

Restoring the ‘Water of the Walleye’ Plaster Creek Stewards

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Plaster Creek in Grand Rapids, Michigan, faces many of the problems that are now commonplace for urban waterways in the United States. Because the Plaster Creek Watershed is a sub-watershed of the Lake Michigan basin, it contributes to the health of the Great Lakes, the largest freshwater resource in the world. Therefore, what happens in the Plaster Creek Watershed has far-reaching effects. The Plaster Creek Watershed is also an integrator, connecting farmers, commercial and industrial interests, as well as suburban and urban residents, to issues of common concern within this shared space.

History of the Plaster Creek Watershed

The Wisconsin ice sheet receded northward out of West Michigan for the last time around 16,000 years ago. As it did so, this mass of ice left a rolling landscape of mixed soils, sand, gravel, silt, and clay. The Great Lakes were formed at this time, along with the basins and sub-basins that drained into these lakes.

By the time the first European explorer, Samuel de Champlain, reached West Michigan in 1615, the Odaawaa Indians (today known as the Ottawa) occupied the Plaster Creek Watershed and called this stream Kee-No-Shay, which means “water of the walleye.”

In the early 1800s, the local Odaawaa tribe’s leader, Chief Blackbird, lived in an area today known as the Black Hills neighborhood, a prominent knob of land in the Grand River floodplain that overlooks the final reach of Plaster Creek before it joins the Grand River. A story recorded by Charles Belknap, one of the earliest mayors of Grand Rapids, recounts a disagreement between Chief Blackbird and a local missionary about the best place to encounter God. Chief Blackbird maintained his people worshipped the Great Spirit best outdoors, and thought it odd that the missionary was trying to convince the chief’s people to come inside a building and look into a book to meet God.

On one particular day, Chief Blackbird took the missionary in a small boat up Kee-No-Shay Creek until they reached a beautiful waterfall pouring over a large, colorful, crystalline outcrop of gypsum. Chief Blackbird explained to the missionary that he and his people met their God in sacred spaces like this one.

This was also the first known encounter of European immigrants with gypsum in West Michigan, a rock quickly recognized as a resource to be mined throughout the Grand Rapids area. New settlers used ground up gypsum as both a fertilizer and as a base for making plaster for construction. In fact, the first plaster mill in West Michigan was set up at a location near Chief Blackbird’s sacred spot in 1841. Soon after, the creek was known as “Plaster Creek,” a tragically more appropriate name because the extensive gypsum mining that ensued caused the creek to become so degraded it was no longer able to support the walleye that had lived in it.

As the city of Grand Rapids developed and expanded, the quality of Plaster Creek progressively declined. Several of the creek's tributaries were put in underground pipes, including a four-mile stretch of Silver Creek, one of Plaster Creek's two major tributaries. By the early 2000s, Plaster Creek was West Michigan's most polluted stream, often carrying bacterial loads so high it was unsafe for wading and swimming (partial human body contact). In other words, people could get sick from touching its water.

The Creek Today

Over the years the land in and around the watershed has been logged, farmed, and developed into residential areas, industries, parking lots, railroads, and highways. It includes nine different local governments. Today the landscape of the watershed has changed to the point that stormwater does not have enough places to soak into the ground, so it flows quickly off the surface taking pollutants with it. The pollutants found in the stream come from a variety of sources: sediment from runoff and from in-stream erosion, excess nutrients from fertilizers, and *E. coli* bacteria from pet waste, agricultural runoff, and possible septic system failures. But there is one factor that is a trigger for all the others: stormwater. As in most cities, stormwater in Grand Rapids is guided into drains that empty directly into Plaster Creek. The rainwater that flows over our roads, fields, lawns, rooftops, and parking lots quickly finds its way into Plaster Creek, along with all the dirt, fertilizer, oil, heat, and debris that stormwater runoff carries with it.

Development of the Plaster Creek Stewards

In 2004 faculty at Calvin College, which is located in the Plaster Creek Watershed, began service-learning projects for students, collecting data on the state of the watershed and organizing stream cleanups in collaboration with other community partners. By 2008 a group of concerned organizations, including Calvin College, began meeting regularly to discuss steps that could be taken to improve the watershed. A staff member of the Michigan Department of Environmental Quality approached the college specifically for help to reach the faith communities in West Michigan. This resulted in a three-day summer workshop for local churches focusing on a theological foundation for creation care, the basics of watershed ecology, and practical strategies for watershed restoration. From this first summer workshop, Plaster Creek Stewards was launched.

A Three-fold Approach

As the work of Plaster Creek Stewards unfolded, we developed three focus areas: research, education, and on-the-ground restoration. Focusing our mission on these three areas clarified our decision-making (when to say yes and when to say no to opportunities and projects) and resulted in successful grant applications.

