FINAL REPORT – STREAM AND WETLAND RESTORATION IN ULAO CREEK – MILWAUKEE ESTUARY AOC

BACKGROUND / OVERVIEW

1. *Briefly summarize the project description as outlined in the original proposal.*

Ozaukee County and partners are completing a large-scale fisheries habitat restoration project on Ulao Creek, restoring multiple stream reaches through channel remeandering, floodplain reconnection, wetland creation and enhancement, invasive plant control and management, native plant restoration, and installation of fish habitat structures. The project will provide direct, tangible improvements to aquatic habitat available to resident and migratory native and desirable introduced fish species in the Milwaukee River Watershed and Lake Michigan Basin. General project goals include:

- Retain/restore sustainable populations of several threatened and endangered species.
- Enhance sustainable populations and genetic diversity of migratory top predator gamefish in the lower Milwaukee River, the AOC, and nearshore areas of Lake Michigan.
- Increase the quantity and quality of in-stream, wetland and floodplain habitat and native vegetation available to native fish species.
- Capitalize on recent aquatic linear connectivity projects in the County portion of the Milwaukee River Watershed by improving the biological and ecological function of formerly isolated habitat.
- Help supplant the need for artificial stocking, habitat manipulation, and creation of artificial habitat in areas without access to certain habitat types.
- Capitalize on existing research, data and projects in the Ulao Creek Watershed, including Ozaukee County NOAA GLRI, GLFT, and FFLM grants.
- Leverage the Ozaukee County and Ozaukee Washington Land Trust's existing USEPA/GLRI grants to control invasive species.
- Refine strategies and techniques that may assist similar projects throughout the country.
- Control and manage invasive plant species and promote reintroduction of native vegetation.

2. *Was the project completed as originally intended? If not, indicate how the final outcome(s) differed from what was anticipated. Does your experience suggest that original expectations were realistic? What factors hindered or helped progress?*

   The project was completed as originally intended. All project goals, outcomes, and metrics were met as stated in the original grant proposal, suggesting that the original expectations were realistic. GLFT funding supported Phase III of the Ulao Creek Habitat Restoration Project, and Phases I and II were significantly completed at the time of Phase III implementation. The same project engineer and contractors worked on all project phases. Thus, the experiences and lessons learned in prior phases, combined with utilizing the same project partners, significantly helped progress at Phase III. Furthermore, work has progressed toward Phases IV and V.

OUTCOMES

3. *Whether they were intended or unintended, what do you consider the most important benefits or outcomes of this habitat restoration project?*

   The overall project goal is to restore sustainable populations of native migratory fish species along the nearshore areas of Lake Michigan, the Milwaukee River Watershed, and the Milwaukee Estuary AOC by restoring historical, high quality spawning and rearing habitats. The project is expected to greatly enhance the ecological function of Ulao Creek, given the extensive modification of the upper reaches of the stream and that over 54% of the wetlands in Ulao Creek are found in the headwaters of the stream. Historic manipulation of the creek has left over 90% of the channel dredged and straightened and disconnected from 2 and 5 year floodplains and adjacent wetlands. The vegetation of the creek and wetland system has also been disturbed by a long history of farming and ditching. Project goals and *intended* outcomes included: (1) channel remeandering, (2) improvement of lateral connectivity by connecting aquatic habitat to floodplain wetland with suitable hydroperiod (whenever possible), (3) wetland creation and/or enhancement, (4) invasive plant control and management, (5) native plant restoration, and (6) installation of fish habitat structures. The most important benefit associated with this habitat restoration project is the increase in the quantity and quality of in-stream, wetland and floodplain habitat and native vegetation available to fish and wildlife species, which was a cumulative result of the implemented project activities and successfully demonstrated through a thorough monitoring effort.

