



Community-wide Stewardship Projects to Benefit the Looking Glass Watershed

*Scott Elementary
DeWitt, Michigan*

A suburban elementary school

About the case study

This case study of place-based stewardship education (PBSE) at Scott Elementary School is one of 11 case studies developed by staff of the Great Lakes Stewardship Initiative (GLSI), staff of the GLSI's nine regional hubs, and the educators whose work is featured in the study.

The case studies focus on PBSE efforts during the 2014–15 school year. At most of the sites featured in these studies, the PBSE approach has been developed over the course of several years.

Each school featured in a case study works with the GLSI through a regional hub. Hubs provide professional development for educators, help schools connect and partner with community-based organizations, and provide funding and other PBSE supports with an environmental stewardship

emphasis. Scott Elementary School has a longstanding relationship with its hub, the GRAND Learning Network.

Cover: Fourth-grade students from Scott Elementary with their teacher and partners.

Community-wide Stewardship Projects to Benefit the Looking Glass Watershed at Scott Elementary School

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Authors:

Cammie Jones
Shari Dann
Margaret Holtschlag
Lisa Marckini-Polk
Mary Whitmore

Photographs:

Cammie Jones
Dave Brigham
Shari Dann
Margaret Holtschlag
Mark Stephens

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Conventions in this document

As you read this study, you will see special icons in the text.



This icon marks a teaching tool, resource, or product that you can access and download from the case study.



This icon marks a connection between the work being described and the GLSI's Guiding Principles for Place-based Stewardship Education, developed by GLSI central and hub staff to describe the GLSI's vision for exemplary place-based stewardship education. Certain aspects of each case study illustrate how one or more of the principles can be enacted in classrooms and communities.



Quick Summary

Students repaired a gully eroded by stormwater runoff, built habitat for monarch butterflies, and explored their broader watershed context

Scott Elementary School serves every third- and fourth-grade student in DeWitt Public Schools. Other elementary schools in the district include Schavey Road Elementary (first and second grades) and Herbison Woods Elementary (fifth and sixth grades).

Scott Elementary teachers, students, and administrators often work with community partners on place-based conservation projects. The following pages introduce stewardship projects completed by Scott Elementary students in the 2014–15 school year.

- **Gully Repair Project:** Fourth graders discovered a gully caused by erosion on their playground. They decided to study the problems the gully posed for safety, for the drain (creek) leading to the local river, and for people. After their study, they decided to fix the problem that was causing this erosion.
- **Water Quality Testing:** Students measured the biological and chemical characteristics of the Looking Glass River, Muskegon Lake, and Lake Michigan.
- **Butterfly Garden Project:** Life cycles are part of the third-grade science curriculum. Students chose to plant a butterfly garden to address a concern about the loss of habitat for butterflies.



“If we repair the gully, what will happen to all of the animals and plants that live there now?”

—Fourth-grade student



Community Context



Context is essential in place-based stewardship education

There is perhaps no more distinctive characteristic of PBSE than its treatment of place as the context for learning.

Our sense of place does not exist in only one geography, and it changes as we age. When we are very young, we may experience our strongest sense of place in our homes, neighborhoods, and favorite places for play. As we grow, we begin to understand that we are members of other communities, too—a school community, a city or town, a watershed, a state, or a bioregion such as the Great Lakes.

PBSE relies on place—including lands and waters, people and organizations, history, and culture—as a starting point for

teaching and learning. Reading about rainforests or deserts may be interesting, but environmental learning grounded in students' home communities builds on a foundation of community attachment and place-based knowledge.

For DeWitt youth, that foundation includes the juxtaposition of this small town and its farmland and forest habitats with the metropolitan bustle of nearby Lansing, Michigan's capital.

DeWitt is a growing suburban community with a small-town feel

Many residents work in Lansing, Michigan's capital.

DeWitt was named for DeWitt Clinton, the founder of the Erie Canal—instrumental in bringing settlers to Michigan and the western Great Lakes. The Looking Glass River, DeWitt's chief natural asset, drew early settlers to mid-Michigan.

Today, the area is a blend of small businesses, historic family farms, and a growing number of large, new subdivisions. Lansing is a 15-minute drive due south, and many residents work in government or industry, or at nearby Michigan State University.

DeWitt is situated in the middle stretch of the Looking Glass River, which provides important habitat for wildlife and many recreational opportunities. Farther downstream in Portland, the Looking Glass meets the Grand River (Michigan's longest river), which empties into Lake Michigan at Grand Haven.



