

Project Profile

Project Title: Tip of the Mitt Watershed Council Water Resources Education Program
Grantee Organization: Tip of the Mitt Watershed Council
Project Team: Eli Baker, TOMWC
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Contact Person: Eli Baker, eli@watershedcouncil.org
Grant Amount: \$25,000.00
Time Frame: March 15, 2017 to January 31, 2019
Focus Area: Stewardship

Brief Project Summary:

The Water Resources Education Program engaged over 300 students from Northern Michigan middle schools in a foundation-laying program of watershed experiences that was focused on local issues and stewardship of community water resources. Students were provided with water resources knowledge over the course of four in-class and community field trip sessions. This knowledge allowed students to plan and implement an action project that was designed to improve or fix a water resource issue in their community. Over the course of the program, teachers received training, resources, and tools to continue water-resources education in the future.

Project in Context

In Northern Michigan, area youth grow up surrounded by fragile, fresh water resources that improve the quality of life for all. Understanding the importance of our water resources is pivotal if we are to sustain our current lifestyle and prepare for future water protection. Many students have limited exposure and understanding of water resources management and ecology. Schools lack the budget to offer enrichment programs, and teachers lack the support and resources to offer place-based water resources education. Area environmental education programs are limited in scope with a focus on terrestrial ecosystems and elementary school students. The Water Resources Education Program provides a unique opportunity for middle school students to learn about their local water resources by engaging in lessons and activities that are focused on their community and their school grounds. The program empowers them with the knowledge, tools, and resources to identify a local water resources issue and implement an action plan to improve their watershed.

Seeing a need for improved water resources education in our service area (Antrim, Charlevoix, Cheboygan, and Emmet Counties), the Tip of the Mitt Watershed Council began working with area middle schools provide this unique offering to students in Northern Michigan. The Watershed Council collaborated during development and implementation with environmental organizations such as Grand Traverse Stewardship Initiative (GTSI), Northeast Michigan Great Lakes Stewardship Initiative (NEMIGLSI), conservation districts and several community resources.

Goals of the Effort

The primary goal of the Water Resources Education Program for the students was to provide students with knowledge regarding their local water resources through five foundation-laying water resources sessions and the implementation of an action project that is designed by the students to improve their local watershed. The primary goal for the teachers was to provide teachers with the training, resources,

and support to help them continue to provide their students with place-based water resources education in the future.

Results

- 323 students (12 teams) from 3 Northern Michigan middle schools were engaged in foundation-laying water resources sessions in their local communities. Each team planned and worked on a student led action project that was designed to improve the local watershed.
- Nine teams completed their project in the 2017-18 school year. Two teams were not able to finish and extended their projects into the 2018-19 school year. Projects completed ranged from native plantings on schools grounds and planting pollinator gardens to school grounds garbage clean-ups and rain barrel builds.
- Students presented WREP team projects at an end of year gathering that was attended by all participating students and teachers, as well as community members and resources persons.
- In-class education of students provided teachers with hands-on training in water resources education. Watershed Council staff have provided all participating teachers with program resources, tools, support to continue place-based water resources education in their classrooms.

Products and Resources

Tip of the Mitt Watershed Council Website – Water Resources Education Program page with information on the program and student action project presentations.

<https://www.watershedcouncil.org/wrep.html>

Media Coverage – Petoskey News Review article about the program. Pub. 3/21/17

https://www.watershedcouncil.org/uploads/7/2/5/1/7251350/3-21-17_pnr-program_introduces_students_to_water_resources.pdf

Media Coverage – Tip of the Mitt watershed Council Newsletter article announcing and describing the program. Pub. Spring 2017, page 4

<https://www.watershedcouncil.org/uploads/7/2/5/1/7251350/spring2017-newsletter-webversion.pdf>

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Media Coverage – Tip of the Mitt Watershed Council Newsletter article describing the program and the student teams' action projects. Pub. Summer 2018, page 1