4. *What activities were pursued in relationship to the intended outcomes, and to what extend did you achieve the intended outcomes listed in your proposal?*

   The following activities were completed to support intended outcomes and ecological performance measures:

   Management:

   The Ozaukee County Natural Resource Committee recommended acceptance of the Great Lakes Fishery Trust (GLFT) funding at their 7/3/14 meeting and the Ozaukee County Board formally accepted the grant award at their 8/6/14 meeting. Ozaukee County received a signed, finalized grant contract from the GLFT on 10/8/14. As noted in the project proposal, Phases I, II, and III of the Ulao Creek

Habitat Restoration project were fully engineered and designed by Interfluve and all applicable permits were received. The WDNR NR 216 permit was issued on 8/8/13, the WDNR Ch. 30 permit issued on 9/18/13, the Ozaukee County conditional use permit issued on 9/23/13, and the USACOE permit issued on 10/22/13. An advertisement for construction bids was published on 6/9/13 and 6/13/13 and two bids were received and publically opened on 6/20/13. The Ozaukee County Natural Resources Committee approved a contract with Solutions 101 LLC, the responsive and responsible low bidder.

Construction Activities:

A preconstruction meeting was held on 4/8/14, the contractor began mobilizing equipment and materials to the site on 4/21/14, and construction activities were initiated on 5/1/14. A final site walkthrough for 2014 Phase I activities was held on 9/29/14 and a final site walkthrough for 2014 Phase II activities was held on 12/2/14. A preconstruction meeting for Phase III activities was held on 5/13/15, and stream grading and pond construction activities began on 5/29/15. A final site walkthrough for major 2015 Phase III construction activities (except for restoration, and tree planting activities) was held on 8/28/15. Restoration and native tree planting activities at Phase III continued throughout fall of 2015 and vegetation maintenance (provided for under additional funding) is ongoing.

Inter-Fluve provided survey stakeout services in advance of all ground disturbing activities. Solutions 101 completed construction activities using small-scale earthmoving equipment (e.g., mini excavators and earth movers) that accessed the sites without causing undue site disturbance (e.g. rutting) with minimal tree removals. Large woody debris for habitat structures incorporated into the project utilized recycled trees felled from the new stream channel areas or felled trees brought in from the Ozaukee County Park System as part of routine park maintenance and as tree removals due to EAB.

Fish and Wildlife Monitoring:

Pre and post-construction fish and wildlife monitoring at all phases/areas of the Ulao Creek Habitat Restoration site are being completed under existing USEPA/GLRI, Fund For Lake Michigan (FFLM), WDNR Wisconsin Citizen Based Monitoring Program (WCBMP), and GLFT funding. To date, monitoring events have documented:

- 16 fish species: (backpack electrofishing, minnow trapping)
    - brook stickleback, northern pike, central mudminnow, black bullhead, creek chub, green sunfish, white sucker, Johnny darter, Iowa darter, fathead minnow, common carp, bluntnose minnow, hornyhead chub, rainbow trout, largemouth bass and common shiner
- 14 reptile and amphibian species (cover object surveys, visual surveys, minnow trapping, egg mass surveys, turtle hoop trapping):
    - Common garter snake, painted turtle, Butler's garter snake, snapping turtle, green frog, bull frog, leopard frog, chorus frog, wood frog, eastern gray treefrog, American toad, tiger salamander, blue spotted salamander, unverified account of red-bellied snake