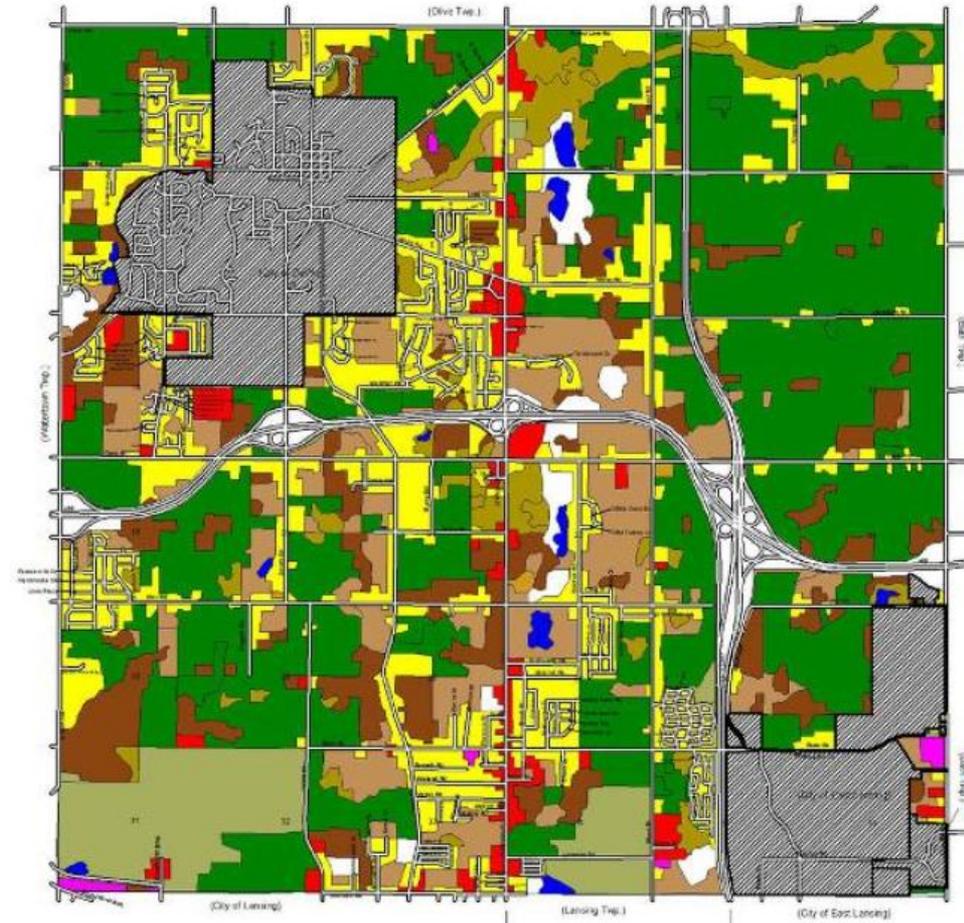
Clockwise from upper right: the city of DeWitt's logo; the Looking Glass River winds through Looking Glass Riverfront Park; local signage; the Sweetie-licious pie shop has small-town charm.

The DeWitt area has significant prime farmland

Some farms are enrolled in state or federal farmland preservation programs, which slow the conversion of farmland to new residential development.

Clinton County, where DeWitt is located, is a leading Michigan county in the production of wheat, milk, and beef. Some farms in the area also produce fruits and vegetables. Although some farmland in DeWitt Charter Township has unique characteristics and is unsuited for development, other parcels contain the flat land, free of trees, that makes farmland a prime target for residential development.

Since 1990, the City of DeWitt's population has increased by 14 percent and DeWitt Charter Township's has risen by 37 percent, but Michigan's overall population increased by only 7 percent. Master land use plans for both the city and township anticipate that these communities will continue to develop at a relatively rapid pace.



A land use/land cover map from DeWitt Charter Township's 2005 Comprehensive Development Plan (p. 2-25) shows a significant area used for agriculture (in green).

Mid-Michigan relies on clean groundwater for drinking and clean rivers for recreation

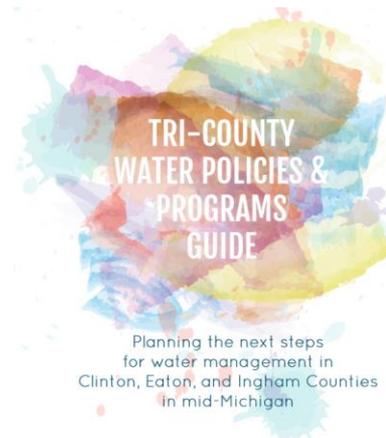
Scott Elementary's work on water quality addresses a key environmental issue in the community.

The Lansing metropolitan area is almost totally dependent on groundwater for its drinking water needs (Tri-County Regional Planning Commission 2015). The region has a significant history of multijurisdictional collaboration on water issues. Organizations like the Groundwater Management Board and the Greater Lansing Regional Committee for Stormwater Management involve area cities and townships in collective work to protect water quality. Organizations like the Middle Grand River Organization of Watersheds and the Friends of the Looking Glass River marshal the efforts of volunteers interested in water quality and river-based recreation like angling and paddling.

The work of these groups is closely linked to the process of development—as the built area of the region expands, so too will the demand for river-based recreation and the need for stormwater management. In the case of Scott Elementary, the John Voltz Drain, which runs through the school's playground and then into the Looking Glass River, was built to ease flooding stemming from a new subdivision north of the town and the school.



Paddlers on the Looking Glass River. Photo courtesy of Friends of the Looking Glass River.