<https://www.watershedcouncil.org/uploads/7/2/5/1/7251350/summer2018-newsletter-final-web.pdf>

Social media Coverage – Tip of the Mitt Watershed Council Social Media Posts about program.

https://www.instagram.com/p/BbNUoZjh7g3/?utm_source=ig_web_options_share_sheet Pub. 11/7/17

<https://www.facebook.com/watershedcouncil/posts/1967218373304945> Pub. 11/10/17

<https://www.facebook.com/watershedcouncil/posts/2234582199901893> Pub. 6/20/18

Final Narrative Report

Background/Overview

Tip of the Mitt Watershed Council Water Resources Education Program (WREP) built on the successes implementing place-based water resources education at the high school level by engaging 300 middle school students in a foundation-laying program of watershed experiences focused on local issues and stewardship of water resources. The WREP program offered classroom programs and water resources education field experiences that 1. Were integrated with current curricula. 2. Included school visits by Watershed Council education staff with an introductory water resources session and/or specific topic or focus area of choice, including but not limited to invasive species, stormwater management, groundwater, lake, and beach monitoring. 3. Water resources education support for teachers through resource library and professional development to support ongoing water resources education. 4. Each program will included an outdoor experience and/or field trip. 5. Additional classroom visits and project support based on group request. Water resources education field experiences took place at local streams or lakes and had participants work as a team to collect data, explore issues and threats to that resource. Students then discussed and implemented possible management techniques to protect and improve water quality. Participating schools engaged with community partners and Watershed Council staff to foster a high level of engagement and depth of knowledge regarding water resources.

The project was completed as originally intended. The program was implemented at 3 schools with 12 different teams during the first year of the grant period. All teams participated in the five water resources sessions and planned an action project. The majority of the teams completed their action projects by the end of the school year. Two Ellsworth WREP teams were unable to complete their projects and continued working on them in the 2018-19 school year. Our experience suggests that our original expectations for the program were realistic. The main factor that helped progress was the continued support and input from Watershed Council instructors throughout the program. The main factor that hindered progress was the time management during the action project phase of the program.

Outcomes

Outcome 1: Planning, Coordination, and Scheduling for WREP Program

Participants include: Petoskey Middle School, eight 6th grade teams; Ellsworth Middle School, three teams (6th, 7th, 8th grades); and Wolverine Middle School, one 7th grade team. Grant goal of 12 teams and 300 participants was achieved. Meetings with participating teachers took place in August and September 2017. Curriculum integration, Place Based Education basics and WREP program overview were shared with participating teachers. WREP sessions were scheduled for October 2017 through February 2018.

Outcome 2: Implement WREP Sessions

Five WREP sessions were implemented for each team. Sessions in sequence included: Watersheds and Water Cycle, Groundwater and School Grounds, Point Source & Non-Point Source Pollution, Invasive Species and Stewardship Action Project. The first three sessions included school grounds field trips for collecting data and planning stewardship projects. Petoskey Middle School teams additionally had a Water Quality/Macroinvertebrate session at a local nature preserve in conjunction with a planned snow shoe field trip. Coordination of community resources for WREP teams included local recycling center,

area businesses, city administrators, school administrators and grounds maintenance personnel. Tip of the Mitt Watershed Council staff served as expert resource persons for Petoskey teams.

Outcome 3: Promote and Communicate WREP Program

Experiences of participating middle school teams are featured on the Watershed Council's website, our Current Reflections newsletter (which is published three times per year) as well on Facebook, and Instagram. Any printed materials associated with the program is displayed at the Watershed Council office, which is open to the public.

Outcome 4: Evaluate WREP Program

Watershed Council staff worked with an evaluator to develop an evaluation plan and pre- and post-surveys for participating teachers and students. Pre-surveys were administered to all teachers and a selection of students. After the program, post-surveys were administered to all teachers and the same selection of students. Results were compiled, compared and put into the evaluation report. Watershed Council staff worked with an evaluator to complete the report and evaluate the program.

