HABITAT PROTECTION AND RESTORATION PROJECT FINAL REPORT GUIDELINES

Final reporting requirements consist of (1) a completed profile of the grant for posting to the public Great Lakes Fishery Trust (GLFT) website (see below), (2) a narrative response to GLFT final report questions (see following section), and (3) a final financial report (form and instructions attached).

PROJECT PROFILE

Your profile should be no more than three pages in length (preferably two). As the profile will be published to the GLFT website, please strive to communicate in language accessible to a general audience. The primary intended purposes of the profile are to (1) provide an overview of the work funded by GLFT and characterize results and achievements in an accessible manner, and (2) help interested parties access further resources or materials germane to the effort. The profile should follow this format:

Synopsis

Project Title: Boardman River-Dam Removal #3

Grantee Organization: Grand Traverse Band of Ottawa and Chippewa Indians

Project Team (Please list all members of the project team who should be credited with contributions to the work, including name and institutional affiliation.)

The Implementation Team (IT) includes the following partners:

Grand Traverse Band of Ottawa & Chippewa Indians, U.S. Fish & Wildlife Service, City of Traverse City, Grand Traverse County, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, Michigan Hydro Relicensing Coalition, Traverse City Light & Power.

IT Ex-Officio members & partners include: Conservation Resource Alliance, Grand Traverse Conservation District, Grand Traverse County Road Commission, US Army Corps of Engineers, Watershed Center – Grand Traverse Bay, Traverse City Rotary Charities, Garfield Township.

Contact Person: Brett Fessell, River Restoration Ecologist, brett.fessell@gtbindians.com

Grant Amount: $430,000

Time Frame: June 20, 2017 through November 15, 2018

Focus Areas: EHSFP Habitat Protection and Restoration (including Dam Management)

Brief Project Summary (In 100 words or less, provide a summary of the project, including its purpose and key results.)

The Boardman River Restoration Project (Project) involves strategically formulated work elements designed to address some of the most complex and crucial aspects of a restoration project aspiring to repair the functional linkage between a watershed and its principle ecological beneficiary, the Great Lakes. Specifically, this project will culminate in repairing a linkage that has been effectively severed for over a century and will serve as a guiding template for future efforts contemplated on countless other similarly truncated watersheds in the Great Lakes region. The removal of the third dam on the Boardman River, Sabin Dam, represents one of the last major Project milestones by completing the final critical step in restoring and reconnecting nearly 5 miles of high-quality riverine habitat and nearly 140 acres of associated wetland and upland habitats important for the natural function of ecosystem services to the watershed. Such benefits transcend localized improvements and will bolster ecological functions operating within Grand Traverse Bay and Lake Michigan; they will pave the way to health, integrity and freedom the Great Lakes region and its life-giving tributary watersheds have been denied for centuries.

Project in Context

This orientation to the project should provide key background information on its purpose, location (where appropriate), and broader significance. You may wish to consider:

- Background research identifying a need for the work
- Stakeholder identification of a need for the work
- Specific focus of the work as it relates to Great Lakes ecology/resources
- Relationship to other related products/services/programs
- Intended audience/population to be served

Goals of the Effort

In this section, identify the key goals and/or the specific purpose of the effort.

In the context of the broadest Project goal of restoring watershed continuity, the following specific focus points and targets were addressed with the help of GLFT funding support:

The principle goal was to focus directly on components of Phase lll (removal of Sabin Dam) in cooperation with the US Army Corps of Engineers (USACE) implemented through a Project Partnership Agreement (PPA) with the Grand Traverse Band serving as the non-federal sponsor responsible for 35% of the total project cost as determined in the PPA. Specific Project targets in this implementation effort included dam embankment de-construction, floodplain connectivity and wetland rehabilitation through the adjacent riparian corridor over nearly a mile upstream of Sabin dam.

In this section, briefly summarize the key findings or results of the project. Identify the results (e.g., fishery habitat restored, products developed, outreach engaged in, participation/use of materials achieved, feedback received).