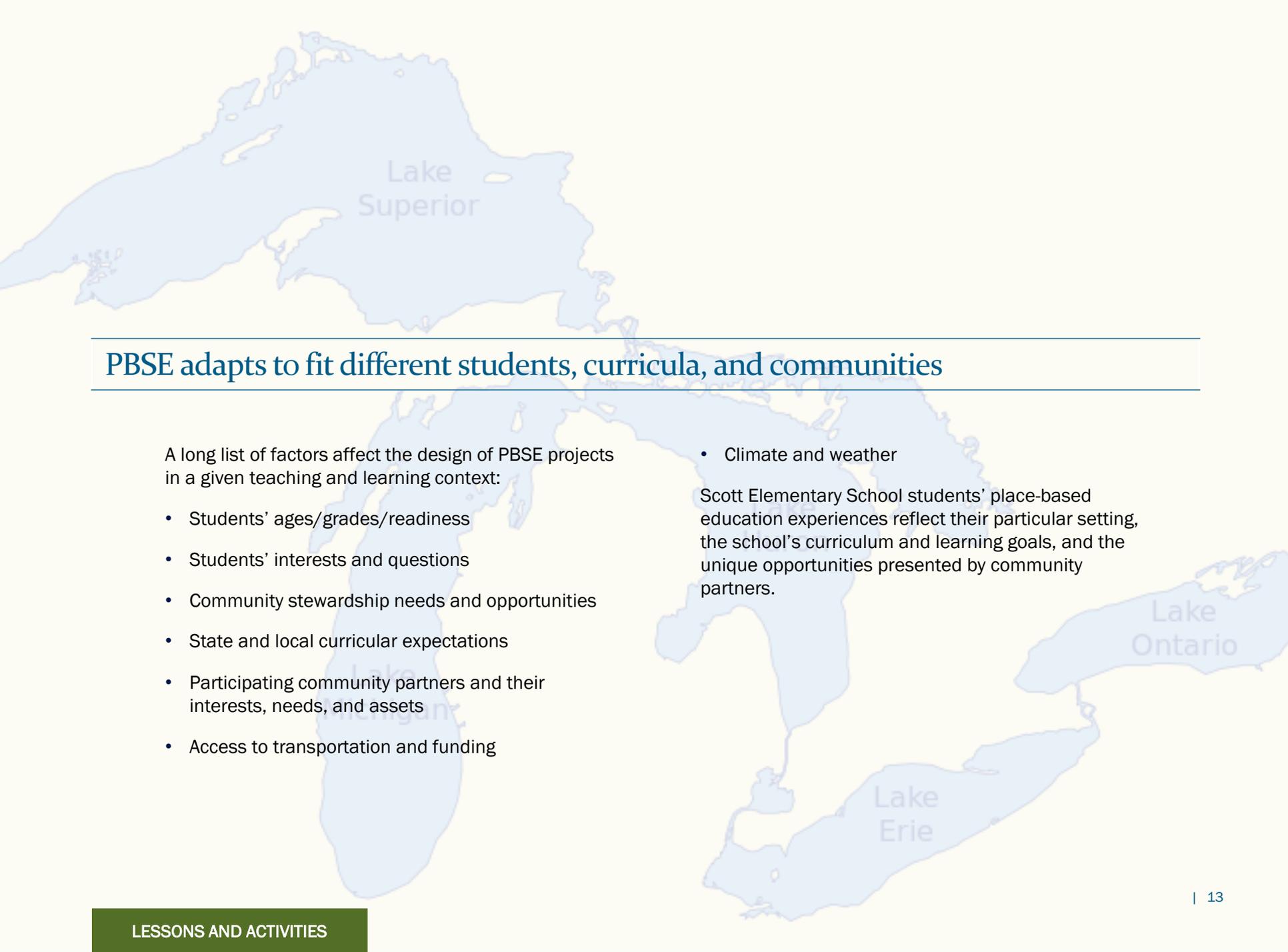


This Tri-County Regional Planning Commission publication outlines the various water policies and programs operating in Ingham, Eaton, and Clinton Counties, including those focused on groundwater, drinking water, stormwater, and public education.

[LINK: TRI-COUNTY WATER POLICIES & PROGRAMS GUIDE](#)



Lessons and Activities



PBSE adapts to fit different students, curricula, and communities

A long list of factors affect the design of PBSE projects in a given teaching and learning context:

- Students' ages/grades/readiness
- Students' interests and questions
- Community stewardship needs and opportunities
- State and local curricular expectations
- Participating community partners and their interests, needs, and assets
- Access to transportation and funding

- Climate and weather

Scott Elementary School students' place-based education experiences reflect their particular setting, the school's curriculum and learning goals, and the unique opportunities presented by community partners.



Part I — The Gully Repair Project

Fourth-grade students learned about water resources in their community and beyond

Learning in the community was not new to these students.

In fall 2014, students in Cammie Jones' fourth-grade class identified a serious erosion problem in their schoolyard and began a yearlong endeavor to fix the problem. As second and third graders, these students had developed a strong background in place-based stewardship education primarily through local field studies and immersion experiences with local partners situated in nature centers, museums, and zoos.

During the 2014–15 school year, the 27 children in Mrs. Jones' class learned about the water resources and habitats of the DeWitt community, the Middle Grand River watershed, and beyond—in fact, their studies extended all the way to Lake Michigan. Students' work on the erosion repair project at their school was just one part of a larger effort to investigate and explore local and regional watersheds.



Students enjoy time aboard a Grand Valley State University research vessel while visiting the mouth of the Grand River at the point where it enters Lake Michigan. This experience helps students understand the concept of a watershed.

“I saw the joy of children learning and doing engaging work in our local spaces. Joy leads to positive memories, which in turn build learning connections and emotional investment, causing students to long for more learning and doing to affect positive change. Remember joy!”

—Cammie Jones, Scott Elementary teacher

Fourth graders' chief effort was to repair an eroded schoolyard gully leading to a county drain

Mrs. Jones and her students will never forget the positive impact they made in their school, community, and watershed.

A gully had developed over several years on the hill of Scott Elementary's playground, adjacent to the basketball courts and parking lot. The fourth graders inspected the site, and observed that portions of the gully were at least three feet deep. They also saw that sand used in the past to repair the 30-foot long gully had been swept away and deposited at the bottom of the site. Students traced the path that water took from the corner of the basketball courts, where the pavement had cracked.

Soil erosion is one of the most important environmental impacts on watersheds. Since a county drain was located at the gully's foot, the county drain commission was interested in this problem. The commission is responsible for making sure that drains (local creeks under their control) safely move stormwater runoff through the community, and thereby help prevent flooding. The commission also works to prevent soil erosion and preserve water quality.



Students examine a gully created by stormwater runoff on their school grounds.



Students line up to create a visual scope of the gully's 30-foot length.

Students first considered whether the gully was a problem

Mrs. Jones asked her students, “Should we fix the ditch? Is it a problem, or just a part of nature?”

After several lessons in early September on how water flows and the basics of the water cycle, as well as initial observations of what students called “the ditch,” fourth graders pondered Mrs. Jones’ questions.

They shouted out a chorus of opinions and observations. “It’s not safe.” “Kids could get hurt.” “Yes, we should fix this.” “Why hasn’t it already been fixed?”

Then Ava asked, “But if we repair it, what will happen to all the

animals and plants that live in the ditch now, Mrs. Jones?”