The audiences that we were particularly hopeful of reaching were the teachers that responded to our initial middle school teacher survey and indicated their interest in learning more about water resources education and the resources and support that the Watershed Council can offer. After receiving the grant, we offered the WREP program to those teachers. Through the WREP program we were able engage and support them in place-based water resources education throughout the school year, and, now that contact has been made, we will continue to support them with the WREP program and water resources education in general. Another audience that we were glad to have reached were the middle school students in our service area. We were able to introduce over 300 Northern Michigan students to water resources topics and issues in their own communities. Our feedback from both groups on the post-program surveys indicated that participation in the program helped to increase understanding and knowledge about water resources as well as foster a level of stewardship for their local watershed.

The main relationships that developed due to work related to WREP were the relationships with the participating schools, teachers, and students. Through the WREP program, Watershed Council staff were able to connect with teachers in three schools that had not participated in the Watershed Council's school-age education programs. These relationships led to opportunities for the Watershed Council to further water resources education in Antrim, Charlevoix, Cheboygan, and Emmet Counties. After working with Wolverine schools on the WREP program, the science teacher expressed interest in participating in the Watershed Council's Watershed Academy Program. Students from Wolverine high school began monitoring the Sturgeon River in 2018, and plan on continuing participation in the WREP program each spring and fall. Petoskey Middle School teams had a Water Quality/Macroinvertebrate session at a local nature preserve in conjunction with a planned snow shoe field trip due to contacts made through the WREP program. Meeting with the K-12 STEM Coordinator for Petoskey Public Schools allowed the Watershed Council to partner with 4th and 5th grade classes to study water quality as a part of their Underwater ROV program. Working with these groups in spring 2017 allowed connections with students to build and increased the benefit of 2017-2018 WREP sessions.

Evaluation Summary

Overall, results of the evaluation report indicate that the goals of the Water Resources Education Program (WREP) were achieved. The WREP program provided meaningful water resources experiences

for middle school students, and also provided professional development to classroom teachers in environmental and place-based education.

The objectives for students participating in the WREP program included:

- Teach young students about their local watershed and how it is connected to the Great Lakes.
- Teach students how their own actions affect these water bodies and the organisms that live in them.
- Provide opportunities for students to connect with a natural watershed habitat by using the school grounds and community to conduct investigations and explore water resources in their environment.
- Engage students in place-based learning experiences both in and with their community.
- Engage students in stewardship “action projects” designed to teach students how they can become watershed stewards and environmental leaders/teachers in their communities.

Students showed an overall increase in knowledge of the program content through results from the pre- and post-program surveys. The individual question results reveal that students did learn about their local watershed and how it is connected to the Great Lakes. Many of the students had prior understanding of the distribution of water and the flow of their local water bodies, but there were increases in understanding regarding the impacts of human activity on their local watershed. The student survey could be improved by ensuring that the questions are easily understood and the answers are straightforward. It is also important that all questions are relevant to program information. This would allow students to more accurately show knowledge.

Both the student surveys and teacher evaluation forms show student comprehension of how their actions affect local water bodies and the organisms that live in them. Students increased their awareness about the storm drain system, the movement of invasive species, and the sources and types of pollution that can impact water resources. Teachers commented that their students are more aware of their actions. Pre-to-post comparisons of measures of responsible environmental behaviors and civic capacity did not show gains among student participants completing the surveys. However, these are general measures of stewardship attributes, not tied to water resources, and so may be a poor fit to this specific program. Students’ written feedback indicated appreciation for the hands-on elements of WREP, including demonstrations and action projects; the lessons on pollution flow and invasive species were particularly well received.

The program provided opportunities for students to connect with a natural habitat by using the school grounds and the community to conduct investigations and explore water resources. In their written feedback teachers acknowledged that the field trip to local community impacted their students in many positive ways. Teachers cited a variety of hands-on activities as highlights of the field trip, and also expressed gratitude that their students were able to apply knowledge gained through participating in WREP in their own watershed and community. A few teachers wrote that the field experiences were valuable to themselves and their students and they would have liked to spend more time out of the classroom.

