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 -** North Branch Boardman River Connectivity and Sub-watersheds Inventory Project
- **Grantee Organization -** Conservation Resource Alliance
- **Project Team** (Please list all members of the project team who should be credited with contributions to the work, including name and institutional affiliation.)
    - Michael Seefried, Erin Teubner, Kim Balke, DJ Shook: Conservation Resource Alliance
    - Sarah U'Ren: The Watershed Center – Grand Traverse Bay
    - Steve Largent: Grand Traverse Conservation District
    - Brett Fessell and Melissa Witkowski: Grand Traverse Band of Ottawa and Chippewa Indians
    - Rob Aster: Land Information Access Association
    - Patrick Middleton: KPM Engineering
    - Wayne Schoonover: Grand Traverse County Road Commission
    - Patrick Ertel and Heather Hettinger: Michigan Department of Natural Resources

- Luke Golden: Michigan Department of Environment Great Lakes and Energy
- Andrea Paladino and Jason Kimbrough: USDA-Natural Resources Conservation Service
- Rick Westerhof: US Fish and Wildlife Service

- **Contact Person** (Please identify the person(s) who should be contacted with questions about the work, providing a name, institutional affiliation, and e-mail address for each.)
  - DJ Shook – Conservation Resource Alliance – dj@rivercare.org
    Kira Davis – Conservation Resource Alliance – kira@rivercare.org
- **Grant Amount -** $97,500
- **Time Frame –** November 25, 2019 - July 31, 2021
- **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.)

Community partners, on the heels of a highly successful and challenging three-dam removal effort on the mainstem Boardman River, worked to keep the broader Grand Traverse Bay Watershed restoration momentum going through the preparation of designs for a new timber bridge over the North Branch Boardman River which will connect 30 miles of tributary to the Boardman River mainstream. The updated Boardman River road-stream crossing inventory as well as new inventory for Mitchell, Acme, Yuba, and Tobeco Creeks will pave the way for local managers as they prioritize road-stream crossing work in this highly valued watershed.

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

With the largest dam removal project in Michigan's history concluding in 2019 on the Boardman River, partners decided that initiating a road-stream crossing improvement in the headwaters is a sound next step to effectively managing the watershed. The Broomhead Road crossing of the North Branch Boardman River now has final designs prepared to construct a timber bridge in place of the undersized culvert. Since the 1990's, managers have been battling streambank and road embankment erosion induced during high flow events as the river is forced to flow through a structure 1/3 its natural width. Large angular rip rap rock installed to stall the erosion is now beginning to fail and a new solution is needed that treats the underlying cause of the erosion – the undersized culvert. Identification of the Broomhead Road crossing of the North Branch Boardman River as a priority project was done with the help of a road-stream crossing inventory of the Boardman River Watershed. This Boardman River Watershed road-stream crossing inventory needed an update using a newly adopted road-stream crossing inventory protocol and the

surrounding Grand Traverse Bay tributaries of Mitchell, Acme, Yuba, and Tobeco Creeks were also in need of road-stream crossing inventory data.

Climate change is creating more severe weather patterns in the Great Lakes. Reconnecting upper reaches of intact high-quality stream habitat with lower watershed habitat increases the likelihood that priority cold-water species, like the Eastern Brook Trout, persist through these severe weather patterns. Scientists use Easter Brook Trout as a surrogate or 'canary in the coal mine', representing a large swath of other important species that are also likely to be protected if Easter Brook Trout populations are healthy.

Thousands of road-stream crossings exist in the Great Lakes Basin and scientists estimate that 65% of them create at least a partial barrier to fish passage. Conducting inventories helps managers prioritize where limited resources for restoration should be spent. Through this project, 403 road-stream crossings were inventoried in the Grand Traverse Bay Watershed.

Goals of the Effort

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

One of the goals of this project was to develop a final design packet for an improved road-stream crossing structure at the intersection of the North Branch Boardman River and Broomhead Road. Another goal of this project was to conduct an inventory of the Boardman River and Greater Grand Traverse Bay Watershed road-stream crossings.