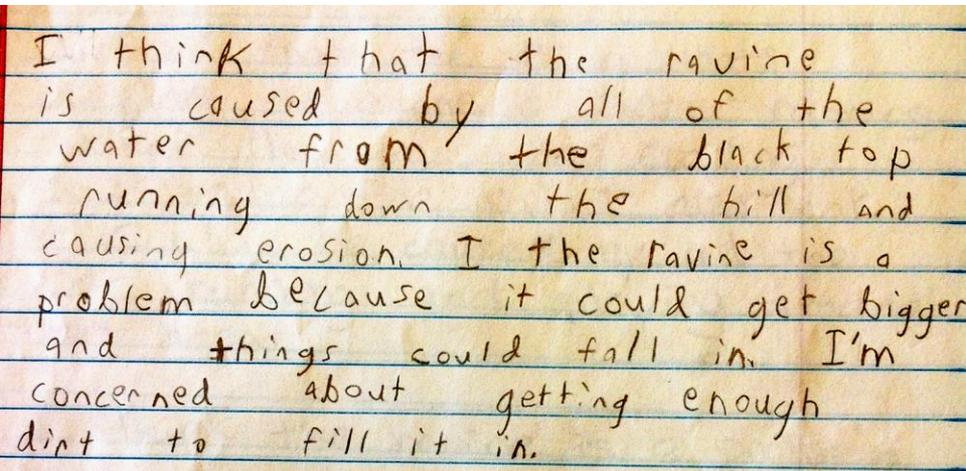
Students’ questions and conversations told Mrs. Jones what she needed to know: these young people already had a sense that their actions could affect the ecosystem and their fellow organisms. The class was eager to dive into the stewardship project. These nine- and ten-year olds were prepared to take the journey to learn about their place and how they might positively affect it in powerful ways.

Students recorded their initial ideas in response to three focusing questions

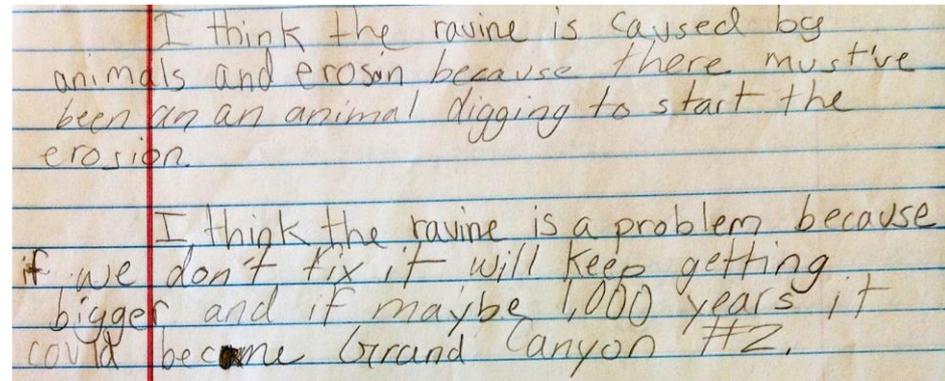
After their initial exploration of the gully, Mrs. Jones asked her students:

1. What do you think caused the gully?
2. Do you think it's a problem? Why or why not?
3. Do you have any concerns for the group?

Their answers revealed that most students were aware of the role played by water in the gully's formation, and most believed the gully to be a problem in need of attention.

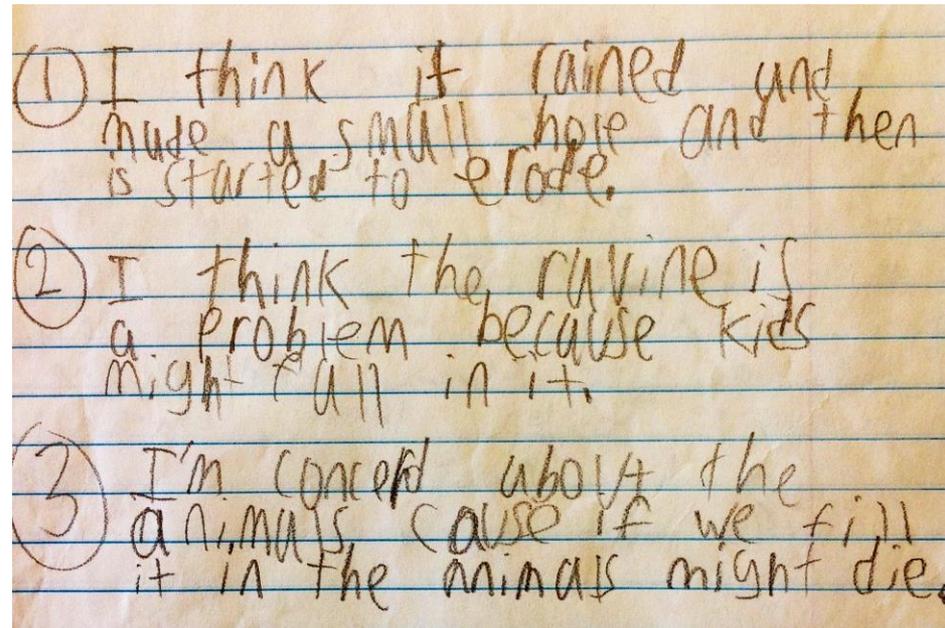


I think that the ravine is caused by all of the water from the black top running down the hill and causing erosion. I think the ravine is a problem because it could get bigger and things could fall in. I'm concerned about getting enough dirt to fill it in.



I think the ravine is caused by animals and erosion because there must've been an animal digging to start the erosion.

I think the ravine is a problem because if we don't fix it will keep getting bigger and if maybe 1,000 years it could become Grand Canyon #2.



① I think it rained and made a small hole and then is started to erode.

② I think the ravine is a problem because kids might fall in it.

③ I'm concerned about the animals cause if we fill it in the animals might die.

Students then asked, “What’s next, Mrs. Jones?”