Since Plaster Creek Stewards emerged out of a college, research has been a natural task to take on. In the context of increased emphasis on undergraduate research experience nationally, Calvin College redesigned its biology core curriculum in 2011 to include a research methods class that uses the Plaster Creek Watershed as its living laboratory. Students learn how to do research in small groups by designing and carrying out a research project focused on the health of Plaster Creek. These student research projects yield helpful information and new findings, and students present the findings of their project at a public forum at the end of each spring semester.

We also began a summer program in which student research assistants would continue to collect data and effectively extend the duration of several key projects. For example, one grant funded four additional students during both the school year and summer to identify the main sources of Plaster Creek's bacterial contamination. In addition to biological research, we continue to work on a social research oral history project, collecting stories and memories from people who have lived, worked, or gone to school or church within the Plaster Creek Watershed over the past 80 years. These stories have become a great way to engage the public in caring for the watershed.

Educating the public is a second key aspect of the mission. In addition to involving students and faculty across many disciplines within the college, we focus on educating local schools, churches, neighborhood associations, and some local businesses. With each of our educational events, we also provide an opportunity for people to take action to restore the watershed. People want opportunities to do something to care for the watershed, but it is important to frame the action with education to increase understanding and awareness among the public. For example, each year we host three events for residents that begin with some watershed learning followed by an opportunity to get their hands dirty by taking restorative action.

One particular emphasis is to create upstream-downstream partnerships within the watershed. Very few Americans identify themselves as watershed residents, so working to form intentional partnerships between upstream schools and churches and downstream schools and churches has been challenging but also rewarding. This approach requires a long-term commitment because building relationships of trust between groups does not happen overnight.

The third focus of Plaster Creek Stewards is on-the-ground restoration. We use greenhouses owned by the college to grow tens of thousands of Michigan native plants from seed, all of which is collected from natural areas around Grand Rapids. These plants are the backbone of our restoration work. We use the plants in green infrastructure projects like rain gardens (shaped like a basin to hold and filter stormwater, with deeply rooted native plants) and native habitat landscapes. With their long root systems, native plants soak up and filter stormwater while providing habitat and biodiversity. As more residents recognize the benefits of green infrastructure, demand grows for us to install rain gardens and other types of native plantings on their personal property. Creating a mosaic of green infrastructure and native habitat plantings is a beautiful way to restore water quality in our urban waterways.

Recognizing Success

Over the past 10 years, Plaster Creek Stewards has not measured a change in the water quality of Plaster Creek. People still cannot safely fish out of or even touch the water. This can start to look like failure until you put the project in the larger historical framework illustrated at the beginning of this article. Plaster Creek began flowing over 10,000 years ago and has become degraded only in the last 150 years. It is a lot to expect to see immediate changes to nonpoint source pollution (pollution caused by rainfall or snowmelt moving over and through the ground) when it results from the lifestyles and land uses of thousands of people throughout the 58-square-mile watershed; however, there are many hopeful signs of improvement in the three focus areas.

Research

We are studying specific problems in the Plaster Creek Watershed as a foundation for developing remediation and restoration plans:

- *E. coli* research is helping pinpoint sources of bacterial contamination.
- Flow level research pinpoints the areas of heaviest input of stormwater and determines the best places to act to slow stormwater and allow it to soak in.
- College students continue to study the creek and locate new areas of concern for restoration work.

Education and Outreach

More people know about and care about Plaster Creek and its impact on downstream neighbors:

- Over 1,500 people learn about Plaster Creek at education events annually (increasing each year).
- 60 college students annually research Plaster Creek as part of their college experience.
- Community partners include local schools, faith communities, businesses, a local golf course, homeowners, local governments, and nonprofit organizations.
- 11+ schools are actively involved in education and restoration activities.
- 15+ faith communities participate in education and restoration activities.
- 8 Green Team high school students are trained in green infrastructure practices each summer (seed collecting, plant growing, rain garden installation, and native landscaping maintenance).

Restoration projects

The evidence speaks for itself:

- 3 large-scale bioswales (large-scale rain gardens) treat and slow stormwater from large parking lots.
- Numerous rain gardens across the watershed including
 - ≈ 38 (increasing to 78 by 2018) engineered curb-cut rain gardens that take polluted stormwater from urban streets into the gardens to be filtered and cooled.
 - ≈ Consultation and installation of rain gardens and native landscaping for homeowners.
- 1 large savanna prairie restoration project.
- Thousands of native plants and trees planted.
- 1 large-scale floodplain restoration to slow and filter stormwater in the headwaters of Plaster Creek.
- 470+ species of Michigan native plants collected locally, helping to preserve biodiversity in the watershed.

In addition to these many hopeful signs of improvement, we are seeing a growing interest among West Michigan residents in learning what they can do to care for their particular place. Everyone contributes to the problem, but everyone can also be part of the solution. As momentum continues to build, we are cultivating the hope that one day the walleye will return, and the creek's name can be changed back to "Kee-No-Shay."