As referenced above, one of the key outcomes derived from the funding received for this Project phase was to help secure and provide the financial leverage and confidence to enter into a PPA with the USACE affording GTB and Project Partners assurance this nearly $6.5M phase of the Project would be funded in full through the Great Lakes Fishery & Ecosystem Restoration (GLFER) program. However, “funded in full”

warrants context in that achieving the necessary funds for this phase of the Project stipulates that a non-federal sponsor contribute (up front) immediately upon signing the PPA 35% of the total project costs while the remaining 65% would be provided by the USACE on an "as needed" basis as the construction contract budget burns through time. At this point, it is important to note that entering into such a complicated binding agreement as the PPA with the federal government (USACE) is not without risk and was most definitely not signed in carefree comfort or certainty. Nonetheless, funding from the GLFT was one of several key contributions allowing GTB and Project Partners to fulfill the financial obligations assumed by GTB through the PPA. In this regard, funding from the GLFT served to help alleviate concern for risk and added a certain comfort to GTB and Project Partners in these somewhat uncertain times.

In specific terms, this Project phase allowed for direct focus on implementation of the most effective measure to be taken in watershed restoration, dam removal. The deliverables were simple yet momentous:

- Sabin Dam was removed and spoils associated with its embankment were redistributed over approximately (50%) of the river valley width.
- Approximately 1 mile of relic channel and attendant floodplain features were restored within the former impoundment.
- Features important to wetland function including hydrology and associated plant communities were restored within riparian corridor spanning the approximately (125 acres) 0.5 mile wide river valley for approximately 2 miles below and 0.75 miles above Sabin Dam.

Products and Resources

List, and provide addresses for, related websites developed for or through the project or that provide additional information. Provide site title, full address, and a brief (one- to two-sentence) description of the relevant content.

List any other communications outlets, publications, media coverage, etc. for the work. If these are available online, please hyperlink the listing. Items that are *planned* or *in process* should be so designated.

Primary Project website: http://theboardman.org/

This website is specifically for the project and contains information on reports, documents, permits, meeting agendas and minutes, press releases and articles, videos and the specific dams.

Project Partner Website: https://www.rivercare.org/news/tag/Boardman+River

This website is maintained by Conservation Resource Alliance which has served as GTB's principle Project Partner in association with the USACE PPA and coupled through sub-agreements and contains updated information on the Boardman River dams and restoration effort.

FINAL NARRATIVE REPORT

Background/Overview

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

The Boardman River Restoration Project (Project) involves strategically formulated work elements designed to address some of the most complex and crucial aspects of a restoration project aspiring to repair the functional linkage between a watershed and its principle ecological beneficiary, the Great Lakes. Specifically, this project will culminate in repairing a linkage that has been effectively severed for over a century and will serve as a guiding template for future efforts contemplated on countless other similarly truncated watersheds in the Great Lakes region. The removal of the third dam on the Boardman River, Sabin Dam, represents one of the last major Project milestones by completing the final critical step in restoring and reconnecting a Project total of nearly 5 miles of high-quality riverine habitat and nearly 140 acres of associated wetland and upland habitats important for the natural function of ecosystem services to the watershed. Such benefits transcend localized improvements and will bolster ecological functions operating within Grand Traverse Bay and Lake Michigan; they will pave the way to health, integrity and freedom the Great Lakes region and its life-giving tributary watersheds have been denied for centuries.

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?

In fundamental terms the project will be completed as originally intended with the key elements, removal of Sabin Dam and restoration of nearly 1 mile of relic channel and floodplain, having been achieved before the end of this grant period in November 2018. As of this writing, subsequent work has been completed in construction and occupation of a new channel into its final alignment through the former location of the powerhouse. As intended, the balance of work to be completed for the project including final grading of floodplain and uplands, channel pattern and profile, and cover crop installations in preparation for winter are to be completed by the end of January 2019. Final site restoration efforts are expected to commence in Spring of 2019 with all phases of construction and restoration on target for completion by early summer 2019. To date, over 17,451 hours (approx. 200hrs/day) have been logged since project commencement on July 23, 2018. Zero injuries to date. All work has been conducted in a very professional manner, within expected timelines and within budget.