Mrs. Jones invited the deputy drain commissioner to visit the class, and he laid out three options for repair.

Students assumed Mrs. Jones had a solution and a plan in mind, so it had not occurred to them that they would figure out the steps of this project together. Mrs. Jones said, “I don’t know the solution, but I know someone who can help us.”

Mrs. Jones invited Jon Morrison, the county’s deputy drain commissioner, to visit her class, learn about students’ observations of the gully, and add his expertise to help solve the problem.

Mr. Morrison listed the factors he investigates when he needs to repair damage caused by erosion. He walked the gully with students and helped them see how its steep slope allowed the moving water to generate even more energy, which pulled soil from the banks and moved it elsewhere. Fixing the problem would involve reducing that slope, which would decrease the water’s energy and also decrease erosion.

Mr. Morrison had a thoughtful, easy way with the students, helping them to see cause and effect relationships. After he and the students talked more about the science behind this issue, Mr. Morrison offered three possible solutions to the problem of soil erosion at the site. For each solution, students created a list of pros and cons.

Rock/ Concrete Option	Grass Option	Landscape Option
\$\$\$	\$	\$\$
<ul style="list-style-type: none"> Rock stairs would help us climb the hill and remove the ugly gully Including both soil and rock can save animal habitat May still be a safety problem on the playground May look out of place or unsightly if not done correctly 	<ul style="list-style-type: none"> Maintains current habitat Looks like the rest of the playground Won't cause injury if you fell on the grass Short roots of grass may not hold the soil in place 	<ul style="list-style-type: none"> Using a variety of plants may hold the soil in place Safer than rocks Visually appealing May improve habitat for animals Increases biodiversity Could add a whimsical feature or bridge Could add trees

The students’ pro-and-con chart of Mr. Morrison’s three options.



Mrs. Jones and Jon Morrison, deputy drain commissioner for Clinton County, Michigan.

“Even with a partner in place, leading my 27 students on this journey to repair the gully felt like a risk. As a teacher, I’m used to being hyper-prepared, but I had to accept the risk that I didn’t have all the answers, my timeline may be at the whim of the weather and the availability of experts, and trust that my experience would be enough. I chose to stay the course and continue to seek out authentic learning with real outcomes.”

—Cammie Jones, Scott Elementary teacher

Students discussed the three options in class

After discussing the three options presented by the deputy drain commissioner, most students found the landscape option to be the most appealing because it would improve rather than just repair the site. They were beginning to see what this project would involve, and their enthusiasm was growing. One student raised a hand to ask, “Will we get to plant and move the dirt?”

The student’s question took Mrs. Jones by surprise. She had assumed that her students understood that the plans they were making together were for the students to carry out—that they would get their hands dirty and do real work.

This moment also reminded her of how powerless children often feel, and brought to mind another goal she has when teaching children: she hopes to help them see the tremendous power they hold as they make everyday choices and actions.





Mrs. Jones’ students surveyed the other students at Scott Elementary

All of the students shared the playground and had a stake in the decision.

Mrs. Jones asked another important question of her students. “Should we ask the opinions of the 400 third and fourth graders who share our playground? Do they get a say in the outcome of our project?”

Students used their classroom technology to create a Google Forms survey to ask the opinions of the other students in the building. They worked in teams to draft the wording of each of the three options for the gully and used bar graphs to analyze the data.

As they watched the responses come in, a new question arose from Mrs. Jones’ students: “Will the survey responses determine our final decision or simply inform it?” Students discussed this real-world dilemma faced by watershed planners. The students had an emotional and personal stake in the final decision. They considered themselves experts and they would be doing the work, so most of them thought the input from other students should inform rather than dictate their decision. Luckily, the landscape option was a favorite of the student body, just as it was for Mrs. Jones’ class.



Guiding Principle 8: Use deliberate processes to identify and consider multiple perspectives regarding a stewardship issue or project.

Erosion Project

Please choose your first, second and third choice of possible solutions for fixing the gully (the really big ditch with the cones) on our playground. Click 1 for your first choice, 2 for your second choice, and 3 for your third choice. Thank you for your help! Sincerely, the students of Mrs. Jones’s and Mrs. Harder’s 4th grade class

• Required

Grass •

For the grass option we will fill the gully with soil and rock to make it the same level as the rest of the hill. Then we will plant grass to make it look the same as the rest of the playground. This is the cheapest option, but we aren’t sure if the grass roots will be long enough to hold the soil in place. The insects and other animals will have a similar habitat as they do now.

1 2 3

first choice last choice

Landscape •

For the landscape option we will fill the gully with soil and rock to make it the same level as the rest of the hill. We will plant flowers, native grasses, and possibly a small tree. The roots of the plants will be much longer than grass, which is more likely to hold the soil. This is the second most expensive option. The diversity of plants will attract more birds and insects. We have discussed adding other landscape features like steps, signs or a foot bridge.

1 2 3

first choice last choice

Rocks/Cement •

For this option we will fill the gully with large rocks or cement. This will keep the soil in place, but it is the most expensive option and may still be dangerous for people playing on the playground. Also, plants and animals may not have any habitat with this option.