Results

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).

A final design packet has been produced for the construction of a Timber Bridge to carry Broomhead Road over the North Branch Boardman River. The new bridge will span the full 30-foot-wide channel and open fish passage to 30 miles of high-quality stream habitat. Michigan Department of Natural Resources staff and Grand Traverse Band of Ottawa and Chippewa Indians Natural Resources Department staff along with local partner staff provided input during the development of the design. Conservation Resource Alliance staff completed the road-stream crossing inventory and merged it with existing data collected by staff from The Watershed Center Grand Traverse Bay. With help from staff from Land Information Access Association, the data is available online via an interactive website.

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.

River Restoration in Northern Michigan – Grand Traverse Bay Watersheds Page, www.northernmichiganstreams.org/gtbayws.asp: Provides access to information pertaining to the 403 inventoried road-stream crossing sites including pictures, priority ranking, and key measurements like water velocity, structure width, and depth of fill. Sites can be queried by site name or located on an interactive map.

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.

Final designs for the Broomhead Road Timber Bridge over the North Branch Boardman River can be provided upon request.

FINAL NARRATIVE REPORT

Background/Overview

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

The *North Branch Boardman River Connectivity and Sub-watersheds Inventory Project* included two distinct and related objectives. The first objective was to develop final designs for a road-stream crossing improvement at the highly problematic Broomhead Road crossing of the North Branch Boardman River. The second objective was to update the road-stream crossing inventory for the Boardman River Watershed as well as additional Grand Traverse Bay Tributaries such as Mitchell, Acme, Yuba, and Tobeco Creeks.

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?

Yes, the project was completed as originally intended. A channel spanning timber bridge has been designed to replace the existing 10.3ft wide by 7ft tall by 40ft long, corrugated metal pipe at the intersection of Broomhead Road and the North Branch Boardman River. 403 road-stream crossing intersections were inventoried in the Boardman River, Mitchell Creek, Acme Creek, Yuba Creek, and Tobeco Creek watersheds as well as the West Bay and Shoreline Watersheds.

Outcomes

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

Having an updated road-stream crossing inventory for the Grand Traverse Bay Watershed is a valuable tool. Both with managers trying to prioritize limited resources as well as a learning tool to demonstrate to the public where and how natural resource investment dollars are needed and have been spent.

Having the engineering designs complete prior to seeking funding for construction allowed for better descriptions of the need to potential funders. The engineer who completed the design also completed a construction cost estimate for the project which has been very helpful during the fundraising for construction effort as well. Having a more accurate picture of project construction costs prior to seeking funding for construction likely reassured potential funders as they considered contributing to the project. The Conservation Resource Alliance appreciates the Great Lakes Fishery Trust for providing support during the design phase of this effort as well as other efforts throughout the basin.

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

Activities pursued in relationship to completing the intended outcomes of the project include the following:

- Design was bid out for the site in October/November 2020. This project is only the second road-stream crossing improvement that CRA has partnered with the Grand Traverse County Road Commission where engineering for design needed to be procured from a third-party using grant funds awarded to CRA. There were a couple of lessons learned involved in this growing relationship that affected the

implementation of this grant project's successful implementation within the budget originally proposed. First, CRA incurred extra staff time than normal in negotiating with the Road Commission staff pertaining to selection of the engineering consultant. Second, there was a lag in communication between the Road Commission, engineer, and CRA pertaining to when the final costs for the engineering services were to be billed to CRA. $7,000 of the engineering costs are not scheduled to be billed to CRA until after the Timber Bridge is completed, not during the program period of this grant, as originally understood.