The last of 3 dams to be removed in the Boardman River Watershed has revealed, restored and served to link nearly a mile of new channel and floodplain with the balance of flow eminating from the entire 260 square mile watershed. After nearly a decade of work and tens of millions of collaboratively sourced funds, the largest dam removal / river restoration project in Michigan history has achieved a magnificent milestone to be celebrated in earnest.

Outcomes:

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

In specific terms, this Project phase allowed for direct focus on implementation of the most effective measure to be taken in watershed restoration, dam removal. The deliverables were simple yet momentous:

- Sabin Dam was removed and spoils associated with its embankment were redistributed over approximately (50%) of the river valley width.
- Approximately 1 mile of relic channel and attendant floodplain features were restored within the former impoundment.
- Features important to wetland function including hydrology and associated plant communities were restored within riparian corridor spanning the approximately (125 acres) 0.5 mile wide river valley for approximately 2 miles below and 0.75 miles above Sabin Dam.

The US Army Corps of Engineers sees this Project as an important natural resource project and has demonstrated their dedication to the team as the paramount contributor allocating through the USEPA up to 8 million dollars for the Boardman dam removal component of the project. While, at the time, this was certainly a substantial financial milestone towards completion of the next major removal phase (Boardman Dam) of this multi-stage river restoration effort, it also served an important role in helping to assure that previously committed funding obligations from **all** project partners not only remain in place but were appropriately shifted 'downstream' and applied to any outstanding unfunded elements of the comprehensive Project. In similar regard, the role of GLFT funding helped serve as a catalyst further driving the Project and its partners to thoughtfully and confidently work through the final phases of financial coordination and planning for direct application of resources to the third phase of the Project; removal of Sabin Dam.

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

Aside from the principle restoration deliverables and outcomes referenced above, one of the key outcomes derived from the funding received for this Project phase was to help secure and provide the financial leverage and confidence to enter into a PPA with the USACE affording GTB and Project Partners assurance this nearly $6.5M phase of the Project would be funded in full through the Great Lakes Fishery & Ecosystem Restoration (GLFER) program. However, "funded in full" warrants context in that achieving the necessary funds for this phase of the Project stipulates that a non-federal sponsor contribute (up front) immediately upon signing the PPA 35% of the total project costs while the remaining 65% would be provided by the USACE on an "as needed" basis as the construction contract budget burns through time. At this point, it is important to note that entering into such a complicated binding agreement as the PPA with the federal government (USACE) is not without risk and was most definitely not signed in carefree comfort or certainty. Nonetheless, funding from the GLFT was one of several key contributions allowing GTB and Project Partners to fulfill the financial obligations assumed by GTB through the PPA. In this regard, funding from the GLFT served to help alleviate concern for risk and added a certain comfort to GTB and Project Partners in these somewhat uncertain times thereby significantly contributing to the full realization of GTB and the Project Team's intended and expected outcomes.

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

The intended audience(s) to be reached included the USACE and its Contractors including Engineering and Construction. Given the relationships that developed with the USACE, the engineering contractor (AECOM), the prime construction Contractor (Jobsite Services) and the Project team the final outcomes for this Project phase genuinely exceeded expectations. This is particularly evident when compared to the Project phase

for Boardman Dam removal where a different contractor and funding mechanism was employed. In this regard, the PPA served to allow a deeper involvement and closer engagement of Project Partners with the entire process involving execution, observation, and adjustments to plans and work completed by the Contractor under direction of the USACE. Communication lines were well established allowing for responsive interaction among the Project Partners, USACE and the Contractor. Of particular significance to the Project success was the formal and informal relationship with Conservation Resource Alliance which served as much the "general project manager" as a critical conduit through which a great deal of the non-federal sponsor's cost share responsibility was met. This degree of trust and resultant comfort and efficiency rises above all other phases of the Project; a clear demonstration of how the Project team learned and improved with each step of its sometimes arduous yet fulfilling journey. In sum, it is suggestive that success was realized through a combination of factors including but not limited to, the accountability borne of the PPA, the cooperative relationships assuring efficient project funding flow and, above all, the people. Open communication, genuine efforts to keep partners appraised, and celebration of successes led the way for people to achieve the impossible nearly equal to moving a mountain; returning a river to its native state.