1 2 3

first choice last choice

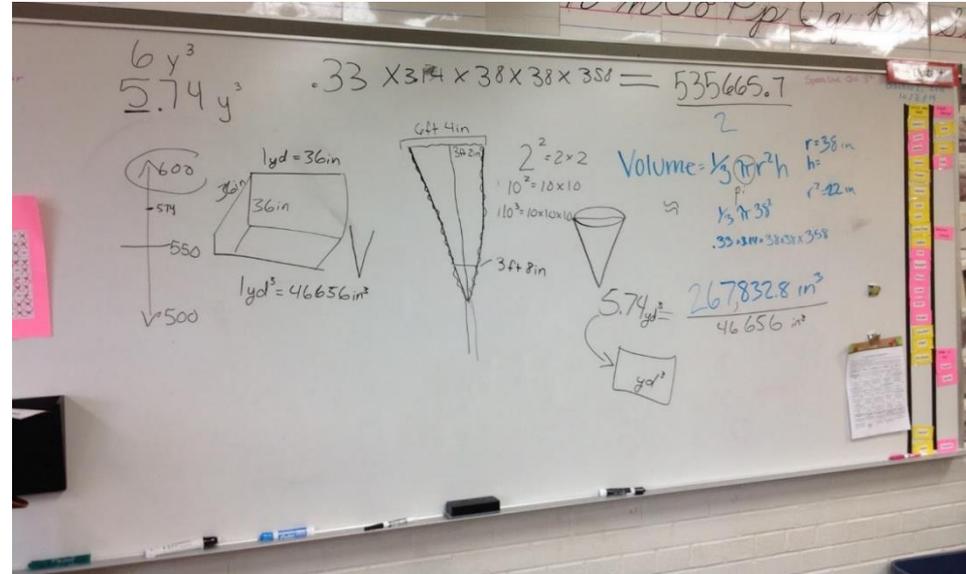
The Google form created and distributed via Gmail to Scott Elementary School’s student body by fourth graders in Mrs. Jones’ class. | 22

Quantifying the need for fill soil was challenging

High school students and their teacher helped with the math.

Students first measured the basic dimensions of the gully to determine how much soil they would need to fill it. They soon realized they didn't know how to calculate the volume of soil required. For help, Mrs. Jones invited Mr. Brian Byars, a teacher from the high school, and several of his students to visit her class. Her students led these visitors to the gully and explained what they already knew about it.

Together, they determined that the shape of the gully was roughly a cross-section of a cone. High school students introduced the fourth graders to pi, then entered measurements into the diagram of a cone and calculated the volume of the gully—5.74 cubic yards. As the whiteboard filled with equations, the fourth graders' eyes grew bigger. Mrs. Jones asked the students to round to the nearest whole cubic yard. That's when one student announced, "All this math, drawing, and measuring.... Mrs. Jones, are you telling us the answer is 6!?"



High school and fourth-grade students and teachers puzzle through the calculation of the amount of soil needed to fill the gully.

“Mrs. Jones, are you telling us the answer is 6!?”

—Fourth-grade student

Students designed a landscaping plan and shared it with others, gaining content knowledge and process skills as they did

Several generous donations of materials helped make their plans feasible.

Students next studied native plants that would survive well at the gully site, have long stabilizing roots, and attract butterflies and birds. Designs by Nature partner Vern Stephens provided a list of plants that might be suitable.

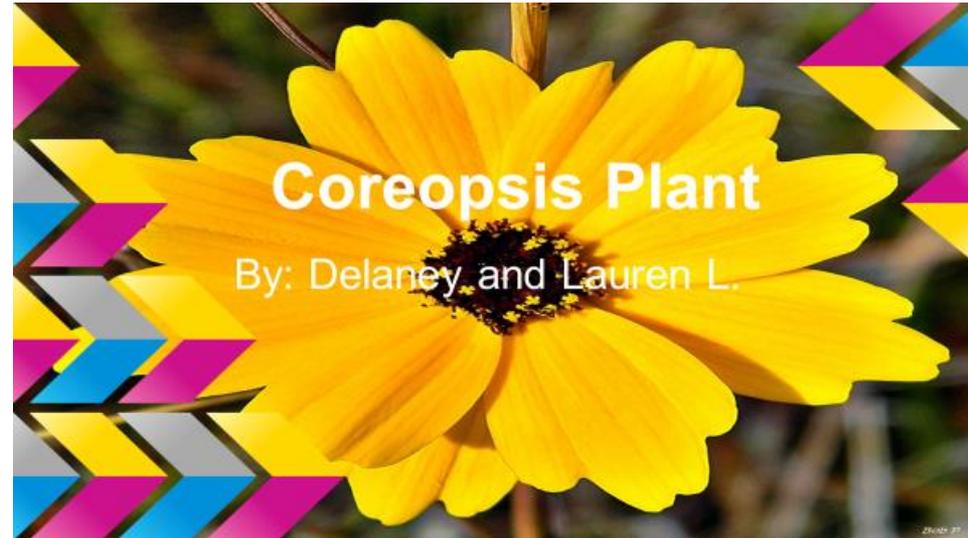
The students used Google Apps (docs, research tool, and slides) to investigate the various plants and prepared slides to teach their peers about them.

Finally, students applied what they had learned during recent lessons about area and multiplication arrays to determine how many plants to purchase (at discount) from Mr. Stephens.

Soon after, Mr. Morrison arranged a donation of soil from Schlegel Sand and Gravel, and discovered that the City of DeWitt would donate compost. Mr. Morrison and some class families donated field stones. It seemed like all the pieces were coming together.

LINK: [ACADEMIC STANDARDS ADDRESSED BY THE GULLY PROJECT](#)

LINK: [SEE THE STUDENTS' PRESENTATION](#)



The title page of a presentation on native plants developed by two of Mrs. Jones' students for the purpose of educating their peers at Scott Elementary.

“So many people were willing to help, and they were appearing right when we needed them!”

—Cammie Jones, Scott Elementary teacher

Mrs. Jones and her students needed permission from the school district to proceed with the gully repair

Working collaboratively, students drafted a letter to the assistant superintendent in charge of operations and grounds.

Mrs. Jones explained to students that if their plan was to be taken seriously, they needed to organize their thinking in a way that others would understand clearly, and ask permission in writing. The tone of the letter would need to be formal and the presentation had to use proper writing conventions. This was also a perfect moment early in the year to teach about the purposes of standard grammar and spelling, and the importance of audience to writers.