- CRA and Grand Traverse County Road Commission (GTCRC) staff reviewed and ranked the four proposals submitted by engineering firms with KPM Engineering being ranked first in project understanding, proposal quality and related experience.
- CRA entered into a cooperative agreement with GTCRC for the design scope and grant funding, and GTCRC entered a contract with KPM Engineering for design services.
- CRA field staff inventoried road-stream crossings in the Boardman River Watershed as well as road-stream crossings in the watersheds containing the following tributaries: Mitchell, Acme, Yuba, and Tobeco Creeks. The inventory includes a total of 403 road-stream crossing sites. The sites were visited over the course of two summers. Having this activity completed by CRA field staff instead of being contracted out meant that this grant incurred more personnel charges than originally expected, as the field staff needed to be trained to collect the data. This extra effort in CRA staff time, however, provided better quality control and allowed for a more thorough quality assurance of the road-stream crossing inventory data.
- CRA entered contracts with The Watershed Center and Land Information Access Association for their roles in getting the field inventory work together and online at www.northernmichiganstreams.org.
- CRA and KPM Engineering organized an on-site meeting on January 17, 2020.
- Over the summer of 2020, CRA shared the 60% design plans with project partners that had attended the site visit in January 2020 to seek input. Discussion regarding the 60% plans amongst partners over the summer included selection of a three-span bridge over a single span bridge for both stream overflow and cost benefits, additional recommended road-approach and pavement work for runoff management, and incorporation of whole tree revetment prescriptions at the inlet and outlet pool formation areas for returning the stream channel to its proper dimensions.
- CRA visited the site multiple times in the spring and summer 2020 to address additional items related to runoff management, span dimensions and stream restoration to reach the 60% design plan milestone.
- KPM incorporated comments from partners completed the 90% and now final designs for the road-stream crossing improvement.
- CRA staff developed and implemented a quality assurance procedure for reviewing the results and display of inventory data on the www.northernmichiganstreams.org website in relation to the algorithms for determining fish pass-ability and priority ranking. This resulted in 53 of the sites having their fish pass-ability and/or priority ranking manually changed. In those cases, the parameters contributing to the algorithms did not provide accurate pass-ability and/or ranking scores for the site conditions. For example, many full-span bridge locations were determined to be fish passage barriers according to the

algorithm because the water velocity in the river exceeded 3 feet/second. This parameter is not applicable for full span bridges where normal base velocity exceeds 3 feet/second as fish are able to utilize pockets of slower water created by the hydraulic roughness of the natural streambed substrate to migrate upstream underneath the bridges.

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

For the inventory, we were primarily interested in reaching the broader community of restoration scientists and practitioners interested in Great Lakes aquatic resource health and restoration. CRA has been very successful in reaching this audience. CRA staff have participated in several phone conversations with Michigan Department of Natural Resources staff who are assembling a State-wide database of road-stream crossings via the following website: https://great-lakes-stream-crossing-inventory-michigan.hub.arcgis.com/ CRA is sharing the data collected through this effort with MDNR staff. CRA has also been in communication with US Fish and Wildlife Staff and US Forest Service staff about sharing road-stream crossing inventory data.

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

A relationship with the Michigan Department of Natural Resource Staff who are working on the State-wide database of road-stream crossings via the following website: https://great-lakes-stream-crossing-inventory-michigan.hub.arcgis.com/ was developed in part through this work. CRA staff participated in several webinars with MDNR pertaining to this State-wide database. CRA and other partners who have contributed data and maintained the www.northernmichiganstreams.org website have agreed to share the road-stream crossing data with MDNR and are cautiously optimistic that the Statewide database will be a suitable long-term and more comprehensive replacement for the www.northernmichiganstreams.org website. For the time being, CRA and the other www.northernmichiganstreams.org partners are planning on maintaining the local database and sharing all the data with the State.

The CRA relationship with The Watershed Center – Grand Traverse Bay was strengthened through this project as well. The Watershed Center staff was surprised to see the prevalence of severe road-stream crossing sites in the Grand Traverse Bay Watershed when all the road-stream crossing sites were displayed in the map format. CRA staff participated in a teleconference with The Watershed Center staff and others pertaining to a road-stream crossing project that The Watershed Center was considering working on through a Michigan Department of Environment Great Lakes and Energy Nonpoint Source Pollution Prevention grant proposal. It is evident that the amount of erosion occurring at the site far exceeded the amount calculated by the database algorithm. CRA staff encouraged The Watershed Center staff to use the gully erosion equation to estimate the yearly erosion at the site in lieu of the database algorithm which uses the Revised Universal Soil Loss Equation and, as such, only accounts for ephemeral gully erosion.