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

The concept of Federal Trust Responsibility is of particular value and importance to Indian Tribes and their pursuit of self-governance and contribution to the greater good. However, as all to often has been the case even through to this day, a wide disparity can exist between words on a page with well meaning intention and the actions taken by federal agencies on behalf or in the best interest of Indian Tribes. This relationship is often obscured by political and fiscal shadows of perceived responsibilities relative to the reality of the needs and desires of each entity. To this end, in somewhat unexpected fashion, the PPA and affiliated formal partnership agreements among Project Partners arguably helped break through at least one pane of the glass ceiling over the disparity of words and actions related to the concept of Trust Responsibility. It is important to note that - to date - this is the first and only PPA the USACE-Detroit District has entered into with an Indian Tribe. However difficult to capture in words, numbers or pictures the value of relationships built under this mechanism cannot be understated and if attended to thoughtfully and consistently such relationships can help serve as the basis for achieving ever greater accomplishments. While in the context of the Project in its entirety the financial contribution realized from this GLFT award may appear minor, in terms of the overall success realized in watershed and community restoration it undoubtably has contributed in ways that far exceed the mere sum of its parts. And at it's center lives Trust built in actions serving the greatest good for health and prosperity of the Boardman River and of the Great Lakes.

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 results of restoration projects cannot be qualified or quantified without viable, healthy and detailed monitoring and assessment efforts pre and post removal. Grand Traverse Band (GTB) Staff have gained extensive training in river restoration and fluvial geomorphic sciences with course completions from Portland State University's River Restoration Professional Program and Wildland Hydrology's Watershed Assessment and Natural Channel Design 4 level training series. GTB's Natural Resource Department staff have become an integral component of state, regional and local efforts to share knowledge which is used to define and refine policy in river management. GLFT funds directed specifically to implementation allow GTB staff to assign in-kind resources towards the important efforts in monitoring, documentation and evaluation of the Project which will contribute significantly to knowledge and practice transfer to other communities endeavoring to restore ecosystems through dam removal. As with the Boardman Dam Removal phase, the

MDEQ requires at least 3 years of monitoring and evaluation to be completed as a condition of the Joint Permit Application for this project phase. Efforts to comply with this requirement are currently in the final planning stages and build on those already being conducted within the Boardman Dam Removal project area directly upstream. The only monitoring efforts required during construction included the establishment of at least 3 cross sections at equidistant intervals from Sabin Dam downstream to the South Airport road stream crossing just above the point where the river enters Boardman Lake. The purpose of establishing these cross sections is to monitor sediment transport and deposition patterns consequent to construction activities in the former impoundment above Sabin Dam. Specifically, regularly scheduled data collection efforts were conducted and continue as of this writing to include water surface elevations, depth to fine sediments and depth of refusal (DOR) to the pre-project river bed elevation measured as a baseline for comparison prior to construction. Accordingly, 4 monumented cross sections and associated stage gages were installed in June of 2018 in advance of construction activity commencement in July. Preliminary results are presented below and in separate report documents referenced.

Results

In summary, results of the sediment transport and deposition patterning show an expected wedge of sand sediments moving in pulses during high flows and smearing longitudinally during lower flows to a region approximately 1 mile downstream of the former dam site (approximately ½ the distance to the road stream crossing at South Airport Rd). Additionally, as expected, suspended fine sediments (primarily organics and clays) were transported further downstream and deposited in greatest quantities at both points of flow constriction at South Airport Road and at the river mouth at Boardman Lake taking the form of a pro-grading delta of extremely rich and fertile substrate for aquatic flora and fauna. See attached report for further detail *(Sabin Downstream Monitoring Update-11-02-18).*

Results of post-project monitoring and evaluation efforts are pending full implementation of the effort subsequent to final as built surveys are prepared and finalized.

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?

