	$ 10,000.00
27	Site Restoration	LS	1	$ 15,500.00	$ 15,500.00
28	As-Built Survey and Drawings	LS	1	$ 2,555.00	$ 2,555.00
29	Vegetation Maintenance	MON	7	$ 500.00	$ 3,500.00
Allowances					
30	Unforeseen Site Conditions	LS	1	$ 95,000.00	$ 95,000.00
	Total Construction Estimate				$ 1,309,300.00

Nankin Lake Restoration Construction Contractor

Wayne County, as project site landowner for the Nankin Lake Restoration project will hire a construction contractor to conduct the sediment removal and habitat improvements. The table below provides a breakdown of the preliminary construction cost estimate.

Subtotal - $2,265,000. The details associated with this subtotal cost are provided in the following table:

Nankin Lake Restoration					
Construction Cost Estimate					
Item	Description	Unit	Quantity	Unit Price	Price
1	Mobilization	LS	1	$ 75,000.00	$ 75,000.00
2	Construction Staking/Surveying	LS	1	$ 8,500.00	$ 8,500.00
3	Traffic Control	LS	1	$ 10,000.00	$ 10,000.00
4	Construction Access	LS	1	$ 10,000.00	$ 10,000.00
5	Water Control/ Dewatering	LS	1	$ 10,000.00	$ 10,000.00
6	Soil Erosion and Sedimentation Control	LS	1	$ 5,000.00	$ 5,000.00
7	Clearing, Grubbing, and Trimming	LS	1	$ 17,000.00	$ 17,000.00
8	Invasive Species Treatment	AC	3	$ 4,000.00	$ 12,000.00
9	Sediment Dredging	CY	40000	$ 35.00	$ 1,400,000.00
10	Natural Stone	CY	500	$ 90.00	$ 45,000.00
11	Bank Restoration	LF	4500	$ 90.00	$ 405,000.00
12	Fish Habitat Structures	EA	15	$ 2,500.00	$ 37,500.00
13	Fish Spawning/Gravel Bed Material	CY	3000	$ 15.00	$ 45,000.00
14	Native Seed	AC	3	$ 2,000.00	$ 6,000.00
15	Plugs	EA	2000	$ 7.50	$ 15,000.00
16	Shrubs	EA	200	$ 75.00	$ 15,000.00
17	Trees	EA	25	$ 500.00	$ 12,500.00
18	Fish Stocking	LS	1	$ 7,500.00	$ 7,500.00
19	Contractor Staging Restoration	SYD	1000	$ 7.50	$ 7,500.00
20	Site Restoration	LS	1	$ 12,000.00	$ 12,000.00
21	As-Built Survey and Drawings	LS	1	$ 3,500.00	$ 3,500.00
22	Vegetation Maintenance	MON	6	$ 1,000.00	$ 6,000.00
Allowances					
23	Unforeseen Site Conditions	LS	1	$100,000.00	$ 100,000.00
	Total Construction Estimate				$ 2,265,000.00

Description of Cost – Other/Partners

Alliance of Rouge Communities
Federal Share: $543,000.

Wayne County, an Alliance of Rouge Communities (ARC) member, will partner with the ARC through a sub-grant Interagency Agreement (IAA) for continued engineering services, as the Engineer of Record, for implementation of the Henry Ford Estate Dam Fishway and Rouge Oxbow Phase 3 Rouge River AOC priority habitat projects.

The ARC is currently working on the design and permitting of the NOAA design grant for the Henry Ford Estate Dam Fishway and have recently completed the design and permitting for NOAA design grant for the Oxbow Phase 3 project. Wayne County, as an ARC member, has been a partner to the ARC through IAAs on both of these NOAA grant projects. The ARC has been and will be the ENGINEER OF RECORD for the implementation of these two projects. Therefore, the work to be funded by this EPA grant is a continuation of these two specific projects with the Engineer of Record. The work to be conducted by the ARC includes assistance with the project QAPP, development of the invitation to bid construction contract bid documents, provide bidding and contractor selection assistance to Wayne County and provide construction oversight as Engineer of Record all for the Henry Ford Estate Dam Fishway and Oxbow Restoration Phase 3 sub-grant projects. The ARC, through a competitive bid process, selected and entered into a contract with Environmental Consulting & Technology, Inc. (ECT) to provide design, permitting, and construction oversight services for these two projects and other restoration projects within the Rouge AOC.