The CRA and conservation partner relationship with the Grand Traverse County Road Commission was also strengthened through this project. The last road-stream project that CRA cooperated on with the Grand Traverse County Road Commission was the East Duck Lake Road Crossing of Mason Creek in 2019. Prior to that it was the Cass Road Bridge over the Boardman River in conjunction with the Boardman River Dams Project. CRA hopes that

completion of the Broomhead Road Bridge over the North Branch Boardman River will cement a long-term relationship for collaborating on undersized road-stream crossing replacements with the Grand Traverse County Road Commission.

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.)

An evaluation was not part of this project.

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 project occurs on the heels of the highly successful and challenging three-dam removal effort on the mainstem Boardman River which was financially supported by numerous entities including the Great Lakes Fishery Trust. The design of this road-stream crossing as well as the development of the road-stream crossing inventory was also supported by the US Fish and Wildlife Service through a grant from the Great Lakes Fish and Wildlife Recovery Act program. Construction of the Broomhead Road Timber Bridge is subsequently being funded by the entities shows in the table below:

Broomhead Road Timber Bridge - Funding Status Update			**Date:**	9/23/2021
Total Project Costs (CRA & Road Commission Project Management Excluded)	**$687,600**			
Construction Estimate as of 8/20/2021	$596,000			
Contingency (est. 10%)	$59,600			
Construction Engineering (est. 5%)	$25,000			
Post Construction Survey	$7,000			
Funding Received - Available for Construction	**$549,975**		**Balance:**	$137,625
Great Lakes Fish and Wildlife Recovery Act 2019	$47,000			
National Fish and Wildlife Foundation 2019	$55,000			
USFWS National Fish Passage Program 2021 Award	$72,341			
Great Lakes Fishery Trust 2021 Award	$74,170			
MDNR Fishery Habitat Grant Program 2021 Award	$70,464			
Oleson Foundation	$7,000			
Bureau of Indian Affairs - Great Lakes Restoration Initiative	$200,000			
Tout and Salmon Foundation	$4,000			
GTB 2% Grant	$10,000			
Great Lakes Fish and Wildlife Recovery Act 2021	$10,000			

Partners are meeting on October 7th, 2021, to decide if there is sufficient funding support to advertising the project for bid. The cost estimates were revised in August this year after previously being calculated in February. A 17% cost increase is projected over that period due to the economic uncertainty and recent issues with lumber prices associated with the COVID-19 pandemic and wildfires in the Western United States.

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?

As stated above, The Watershed Center – Grand Traverse Bay is considering working on a road-stream crossing in the ACME creek watershed through a Michigan Department of Environment Great Lakes and Energy Nonpoint Source Pollution Prevention grant proposal. The road-stream crossing being considered is a severely rated road-stream crossing site that was inventoried through this GLFT funded project. Having that site inventoried and identified as a severe site will hopefully help the chances that The Watershed Center will receive funding to address that undersized culvert.

Also, as stated above, CRA and partners are very hopeful that the Road Commission will agree to advertise the Broomhead Road Timber bridge for construction this fall and that the bids come back in an acceptable range for awarding the contract and going to construction in 2022.

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*.

Communications on the project continues via:

- The Boardman River Collaborative effort being initiated and led by The Watershed Center with funding help from Traverse City Rotary Charities.
- Working meetings and communications between CRA, MDNR, EGLE, KPM Engineering, Grand Traverse Conservation District, The Watershed Center, Grand Traverse Band, LIAA and the Grand Traverse County Road Commission.
- In outreach materials with CRA (CRA's newsletters, River Care Maps, social media and www.rivercare.org).

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

The inventory data collected via this GLFT grant project has been posted on the www.northernmichiganstreams.org website. This is a well know resource by local and regional river restoration practitioners. CRA staff also emailed a local group of partners once the inventory was complete and available to the public on the website. CRA is also sharing the road-stream crossing data collected through this GLFT grant with MDNR staff for inclusion into their State-wide database.