Using Google Docs, students worked in groups on separate pieces of the letter, then came together to share and edit their work. The students learned about parallelism as they wrote about pros and cons for each option they had investigated for the gully.

Mrs. Jones noted: “During our revision work, students looked more closely at this writing and with more concern for the final outcome than I have found during my typical lessons on revision.”

Finally, the students asked if there were any experts in this type of writing who could review their letter before it was sent.

A parent of one of the students agreed to review the letter. She had been in the social work field and had skills in grant writing. She suggested adding a table with a projected budget and explained that successful grants have a clear purpose, defined intended outcomes, and an organized and realistic budget.

Finally, each student signed the letter, using their fourth-grade cursive signature, and it was sent to Assistant Superintendent Rob Spagnuolo.

LINK: [SEE THE STUDENTS' LETTER](#)

Permission granted!

The assistant superintendent praised the students and asked them to keep him in the loop.

When the students received Mr. Spagnuolo's letter, they applauded, cheered, and patted each other on the back. They were clearly proud of their work and excited about the approval of their plan.

LINK: [SEE MR. SPAGNUOLO'S RESPONSE](#)



Students prepped the ground and spread soil

With final permission in hand, real work could begin. The final days of fall were flying by when the first work day to fill the gully was scheduled on a gray, drizzly November day. With borrowed tools and donated compost, rock, and soil, students and a few parents enthusiastically went to work.

Everyone found their specialty. Some kids dug, some hauled buckets and pushed wheelbarrows, and some raked and spread materials. During recess, some students continued to work while others simply kept watch, protecting the work site and describing their gully project to other students.



Students, teachers, and parent volunteers spread soil and compost and place boulders.



“Seeing how hard students worked to keep the area ‘safe’ reaffirmed my belief that when people have connections to a natural space, they are more likely to behave in ways that conserve it.”

—Cammie Jones, Scott Elementary teacher

New native plants were installed

On a sunny November day, students planted native species purchased from community partner Vern Stephens. The weather had grown much cooler, and the plants were approaching dormancy. If the plants were going to get in the ground before the first frost, there was no time to waste.

Some children had never planted before. Everyone carefully cradled each little pack of roots and soil as each student found a place to plant. Students also spread mulch around the plants to provide some insulation from the coming cold.



Students set the native plants they chose for the gully.

Oh no! A storm event two days later washed out the gully repairs

The ground froze soon thereafter, putting repair efforts on hold.

No one expected the torrential rainstorm in November. Many of the plants were washed away before they could take root. The students came back to school to find a large rut running through the center of the gully, and a few days later, the ground froze.

The mood of the students had been dampened. The fourth graders were disappointed that their work hadn't been a success and understood that further repairs were needed.



The gully after the November rainstorm—some work would need to be redone.

While deeply disappointing to students, the setback was an opportunity for double-loop learning

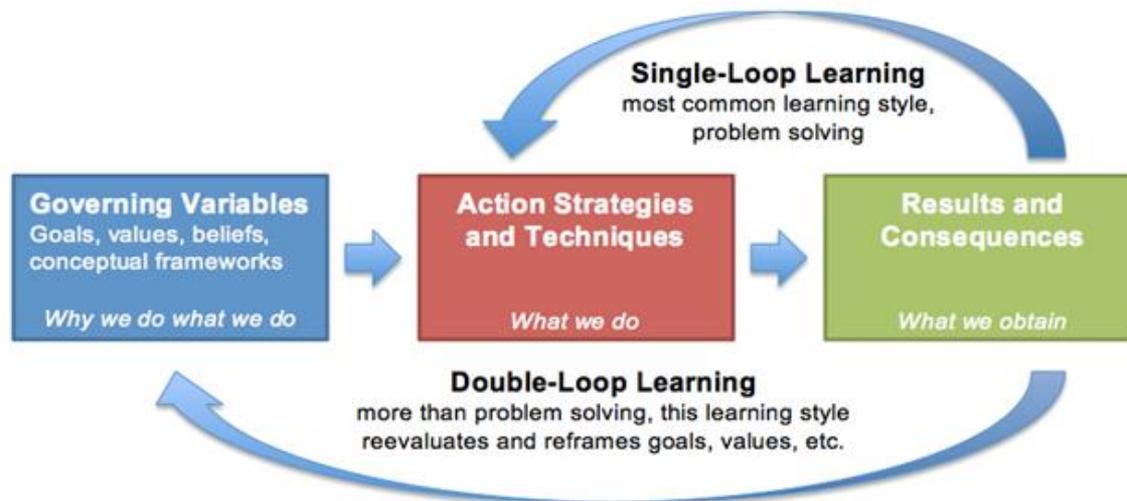


Image: The AFS Intercultural Learning Blog, <http://www.afs.org/blog/icl/?p=2653>.

The term “double-loop learning” was developed by Chris Argyris and Donald Schön, noted theorists of organizational development, to describe situations in which learners are prompted to reconsider the expectations, beliefs, and values that are driving their problem-solving efforts (1974, 1978). The storm event challenged students to reconsider their ideas about the meaning of success on this project. The circumstances may also have prompted students to reexamine their ideas about stewardship and reimagine it as an ongoing commitment to a place, rather than a one-time effort.

LINK: [BRIEF SUMMARY OF DOUBLE-LOOP LEARNING](#)

In May, Deputy Drain Commissioner Jon Morrison returned to consult with the class

During the gully project, students had to reflect, reconsider, and redo.

Upon his return, Mr. Morrison observed the gully with the students. At first the kids could only see the negative. There was a new rut, plants hadn't survived, and their plan hadn't succeeded.

Mr. Morrison asked an important question: "In looking at the gully, what was successful and what wasn't?"

With Mr. Morrison's help, students began to see the positives. They had reduced the size of the gully significantly, there were plants that had found their way to the gully, and the slope had been decreased. Slowly, the students' tone and attitudes became more positive.