- Three species of crayfish (minnow trapping)
    - prairie crayfish, calico crayfish, digger crayfish
- 72 bird species (visual/audio point and count surveys)
    - American kestrel, common yellowthroat, killdeer, mourning dove, chipping sparrow, red-winged black bird, eastern kingbird, indigo bunting, house finch, American robin, house wren, warbling vireo, brown-headed cow bird, American crow, northern flicker, American goldfinch, sandhill crane, tree swallow, Eurasian tree sparrow, American woodcock, common snipe, Red-eyed vireo, Great blue heron, black-capped chickadee, ruby throated hummingbird, song sparrow, gray catbird, clay-colored sparrow, turkey vulture, northern cardinal, blue jay, red-tailed hawk, Cooper's hawk, sora, green heron, eastern phoebe, eastern wood-pewee, brown thrasher, wild turkey, blue-winged warbler, blue-gray gnatcatcher, spotted sandpiper, downy woodpecker, blackburnian warbler, golden-crowned kinglet, wood duck, mallard duck, blue winged-teal, red-bellied woodpecker, Canadian goose, cedar waxwing, brown creeper, yellow warbler, willow flycatcher, American Bittern, belted kingfisher, barn swallow, scarlet tanager, swamp sparrow, yellow-billed cuckoo, black-billed cuckoo, Baltimore oriole, common grackle, tufted titmouse, rock dove, white-breasted nuthatch, savannah sparrow, wood thrush, great-crested flycatcher, field sparrow, great-horned howl (unverified), hairy woodpecker
- 16 mammal species (visual surveys)
    - Red fox, white-tailed deer, raccoon, grey squirrel, meadow vole, short tailed shrew, common shrew, ground squirrel, mink, eastern chipmunk, muskrat, woodchuck, fox squirrel, red squirrel, coyote, least weasel

The section below describes the original proposal's specific performance measures and final performance measure/outcome achievements:

Ecological Performance Measure 1 – Stream Channel Restored: The project will re-meander up to 1,769 feet of Ulao Creek artificially straightened for agricultural purposes. Progress will be measured in feet of stream channel restored.

- Approximately 1,769 feet of stream channel was remeandered at Phase III.

Ecological Performance Measure 2 – Wetland and Floodplain Habitat Reconnected or Enhanced: The project will also restore and/or enhance available wetland habitat. Anticipated project goals include reconnection of up to 14.3 acres of wetlands, 10.6 acres of 2-year floodplain, 12.7 acres of 5-year floodplain, and 140.1 acres of 100-year floodplain. Progress will be measured in acres of wetland and floodplain habitat reconnected or restored/enhanced.

- The project has restored and/or enhanced available wetland habitat, including the reconnection of approximately 14.3 acres of wetlands, 10.6 acres of 2-year floodplain, 12.7 acres of 5-year floodplain, and 140.1 acres of 100-year floodplain.

Ecological Performance Measure 3 – Habitat Structures Installed: Fish habitat structures (e.g., logs/rootwads) will be installed to enhance available cover,

stream heterogeneity, etc. Anticipated project outputs include up to 35 units of large wood installed. Bluebird houses will also be installed. Progress will be measured in number of logs, rootwads, and bluebird houses installed.

- 49 units of large woody debris, four bluebird houses, and one wood duck box were installed.

Ecological Performance Measures 4 – Increased Vegetative Diversity: The project will include the reestablishment of native vegetation as recommended by Hewitt's 2002 study of the Ulao Swamp, while also controlling and managing invasive species through constructed topographic features (e.g., nature-like hummocks) and targeted native plantings. Anticipated project outputs include up to 92 full-size trees, 50 live tree stakes, 50 potted shrubs, and 140 live shrub stakes, as well as up to 26 pounds of cover crop and native seeding. Progress will be measured in number of plantings and acres/pounds of native seeding.

- To date, 499 full-size trees, 190 live tree stakes, 252 potted shrubs, and 500 live shrub stakes have been planted at Phase III. GLFT funding provided for the anticipated project outputs as described above (e.g., 92 full size trees, 50 live tree stakes, 50 potted shrubs, and 140 live shrub stakes) and match funding provided for the balance of plantings. Vegetation maintenance under match funding is ongoing.