This phase of the Project is part of the greater effort to restore the free flowing form and function of the Boardman River, with the removal of Brown Bridge Dam in 2012 (Phase I), removal of Boardman Dam (Phase II) in 2016 and now Sabin Dam (Phase III) in 2018 to be followed by the modification of Union Street Dam (Phase IV - FISHPASS) in 2020. Including all phases and elements to the comprehensive Boardman Restoration Project, the total investments to service the health and prosperity of the river and the communities it touches will likely approach $40Million over the past decade or more. Contributors to these investments are so numerous that a list must be qualified to Owners, Partners and/or those of "significant" contributions:

Bureau of Indian Affairs	U.S. Fish & Wildlife Service
U.S. Environmental Protection Agency	U.S. Army Corps of Engineers
Michigan Department of Natural Resources	Michigan Department of Transportation
Michigan Department of Environmental Quality	National Fish & Wildlife Foundation

City of Traverse City	Conservation Resource Alliance
Grand Traverse County	Traverse City Light & Power
Michigan Hydro Relicensing Coalition	Grand Traverse County Road Commission
Watershed Center, Grand Traverse Bay	Traverse City Rotary Charities
Garfield Township	AECOM Engineering
Jobsite Services, Inc.	M.J. Van Damme Contracting, Inc.
Stream Mechanics, PLLC	

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?

To describe the "spinoff" and related work to this Project would be difficult if not onerous and duplicative of other GLFT funding recipient's reports to date. In sum, the most notable initiatives, efforts and work include the following:

FISHPASS – A world class effort to design and construct a selective bidirectional fish passage facility in place of the existing lower most (defacto sea lamprey) barrier at Union Street Dam in Traverse City, Michigan. This $20Million+ project will serve as a landmark achievement in Great Lakes fishery management, restoration and conservation. Once completed and operational it will serve as a model for countless other watersheds now ecologically fragmented from the Great Lakes by similar lower most (defacto sea lamprey) barriers.

Stream Quantification Tool (SQT) – A technical protocol following an approach developed by Stream Mechanics, EPA and USFWS, *A Functional Framework for Stream Assessment & Restoration Projects (2012)*, will be endorsed and utilized by regulatory and management agencies including MDEQ, MDNR, GTB and others in Michigan. The SQT is currently near completion with expected application and subsequent adaptation over the minimum 3 year monitoring and evaluation period for Boardman and Sabin Dam removal phases of the Project.

Michigan Arctic Grayling Initiative – At the request of MDNR Fishery Chief GTB nominated the Boardman River as a candidate stream for the Michigan Arctic Grayling Initiative (MAGI) focusing on re-introduction efforts in a select number of Michigan rivers through a cooperative effort between MDNR and Little River Band of Ottawa Indians. Project proposals and funding requests to applicable agencies are being prepared for feasibility assessments to be conducted in coming years.