The Alliance of Rouge Communities (ARC), a 501(c)(3) organization, is a public watershed entity currently comprised of 35 municipal governments (i.e. cities, townships and villages), three counties (Wayne, Oakland and Washtenaw), Henry Ford Community College, University of Michigan-Dearborn and cooperating partners (i.e. other organizations) as authorized by Part 312 (Watershed Alliances) of the Michigan Natural Resources and Environmental Protection Act (MCL 324.101 to 324.90106) as amended by Act No. 517, Public Acts of 2004. The purpose of the ARC is to provide an institutional mechanism to encourage watershed-wide cooperation and mutual support to meet water quality permit requirements and to restore beneficial uses of the Rouge River to the area residents. Therefore, as part of its mission, the ARC has been providing administrative/fiduciary and technical support services to the Rouge AOC Public Advisory Council (aka. RRAC) and has provided design and Engineer of Record construction engineering services for many of the previously implemented and several of the currently listed Rouge River AOC habitat restoration projects. These have included the fore mentioned Oxbow and HFE Fishway projects, the conceptual plan/project description for Nankin Lake Restoration, the NOAA funded (NOAA-NMFS-HCPO-2011-2002872) Wayne Road Dam Removal & Habitat Restoration Implementation Project, the EPA funded (EPA-R5-GL2010-1) Danvers Pond Dam Removal and Stream Restoration Project, and the EPA funded (EPA-R5-GL2010-1) Transforming the Rouge from Mowed Down to Grown Up Project including the Valley Woods Wetland Restoration, the Eliza Howell & River Rouge Parks Habitat Improvements and the Wayne County Parks Native Plan Grow Zones.

Subtotal - $543,000. The details associated with this subtotal cost are provided in the following table:

ARC Costs		Task 1: Grant Reporting/Administration/Public Outreach		Task 2: Preliminary Engineering & Field Investigation - Nankin Lake		Task 3: Design/Permitting - Nankin Lake		Task 4.1: Contract Documents/Contractor Selection - HFE Fishway		Task 4.2: Contract Documents/Contractor Selection - Oxbow Phase 3		Task 4.3: Contract Documents/Contractor Selection - Nankin Lake		Task 5.1: Construction/Construction Oversight - HFE Fishway		Task 5.2: Construction/Construction Oversight - Oxbow Phase 3		Task 5.3: Construction/Construction Oversight - Nankin Lake		Totals	
Professional Services	Rates	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost	Hrs	Cost
Principal	$185	8	$1,480		$0		$0		$0	8	$1,480		$0	8	$1,480		$0		$0	24	$4,440
Principal Engineer	$170	60	$10,200		$0		$0	40	$6,800	60	$10,200		$0	300	$51,000	240	$40,800		$0	700	$119,000
Sr. Level Engineer	$140	8	$1,120		$0		$0		$0		$0		$0	80	$11,200	16	$2,240		$0	104	$14,560
Sr. Level Staff	$135	16	$2,160		$0		$0	100	$13,500	40	$5,400		$0	440	$59,400	80	$10,800		$0	676	$91,260
Mid-level Engineer	$110	40	$4,400		$0		$0	80	$8,800	100	$11,000		$0	100	$11,000	520	$57,200		$0	840	$92,400
Mid-Level Staff	$100		$0		$0		$0	100	$10,000		$0		$0	620	$62,000	500	$50,000		$0	1220	$122,000
Sr. Administration	$95	40	$3,800		$0		$0		$0	24	$2,280		$0	40	$3,800	40	$3,800		$0	144	$13,680
Jr-Level Staff	$75		$0		$0		$0	40	$3,000	40	$3,000		$0	280	$21,000	100	$7,500		$0	460	$34,500
Administrative Support	$65		$0		$0		$0	18	$1,170	24	$1,560		$0	40	$2,600	40	$2,600		$0	122	$7,930
Labor Totals		172	$23,160	0	$0	0	$0	378	$43,270	296	$34,920	0	$0	1908	$223,480	1536	$174,940	0	$0	4290	$499,770
Expenses:																					
Mileage (Federal rate, current $0.54/mile)			$490						$500		$250				$3,425		$3,575				$8,240
Geotechnical & Strucutral Analysis											$1,000				$10,000		$19,000				$30,000
Field Equipment (survey, GPS, marking paint, flagging, etc.)															$3,000		$1,490				$4,490
Permit Fees									$500												$500
Expense Total			$490		$0		$0		$1,000		$1,250		$0		$16,425		$24,065		$0		$43,230
TOTAL COST			$ 23,650		$ -		$ -		$ 44,270		$ 36,170		$ -		$ 239,905		$ 199,005		$ -		$ 543,000