5. *What audience were you particularly hopeful of reaching? To what extent did you reach them? Did you receive any feedback?*

There is significant research that demonstrates that if individuals are engaged in stewardship activities at the local level they are more likely to become overall environmental stewards. Based on this theory, the project team has made education and outreach core to its habitat restoration projects through volunteer tree planting events, volunteer environmental monitoring activities, and trainings, tours, presentations, and demonstrations (see below under "Communication / Dissemination"), which have been very successful. In addition, riparian landowners adjacent to the initial project phases have expressed interest in partnering with Ozaukee County on additional phases of the Ulao Creek Habitat Restoration project (see "Related Efforts"). The Ozaukee County Planning and Parks Department has regularly communicated project progress to multiple stakeholders including the WDNR, FFLM, NOAA, USFWS, the Ulao Creek Partnership (UCP), Milwaukee Audubon Society (MAS), Milwaukee Riverkeeper, the Ozaukee Washington Land Trust, the Great Lakes Community Conservation Corps, the Village of Grafton, Southeast Wisconsin Chapter of Trout Unlimited (SEWTU), and affected landowners through site visits, meetings, phone conversations, and email correspondence. In addition, the Ulao Creek Habitat Restoration project was featured on several educational tours and field trips, including the Fish Passage 2014 Conference Field Trip, a 2014 Southeast Area Land and Water Conservation Association Tour, field trips in 2014 and 2015 for the Natural Resources Foundation, a Society for Freshwater Sciences 2015 Annual Conference Field Trip, and was featured on a segment on WUWM's "Lake Effect" program to promote the 2015 Treasures of Oz event. Ozaukee County, UCP, MAS, and SEWTU also coordinated volunteer tree planting events on 10/11/14 and 10/10/15, which were attended by approximately 81 volunteers from a variety of organizations. A photograph and article was published in the

Ozaukee Press, a local newspaper, on 10/16/14. Ozaukee County will continue to include project information as applicable at professional meetings, conferences, education and outreach events, and through its website, partner newsletters, and social and print media.

6. *What relationships or opportunities were developed or strengthened through the work?*

The National Oceanic and Atmospheric Administration (NOAA), US Environmental Protection Agency (USEPA), US Fish and Wildlife Service (USFWS, U.S. Forest Service (USFS), Wisconsin Coastal Management Program (WCMP), Wisconsin Department of Natural Resources (WDNR), National Fish and Wildlife Foundation (NFWF), Fund for Lake Michigan (FFLM), and other organizations have recognized the importance of aquatic connectivity in the Milwaukee River Watershed and Lake Michigan Basin, funding multiple Ozaukee County Planning and Parks Department projects to inventory, prioritize, and remove/remediate impediments to fish and aquatic life. The County has developed a network of local, regional, and nationally renowned fish and restoration experts and utilized their support throughout the project. The County contracted with Solutions 101 LLC, a project management company with extensive restoration experience (including past large-scale projects with Ozaukee County), to complete Phases I-V of the project. The County also employed the skills of experienced staff and multiple regional experts to successfully implement the proposed project. This consortium of experts includes professional services from Inter-Fluve, Inc., a renowned engineering firm that has completed a wide array of river restoration and habitat improvement projects, including several with the County, as well as regional fisheries experts. The County discussed the overall project with all affected landowners and received letters of support and memorandums of agreement. In addition, the project has the full support of the Ulao Creek Partnership (UCP), of which several landowners are board members or members. The UCP is a well-established and focused non-profit alliance of concerned citizens, landowners, and public and private organizations, and completed invasive species removals, native vegetation plantings, fish passage impediment monitoring and removals, and education and outreach activities throughout the project. Milwaukee Audubon Society (MAS) assisted with bird counts, vegetation restoration, and education and outreach activities. The UCP and MAS, with landowner support, will help to ensure successful implementation and long-term maintenance of the project and improvements. Ozaukee County, UCP, MAS, and the Southeast Wisconsin Chapter of Trout Unlimited (SEWTU) also coordinated volunteer tree planting events on 10/11/14 and 10/10/15, which were attended by approximately 81 volunteers from a variety of organizations.

7. *Was an evaluation included as part of this project? If so, what were the key findings? (Please attach a copy of the evaluation report.)*

The “evaluating results” section of the original proposal indicated specific performance measures as noted above. Progress on these performance measures / outcomes was routinely tracked and reported to GLFT via interim reporting. No other formal evaluation was required or completed specifically for Phase III.