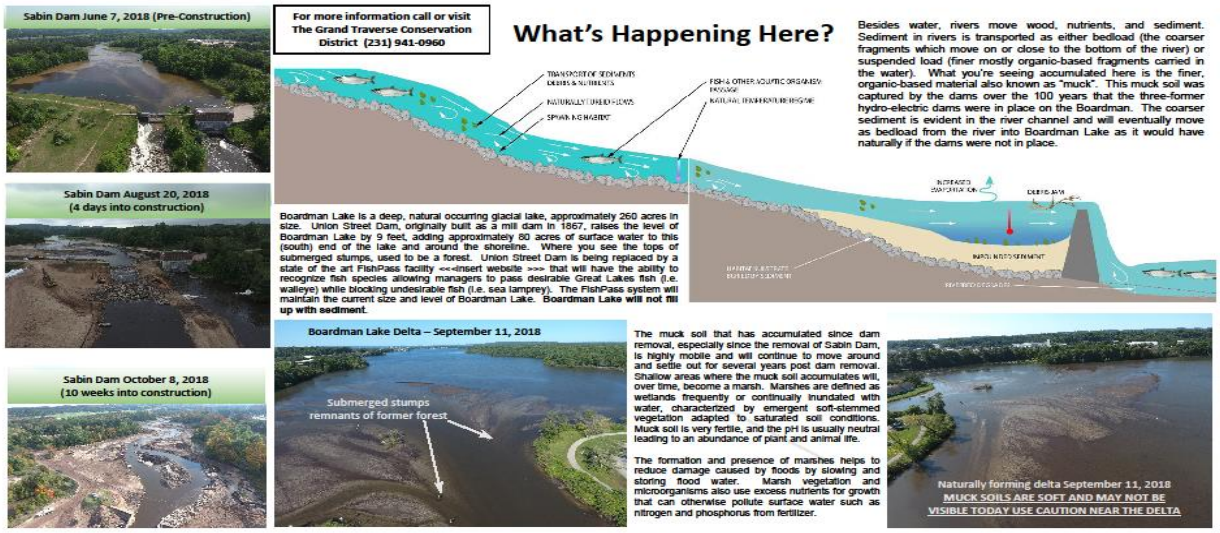
Dam removal feasibility on the Black River, Presque Isle County, Michigan – The Boardman Project inspired GTB, MDNR and other Tribes to contemplate the notion of restore the Black River in similar fashion. Work is underway to engage in ongoing FERC relicensing proceedings for Tower and Kleber Dams near Onaway. The Black River is tributary to Black Lake and the Cheboygan River and holds the only naturally reproducing inland population of Lake Sturgeon to which 1836 Treaty Tribes and the State of Michigan manage for harvest by their affiliated citizens. Removal of these dams would allow spawning sturgeon access to nearly 50 miles of river and untold quantities of spawning and nursery habitat. The existing conditions with the dams in place relegate migrating Lake Sturgeon to a reach of river suitable for spawning approximately 2 miles in length.

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 process*.

Primary Project website: http://theboardman.org/
This website is specifically for the project and contains information on reports, documents, permits, meeting agendas and minutes, press releases and articles, videos and imagery related to the Project.

Project Partner Website: https://www.rivercare.org/news/tag/Boardman+River
This website is maintained by Conservation Resource Alliance which has served as GTB's principle Project Partner in association with the USACE PPA and coupled through sub-agreements and contains updated information on the Boardman River dams and restoration effort.



http://naturechange.org/2018/10/25/the-changing-river-delta-formation-at-the-mouth-of-the-boardman-river/

Similar education and outreach materials (signage to be posted at pertinant sites in the watershed) are in development including "What's Happening Here" for large wood structures and other features, phenomena or changes observable by the public when visiting the watershed.

11. Please characterize your efforts to distribute and encourage use of products, processes, programs, etc. developed through this grant.

Respectfully, response to this inquiry was addressed in multiple other sections of this report.

Reflections

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

Although this grant specifically funded a portion of construction activities at Sabin Dam, the processes and concepts developed and arising through the comprehensive Project are and have been widely shared – locally, regionally, nationally and even globally. As a small example, and notwithstanding even greater efforts

by former and other project managers associated with the Project, the author of this report alone has presented the Boardman Project and its multiple associated efforts (implementation, monitoring, management, planning, etc) to audiences from school aged children to industrial and academic professionals, in venues spanning local meetings to national and international conferences and symposia. An underpinning element to the Project has always been the development and promotion of a transferrable model to which other river-based communities may draw from. We have both gathered and shared lessons learned from communities connected with rivers from the Waikato Tanui in New Zealand to the Grand River in Grand Rapids. These efforts will continue for years to come as the story continues to unfold and manifest the great achievements realized here. Achievements that seek to transcend a simple dam removal or river restoration project, rather a multi-faceted community restoration and revitalization project where the people strive to live in reverence and respect to what becomes more than just a channel conveying water, sediment and nutrients. It becomes a reflection of the people themselves.

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

Take care and make time for efforts to communicate, educate, engage, and tell the story….

Pictures

14. Provide at least three photos of the completed project (if applicable).

The River now back in its original and final location; December 19, 2018.

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.**

Attachments

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

Attached:
Bid Documents
Project Partnership Agreement (PPA)
Report - *Sabin Downstream Monitoring Update-11-02-18*
Report – *Sabin Dam Removal & River Restoration Photo Report – December 2018*