Many teachers also said that the field trips and the action project provided their students with new experiences and opportunities to engage in place-based education. Teachers went on to say that the program provided experiences their students would otherwise not have been able to participate in.

Teachers also reported that students developed a greater pride and passion for acting as stewards for their community and their watershed.

The objectives for teachers participating in the WREP program included:

- Provide in-class modeling and curriculum resources so teachers are supported and confident in the future when teaching water resources science in their classrooms.
- Provide opportunities for teachers to learn about and experience place-based education throughout the school year and beyond.

Teacher survey and written evaluation form results indicate that the program provided professional development opportunities and the resources needed for teachers to feel comfortable teaching water resources in their classrooms in the future. Our direct in-class training model and the program equipment and resources proved to be most effective in preparing teachers to teach the program themselves. The program guide, with lesson plans, extensions, and other resources was also seen as a valuable tool for increasing teachers' confidence in teaching the program themselves. Several teachers mentioned that having the instructors from the Watershed Council in the classroom was very helpful for them to better understand different ways to teach water resources. Every teacher felt prepared to teach the program to future classes of students after participating in the first year of the program.

The program provided opportunities for teachers to learn about and experience place-based education. In their written feedback, teachers indicated that their experience participating in WREP allowed them to view place-based education at work. Several teachers mentioned the value of introducing students to community water resources and the process of planning a project in collaboration with community partners. Through the evaluation process, we learned that the program has provided teachers with place-based education related knowledge, resources, and opportunities that they otherwise would not have received or known about.

The most important benefits or outcomes of this stewardship project were the increased student and teacher knowledge of Northern Michigan's Water Resources. Increased teacher and school exposure to place-based education, water resources education, and the resources and support that the Watershed Council has to offer. The action projects that the students completed also had various benefits on their communities and watersheds, including, but not limited to, increased knowledge of local water resources, increased native vegetation and green infrastructure, and cleaner roadsides and school grounds due to trash clean-up projects.

Related Efforts

The Water Resources Education Program was a stand-alone effort piloted in the 2017-18 school year. Response to the WREP program continues to be very positive from the students, teachers, school districts, environmental organizations, and communities. The WREP program broadened the Watershed Council's geographic participation in a unique way. The Watershed Council has now worked with middle schools in Antrim, Charlevoix, Cheboygan, and Emmet Counties. This opens up new opportunities for securing funding for program sustainability.

Local Community foundations have shown strong support for the WREP program. After a successful pilot year the Charlevoix County Community Foundation provided funding to the Watershed Council to offer the WREP program in three middle schools in Charlevoix County. Boyne Falls Middle School, Boyne City

Middle School, and East Jordan Middle School are participating in the WREP program for the 2018-19 school year thanks to this funding. The Rotary Club of Petoskey provided funding that allowed the Watershed Council to purchase two new models (watershed model, septic system model). These models are being used to improve water resources education and student understanding of local water resources. In April 2019, the Watershed Council will receive a grant from the Great Lakes Fisheries trust to provide the WREP program to even more schools in Northern Michigan.

Communication/Dissemination

Publications

Student projects from each WREP team can be found on the WREP page on the Watershed Council's website.

<https://www.watershedcouncil.org/wrep.html>

Media Coverage – Petoskey News Review article about the program. Pub. 3/21/17

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Social media Coverage

Tip of the Mitt Watershed Council Social Media Posts about program.

https://www.instagram.com/p/BbNUoZjh7g3/?utm_source=ig_web_options_share_sheet Pub. 11/7/17

<https://www.facebook.com/watershedcouncil/posts/1967218373304945> Pub. 11/10/17

<https://www.facebook.com/watershedcouncil/posts/2234582199901893> Pub. 6/20/18

Presentations

- Charlevoix County Community Foundation (CCCF), Youth Advisory Committee Meeting – Eli Baker presented the results of the pilot year of the WREP program and applied for funding to provide WREP program to three schools in Charlevoix County on March 20, 2018.
- Lake Charlevoix Association Annual Meeting – Eli Baker presented the results of the pilot year of the WREP program and announced the CCCF grant to offer WREP in Charlevoix County to the lake association membership on July 6, 2018.