RELATED EFFORTS

8. *Was this project a standalone effort or was there a broader effort beyond the part funded by the GLFT? Have other funders been involved either during the time of your GLFT grant or subsequently?*

Project activities specifically funded by GLFT have been part of a broader effort that has been supported by additional funding entities. The project is complementary to over 20 years of related work and directly relates to two Milwaukee Estuary Area of Concern (AOC) Beneficial Use Impairments (BUI's): "Loss of Fish and Wildlife Habitat" and Degradation of Fish and Wildlife Populations." In recognition of the land and water-based uses and limited opportunities for large-scale habitat restoration projects in the Milwaukee Estuary inner and outer harbors, and in appreciation of the benefits afforded by recent removal or modification of fish passage barriers, the Milwaukee Estuary AOC Fish and Wildlife Technical Team (FWTT) established habitat goals for the AOC, including (1) identify and enhance fish spawning sites from Lake Michigan to the tributaries and headwaters where opportunities exist and (2) improve linear connectivity by connecting aquatic habitat to floodplain wetland with suitable hydroperiod, whenever possible (WDNR 2012). In particular, the FWTT identified stream and wetland restoration projects on Ulao Creek as a key project to address fish and wildlife related BUIs. The proposed project was rated a top five project to address the Habitat BUI in 2014 by FWTT participants, a majority of whom consider the project necessary for removal of the Habitat BUI and a priority for funding (2014). Improving aquatic and terrestrial habitat in the Milwaukee River Watershed directly supports sustainability and/or population recovery for remnant desirable, native, and/or threatened or endangered species. Specifically, improved fish and wildlife habitat promotes the long-term restoration of naturally-reproducing, native wildlife and migratory bird and fish species to the lower Milwaukee River, the Milwaukee Estuary AOC, and near-shore waters of Lake Michigan.

The County, WDNR, SEWRPC, and other partners are finalizing a USEPA-funded, GIS-based Fish and Wildlife Habitat Tool (Tool), which prioritizes restoration projects based on species requirements and the greatest benefit to the resource. Tool results and consultation with local fish, avian and wildlife experts indicated high priority project sites along Ulao Creek at the project locations. The County and its partners have also developed 2-year and 5-year floodplain studies for Ulao Creek and additional streams. This information is critical for understanding and prioritizing native fish, avian and wildlife habitat restoration, wetland improvement, and floodplain connectivity projects for maximum value. Multiple riparian landowners and stakeholder groups including UCP and MAS committed to partnering with the County on this comprehensive, large-scale aquatic and terrestrial habitat improvement project. The project is directly synergistic with the elimination or modification of remaining barriers (linear connectivity) and rehabilitation of stream corridors, floodplains and wetlands (lateral connectivity) as critical tasks for the rehabilitation of fish and wildlife populations and habitat in the Lake Michigan Basin. The County has completed 10 fish passage impediment removal or restoration projects in Ulao Creek, opening a large majority of the Ulao Creek Watershed to linear connectivity and the free passage of resident and migratory aquatic life in the watershed. The

watershed has been the focus of several restoration projects conducted by the UCP and other partners since 1995. Project planning and expected outcomes were guided by a USEPA-approved Quality Assurance Project Plan (QAPP) and existing research and data for the Ulao Creek Watershed and Ulao Swamp to address goals and recommendations of multiple plans and reports including the Ulao Creek Watershed Restoration and Stewardship Plan (Cedarburg Science 2003), Vegetation of the Ulao Swamp, A Hardwood-Conifer Swamp in Southeastern Wisconsin (Hewitt 2002), Ulao Creek Stormwater Management Plan (Bonestroo 1998), and the Hydrogeology of the Ulao Creek Watershed (Northern Environmental 1997). As noted in the original GLFT project application, Phase III activities occurred in conjunction with Phases I and II (see attached project map), which were funded by USEPA Great Lakes Restoration Initiative (GLRI), NOAA GLRI, and FFLM funding. Combined, Phases I and II resulted in approximately 6,114 linear feet of restored channel and the creation of approximately .54 acres of new wetlands/habitat areas through construction of three ponds and wetland scrapes.