The final design as well as previous design iterations for the Broomhead Road Timber Bridge over the North Branch Boardman River have been shared with Tribal, Federal, State, and Local agencies as well as staff from The Watershed Center Grand Traverse Bay.

Reflections

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

Implementing this project during the COVID 19 pandemic was a challenge for CRA. Having new work procedures in place in response to the pandemic increased the staff time needed to complete the work. Communication amongst partners was also more difficult which increased the workload for CRA staff as well.

The rollout of the Michigan Department of Natural Resources State-wide road-stream crossing database occurred during the program period of this GLFT grant project. As the State-wide database becomes populated, the continuation of local, smaller databases come into question. CRA is cautiously optimistic that the Statewide database will be a suitable long-term and more comprehensive replacement for the www.northernmichiganstreams.org website. For the time being, CRA and the other www.northernmichiganstreams.org partners are planning on maintaining the local database and sharing all the data with the State.

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

I would encourage any project directors that are working on road-stream crossing replacements to manage a road-stream crossing inventory data collection project and participate in the quality assurance of the inventory. For me, going through that process made me more appreciative of having the inventory. Prior to this project my involvement with these inventories has been as an end user as well as helping train people to collect the data. Having to go through all the sites and consider whether the algorithm results were applicable to the site conditions, deepened my understanding and appreciation of the data set.

Pictures

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

The only pictures that seem applicable for this project are screen shots of the completed web site. They are included below for reference:

RIVER RESTORATION
in Northern Michigan

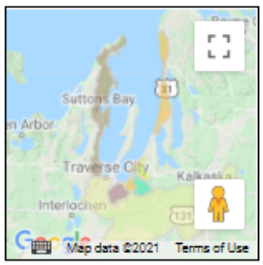
About River Restoration | Watersheds | Counties | Partners

Home | Log In | Search: Go

Home>Watersheds>Grand Traverse Bay

Grand Traverse Bay Watersheds

- Grand Traverse Bay
- All Grand Traverse Bay Crossings
- East Bay Shoreline and Tributaries
- West Bay Shoreline and Tributaries
- Acme Creek Watershed
- Boardman River Watershed
- Mitchell Creek Watershed
- Tobeco Creek Watershed
- Yuba Creek Watershed



The Grand Traverse Bay watershed is located in beautiful northwest Michigan's lower peninsula and drains approximately 976 square miles of land. The watershed covers major portions of four counties: Antrim, Grand Traverse, Kalkaska, and Leelanau. Grand Traverse Bay comprises 132 miles of Lake Michigan shoreline from its northwest tip at the Leelanau lighthouse to its northeast tip at Norwood. The bay spans 10 miles at its widest point and stretches a lengthy 32 miles to its base in Traverse City. Grand Traverse Bay is one of the few remaining oligotrophic embayments in the Great Lakes and arguably has the highest water quality of the larger Lake Michigan bays.

The watershed may be divided into nine distinctive major drainage basins, referred to as subwatersheds. These subwatersheds are the Elk River Chain of Lakes, Boardman River, Mitchell Creek, Acme Creek, Tobeco Creek, Yuba Creek, East Bay Shoreline and Tributaries, West Bay Shoreline and Tributaries, and Old Mission Peninsula. Along with the six major rivers and creeks entering the bay (Elk, Boardman, Mitchell, Acme, Tobeco, and Yuba), it has been estimated there are more than 100 additional small streams that enter the bay.