- Black Lake Association Annual Meeting – Eli Baker presented the results of the pilot year of the WREP program to the lake association membership on August 13, 2019.
- Friendships Center Of Emmet County Luncheon Presentation – Eli Baker presented the results of the pilot year of the WREP program and provided information about the ongoing WREP programs on January 1, 2019.

In order to distribute and encourage the use of products, processes, and the WREP program. We have increased, and continue to increase, the number of schools that participate in the WREP program. We have also posted details of the WREP program on the Watershed Council's website on a dedicated WREP page. We also plan to post program lessons and resources on the Watershed Council website to increase teacher access to WREP and Watershed Council Education resources.

Reflections

The teacher and student response to the program has been overwhelmingly positive. Schools were so enthusiastic about participating in the program that selection of participants went to schools not currently participating in Tip of the Mitt Watershed Council education programs.

Meeting with the K-12 STEM Coordinator for Petoskey Public Schools allowed the Watershed Council to partner with 4th and 5th grade classes to study water quality as a part of their Underwater ROV program. Working with these groups in spring 2017 allowed connections with students to build and increased the benefit of 2017-2018 WREP sessions.

The twelve team Stewardship Action Projects (nine completed this spring) were incredible in creativity and range. Every team studied the school grounds and/or community for impacts, selected an area to focus and completed a plan for implementation. Teams had "big ideas" but learned quickly to scale their expectations based on cost, time and resources available.

Continue to provide hands-on, engaging water resources education to middle school students, both in the classroom and in the field. Continue to provide meaningful and relevant learning experiences, and opportunities for students to be engaged in learning about and caring for their local watershed

Consider options to provide students with more time for hands-on work, and ensure that all students have equitable access to opportunities to handle tools and demonstration equipment.

Continue to provide teachers with in-class water resources training, resources, program equipment, and support so teachers feel comfortable and confident in teaching water resources and engaging in place-based education in their classrooms.

Work on ways to increase teachers' comfort level of participating in place-based education and facilitating an environmental action project with their students.

- Work with teachers to improve the planning and timing of program sessions and field trips. Use written feedback from teachers for insight as to ways to improve planning and timing. Earlier recruitment, summer planning sessions, etc. may be necessary in future WREP programs.
- Help teachers work with a partner in the building or at least network them in the region and have one face-to-face get together. Teachers struggle when they are all alone trying to do something new.

Evaluate and continue to improve the program evaluation process. Revise questions on the student surveys to better reflect program information and improve student understanding.

- Some items on the multiple-choice component of the test are misleading and should be updated or eliminated
- Some items are too easy and should be eliminated or replaced with more challenging questions
- Stewardship domains—responsible environmental behaviors and civic capacity—should be critically considered in terms of their fit for the program.
 - o If a goal of WREP is to encourage pro-environmental behaviors among middle-schoolers, then these questions may be important to retain. Similarly, if WREP incorporates learning and skill-building relating to working with others and developing community partnerships to resolve issues, then the civic capacity index is a good fit. However, if either or both of these goals feel peripheral to the program, they should be eliminated, and potentially replaced with items better aligned to the program goals and activities.
 - o If these indices are retained, Tip of the Mitt should consider a “retrospective pre/post” format in which students rate their environmental behaviors and civic capacity “now” and “before WREP,” rating both periods on the post-program survey. The retrospective pre/post format is useful for situations where respondents may overestimate or overstate their capacity or commitment on a pretest because they don’t know what they don’t know, or haven’t considered an issue closely.
- It may be beneficial to reduce the scope of surveys and tests but administer them more broadly, with all students.

Attachments

GLFT #1697 WREP Financial Report

WREP GLFT Evaluation Report

Program Documents