9. *Has there been any spinoff or follow-up work related to this project? Did this work inspire subsequent, related restoration projects involving you or others?*

Success at Phases I-III has directly contributed to and inspired additional project phases. Specifically, NOAA GLRI funding is supporting the implementation of Phase IV (immediately downstream of Phase III and north of HWY Q), which includes remeandering of approximately 1,700 feet of stream channel, construction of a 0.5 acre pond, creation of riparian and in-stream habitat features, invasive species controls, and native vegetation restoration. The Department has also reconnected the majority of the Kaul Creek watershed through a culvert replacement project at Ulao Parkway, construction of a bypass channel around an earthen berm and invasive vegetation removals in the USFWS Blue-wing WPA, and remediation of the culvert at HWY C through a series of cross vane structures under FFLM and NFWF Sustain Our Great Lakes (SOGL). Kaul Creek is tributary to Ulao Creek with its confluence at the upstream end of the Phase I project area. An additional 1,000 of Kaul Creek between Ulao Creek and Ulao Parkway (adjacent to the current restoration activities) has been artificially straightened for agricultural uses and has been significantly impacted by invasive vegetation (e.g., reed canary grass) resulting in a non-defined channel with diffuse, interstitial flow. FFLM and other private foundation funding (e.g., Brookby Foundation) is providing for the engineering, design, and construction of the Kaul Creek Impediment Removal and Habitat Restoration Project (Phase V of the Ulao Creek Habitat Restoration Project), which will be constructed in fall 2016. The Department and partners have also completed an aquatic and terrestrial habitat improvement project on Sandhill Creek and are managing a similar large-scale project on Mole Creek in the Village and Town of Saukville within WDNR easements using Tool outputs and lessons learned from the Ulao Creek projects. Ongoing fish, wildlife, and avian monitoring is being completed at all habitat restoration projects.

The Department is also conducting water quality monitoring at the habitat improvement projects on Ulao and Mole Creeks to determine effectiveness of stream remeandering as a best management practice to reduce pollutant loads (e.g., TMDL's). Discrete water samples (grab samples) are being analyzed for E-

Coli, Total Phosphorus, Orthophosphate, Total Suspended Solids, and Chlorides. Continuous water quality units are collecting data on Water Temperature, Conductivity, Water Depth, Dissolved Oxygen, and pH. Funding for water quality monitoring has been secured through the WDNR and private foundations (e.g. Brookby Foundation).

COMMUNICATION/DISSEMINATION

10. *List publications, presentations, websites, and other forms of formal dissemination of the project deliverables, tools, or results, including those that are planned or in progress.*
11. *Please characterize your efforts to distribute and encourage use of products, processes, programs, etc. developed through this grant.*

As noted above, there is significant research that demonstrates that if individuals are engaged in stewardship activities at the local level they are more likely to become overall environmental stewards. Based on this theory, the project team has made education and outreach core to its habitat restoration projects through volunteer tree planting events, volunteer environmental monitoring activities, and trainings, tours, presentations, and demonstrations. In addition, education and outreach performed as part of this grant built on Department efforts already underway. Public outreach and information dissemination efforts regarding project goals, progress and results was a joint effort between Ozaukee County and other major stakeholders/project partners. Specific outreach activities used to foster public participation and education as part of the project include:

- Detailed project information posted under the Ecological Division of the Ozaukee County Planning and Parks Department website (http://www.co.ozaukee.wi.us/540/Planning-Parks), as well as partner websites.
- Active public relations outreach, including publication of project information and updates in local community newspapers (News Graphic, Ozaukee Press), with the goal of garnering showcased examples of project activity in print media.
- Presentations at local, regional and state professional organization technical meetings / conferences.
- Additional presentations, events and tours created by Ozaukee County, the WDNR, and others to educate public officials and watershed patrons on the beneficial effects of habitat planning and restoration.
- Articles in the County's Department newsletters, including the Land and Water Management Department "Ozaukee Dirt" newsletter.
- Articles in advocacy and community partner newsletters (OWLT, Ulao Creek Partnership, Land Conservation Partnership, Treasures of Oz, Milwaukee Audubon Society, Riveredge Nature Center, Mequon Nature Preserve, Schlitz Audubon Nature Center).
- Updates on the Department's social media websites, including Facebook (https://www.facebook.com/FishPassageProgram/) and Twitter (https://twitter.com/OzCoFishPassage).
- Provision of project information in posters, pamphlets, and factsheets with distribution at numerous events and conferences.