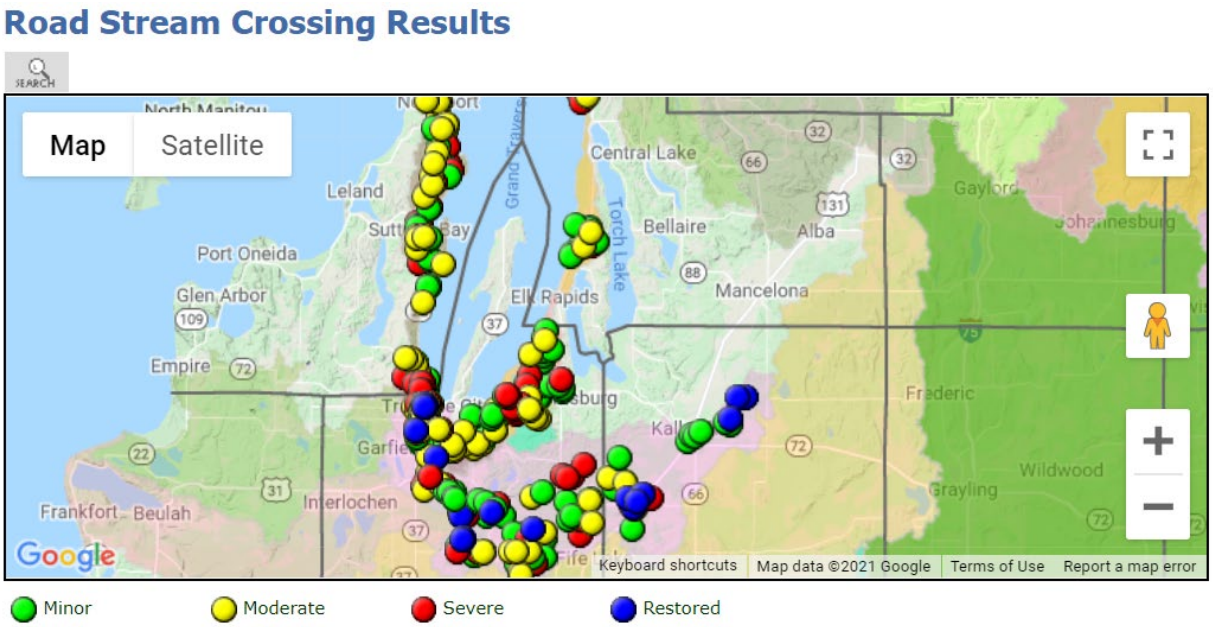
Land use and land cover in the entire watershed is predominantly forest (41%) and agriculture (16%). Other land uses include open shrub/grassland (nonforested), water, wetlands, and urban. Patches of forests occur regularly throughout the watershed with the bulk occurring in the Pere Marquette State Forest (found in the upper Boardman River watershed) and the headwater areas in the Elk River Chain of Lakes watershed. Most of the urban area in the watershed is centered in Traverse City, with small villages scattered along both bays. Just over half of all the agricultural land in the watershed is comprised of pastures and permanently seeded areas (58%), with orchards/vineyards comprising another 30%. Orchards (mostly cherries and apples) and vineyards dominate agricultural land uses surrounding the bay with other agricultural land types likes pasture and croplands mainly found in outlying watershed areas.

The Watershed Center Grand Traverse Bay (TWC) has developed watershed plans for the two largest subwatersheds in the Grand Traverse Bay watershed (Boardman River and Elk River Chain of Lakes) as well as the Coastal Grand Traverse Bay watershed encompassing all other areas.

Conservation Resource Alliance conducted a road stream crossing inventory for the Grand Traverse Bay watershed, excluding the Elk River Chain of Lakes, in 2020 utilizing funding from the Great Lakes Fishery Trust and US Fish & Wildlife Service. The Old Mission Peninsula subwatershed is absent from this road crossing inventory summary because this subwatershed has no road stream crossings. Road crossing information for the Elk River Chain of Lakes was collected as part of the development of that watershed plan and is not yet available for entry to this database.

Find Road/Stream Crossings

This page last updated on 2/9/2021.



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.

The GLFT assistance is acknowledged in the last paragraph on the Grand Traverse Bay Watershed section of the River Restoration in Northern Michigan webpage. When the Timber Bridge is built GLFT assistance will also be acknowledged via a permanent plaque on the bridge.

Attachments

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

The final designs for the Broomhead Road Timber Bridge over the North Branch Boardman River are attached for reference.