During the GLFT grant award period, the Ozaukee County Planning and Parks Department staff provided Fish Passage Program and project information to over 7,513 people at 45 professional meetings, presentations, conferences, volunteer work days, and other education and outreach events, including the Pilgrimage up the River (8/16/14), Ozaukee Treasures Network conference (9/11/14), Sturgeon Fest (9/27/14), Ulao Creek Volunteer Day (10/11/14), the Southeast Area Land and Water Conservation Tour (10/14/14), Riveredge Nature Center Science for Everyone program (1/20/15), presentation to a UW Milwaukee Conservation and Environmental Science class (2/24/15), Ozaukee County Youth Government Day (3/4/15), UW Milwaukee School of Freshwater Sciences Seminar Series presentation (4/9/15), Wisconsin Society for Professional Engineers Milwaukee Metro meeting (4/23/15), Clean Rivers Clean Lake Conference (4/30/15), Milwaukee Audubon Society Natural Landscapes Conference (5/2/15), Society for Freshwater Sciences annual conference (5/19/15), Society for Freshwater Sciences field trip (5/22/15), a Natural Resources Foundation of Wisconsin field trip (6/12/15), WUWM's "Lake Effect" program (6/17/15) (http://wuwm.com/post/restoration-spawning-grounds-ozaukee-countys-ulao-creek#stream/0), Treasures of Oz (6/20/15), Ozaukee County Fair (7/29/15-8/2/15), Lake Michigan Day (8/14/15), Sturgeon Fest (9/26/15), Mole Creek Habitat Enhancement Project Volunteer Tree Planting Day (10/3/15), Presentation to UW Milwaukee CES students (10/5/15), Ulao Creek Habitat Enhancement Project Volunteer Tree Planting Day (10/10/15), Great Lakes Regional Collaboration Team Meeting (10/20/15), Riveredge Nature Center "Science For Everyone" Lecture Series (10/20/15), Lake Michigan Stakeholders Steering Committee Meeting (11/10/15), We Energies and Partners Meetings (11/11/15, 12/1/15), UW Madison Center For Limnology (12/4/15), UW Milwaukee Urban Planning Lecture Series (12/8/15), Ozaukee Treasures Network Conference (2/4/16), Partnership for River Restoration and Science in the Upper Midwest (PRRSUM) Conference (2/9/16), Youth Government Day (3/16/16), Ozaukee County Fish Passage Program Video Release / Volunteer Celebration (3/23/16), Ozaukee Treasures Network Conference (4/7/16), University of Wisconsin Milwaukee graduate student presentation and educational video screening (4/18/16), Clean Rivers Clean Lake Conference (4/28/16), Lake Michigan Day (5/13/16), World Fish Migration Day (5/21/16), Natural Resources Foundation Field Trip (6/3/16), Educational Video mass mailing throughout Great Lakes Basin (6/10/16), Ozaukee County Board Meeting (6/15/16), Treasures of Oz (6/18/16), Ozaukee County Fair (8/3/16-8/7/16) and Lake Michigan Day sponsored by the Lake Michigan Stakeholders (8/12/16).

Additional project information can be found on the Planning and Parks Department's Ecological Divisions Fish Passage Program (Program) webpage at: http://www.co.ozaukee.wi.us/1879/Ulao-Creek. This website also includes a link to multiple partner newsletters and press articles. The project was also featured on the Program's education and outreach video which can be viewed at:

http://www.co.ozaukee.wi.us/619/Fish-Passage or at https://youtu.be/Tuh_lbsgBsU. Copies of this video were sent to every unit of local government (e.g., counties, cities, villages, towns) in the Lake Michigan Basin as well to multiple schools, environmentally focused non-profit organizations, and other partners throughout southeast Wisconsin. All pertinent project information including updates, upcoming volunteer events, and project results is routinely uploaded to the Department's website and social media pages. Many of our partners have well-developed web resources on environmental education and invasive species and the Department will assist in subsequent marketing partner workshops, webinars, and website information as it is available to support local partners and not to duplicate efforts. It is anticipated that the project will encourage and facilitate future restoration activities within and outside the Lake Michigan Basin, as the Department's Program has become a regional model for restoring aquatic connectivity and improving ecologic productivity across large watersheds. Applicable partner newsletters, press articles, and other education and outreach items are included as Attachment A.

REFLECTIONS

12. *Please describe any unanticipated benefits, challenges or surprises, and/or important lessons learned over the course of the project.*

In winter 2014, persistent cold temperatures, above normal snow coverage, and unusually extensive river ice delayed typical ice-out and spring thaw conditions. In April and June 2015, Wisconsin had greater than average monthly precipitation levels (http://www.aos.wisc.edu/~sco/clim-watch/#90day). In addition, WDNR Ch.30 permit requirements for the Ulao Creek habitat restoration project required that project activities must occur during periods of low-flow and no temporary stockpiles may remain over the winter months. As such, these conditions prevented the start of on-site project activities at Ulao Creek until low-flow conditions were observed in late May 2015. In addition, the WDNR permit also requires that the new stream channel be fully vegetated before accepting flow, so this permit condition has added unforeseen time to the overall project. During the new channel excavation, significant amounts of gravel and cobble at the design elevation of the new stream thalweg were exposed, suggesting that the old channel once meandered through the design alignment. As such, the engineer determined that the existing exposed materials would be suitable as bed materials instead of incorporating off-site materials per the plan, which was an unanticipated benefit.

13. *What recommendations (if any) would you make to other project directors working on similar efforts or to the GLFT?*

As noted above, using small-scale earthmoving equipment (e.g., mini excavators and earth movers) minimized overall site disturbance and required tree removals which, in turn, saved on overall project costs. Large woody debris for habitat structures utilized recycled trees felled from the new stream channel areas or felled trees brought in from the Ozaukee County Park System as part of routine park maintenance and EAB removals, also resulting in cost savings. Restoration

of the project area through native re-vegetation can represent a significant amount of total project costs. As such, the Department required a 3 year vegetation maintenance plan as part of the contract to ensure that any dead or dying native tree plantings are replaced to maximize this investment. The Department recommends that other project directors and the GLFT recognize that challenges associated with large scale restoration projects, including permitting timelines and constraints and site/weather conditions, can impact the overall grant timeline and project scope.

PICTURES

14. *Provide at least three photos of the completed project (if applicable).*
15. *The GLFT requires each project it funds to have suitable permanent public acknowledgement of GLFT assistance. If applicable, the GLFT will provide a sign to you (via mail) and requires photo verification of the posting of the sign before it will process your final reimbursement request.*

Applicable project photos are included as Attachment B. Phase III activities funded by the GLFT are located wholly on private property. However, the Department has installed project signage at the Phase II project area at the corner of HWY Q and Washington Street, which is highly visible to the public. This signage includes the GLFT logo. A photo of this sign is included in Attachment B. In addition, the Department has developed permanent signage (currently in production), to be installed at Phase II which also includes the GLFT logo. A copy of the draft sign template is also included in Attachment B. The Department would be willing and able to install any permanent signage provided by the GLFT.

ATTACHMENTS

16. *Please attach any reports or materials developed throughout the grant.*

Attachment A includes applicable education and outreach media, Attachment B includes site and project photos, and Attachment C includes the final project plans, project memo, and design report for Phases I-III.