Brainstorming continued. The group decided that the slope needed to be reduced even more to limit the energy that was causing soil erosion. Additional supports in the soil would be necessary. Students would add rock and a layer of mesh landscape material. More compost was required, too. The school year's end was fast approaching and students wanted to solve this problem soon.



Mr. Morrison talks with the students in Mrs. Jones' class about what they can do next.

In early June, students revisited the gully and repaired the damage

Determined and enthusiastic students were hammering large landscape staples into place and climbing the compost pile to fill wheelbarrows, and several students were just fascinated with the little things. After a few hours, the second repair of the gully was complete.

Remember Ava? She was entranced with the centipedes and pill bugs she found in the compost.



Proud fourth graders admire their successful repair.



“Every time we get outdoors and into the community, the faces and minds of my students light up. They take ownership of the places we explore, and they meet experts in the community who can help them solve problems. Even when you’re ten years old, if you see a problem, you can be a part of the solution. That’s a lesson I’m hopeful all citizens in our country will know.”

—Cammie Jones, Scott Elementary teacher

The timeline for the gully project

Preparation and outreach

- Water quality testing on the Looking Glass River
- Presentation to the school board on water quality
- Students survey the student body
- Students write to the assistant superintendent and plant expert
- High school students help calculate volume of space in the gully

Reflect, reconsider, redo

- New hope and work with Mr. Morrison
- A new inquiry: What was successful?
- A new plan and new work to stabilize the gully and prevent future erosion
- Shipboard trip on the research vessel *W.G. Jackson*

SEPT

Exploration and commitment

- Students do first-look observations outdoors
- The class follows the path of water that falls on the playground to understand its flow
- Students explore the issues presented by the gully, and decide, “We should fix it!”

OCT

NOV

Research and action

- Students research native plants with deep roots
- “Fix the Gully Day,” followed by heavy rains that wash away the new plants

MAY-
JUNE

[LINK: MRS. JONES' EXPANDED TIMELINE OF ENVIRONMENTAL LEARNING IN 2014-15](#)



GLSI Guiding Principle 5: Explore local environmental issues over a period of weeks or months, with sufficient time for all parts of the inquiry cycle and relationship development, and offer opportunities to repeat the process over the years of schooling.



Part II — Other Activities

Third graders at Scott Elementary developed a butterfly garden

Students in Lisa Waterson’s third-grade class learned about life cycles as part of the science curriculum. Ms. Waterson wanted children to learn the real world application of life cycles.

For several years, Ms. Waterson’s class participated in the BIG Zoo Lesson at Potter Park Zoo—an immersive learning experience. In addition, Ms. Waterson participated in and, in some cases, led several of the GRAND Learning Network’s professional development workshops. In this context, she met Dave Reicosky, a local volunteer with Monarch Watch. Mr. Reicosky told her about monarchwatch.org, an organization that supports butterfly conservation by encouraging gardening and other community-based efforts to create and protect habitats for these insects.

Ms. Waterson worked with her third graders to plan, plant, and care for a butterfly garden at Scott Elementary School. They used a plot of ground close to the school’s doors for their first garden, and successfully planted and maintained it.



Students record their observations at the butterfly garden, where caterpillars are metamorphosing into monarch butterflies.

“We do garden chores to help the plants grow. We are watering the plants, covering the plants when it’s windy, checking on the plants, and putting up signs so people do not hurt them.”

—Third-grade student

The garden was a place to teach and learn about life cycles

Students observed butterfly eggs throughout the summer and then witnessed caterpillars forming chrysalises on leaves and on bricks near the garden. Through their work on the butterfly garden, students applied their skills in writing, plant identification and care, and scientific inquiry.

The garden was home to as many as 50 monarch butterflies in fall 2015.



Students performed the play *Life Cycles*

Students performed a play about life cycles as a culminating activity and public event for Scott Elementary students.

Plays have been a recurring event at Scott Elementary through the leadership of Sally Fizzell, now retired. As a teacher leader, Ms. Fizzell frequently coordinated with other teachers and classrooms for the public performances of musicals to share place-based stewardship education with the community. She even wrote one such play. During her time at Scott Elementary, she was very active in the GRAND Learning Network, attending several professional development workshops.

LINK: [LIFE CYCLES PLAY from BAD WOLF PRESS](#)



Scott Elementary students perform the play, *Life Cycles*.

Students at Scott Elementary engaged in some additional water-focused learning throughout the year

Third- and fourth-grade students tested water quality on the Looking Glass River, and fourth-grade students did further testing on the W.G. Jackson, a lake-going research vessel.

Ruth Pearson, a retired classroom teacher, supports teachers engaged in stewardship projects. She is part of a team that leads water quality testing efforts in the Looking Glass watershed and other local rivers that are part of the Middle Grand River watershed. In the 2014–15 school year, she worked with third- and fourth-grade students at Scott Elementary.

Fourth graders traveled to Muskegon in April where they visited the Annis Water Resources Institute. There, they took part in hands-on learning about water, which included performing water quality tests on Muskegon Lake and Lake Michigan.



Retired teachers Jill Tribell and Ruth Pearson help students in Lisa Waterson's third-grade classroom analyze data.



Lisa Waterson and Ruth Pearson work with students on water quality testing of the Red Cedar River near Potter Park Zoo.

Fourth-grade students shared their knowledge of erosion and water quality testing during an Earth Day event

In April, Mrs. Jones and her fourth graders participated in an Earth Day event organized by the Friends of the Looking Glass River. Students set up stations to teach community members about the Middle Grand River watershed. They taught families how to use dichotomous keys to identify macroinvertebrates and used a stream table to demonstrate the power of water and its role in erosion. They partnered with Jon Morrison and used the EnviroScape model to demonstrate how the flow of water and human impacts on a local watershed affect the whole community. The students became the teachers, and the attendees—from toddlers to adults—learned from them.

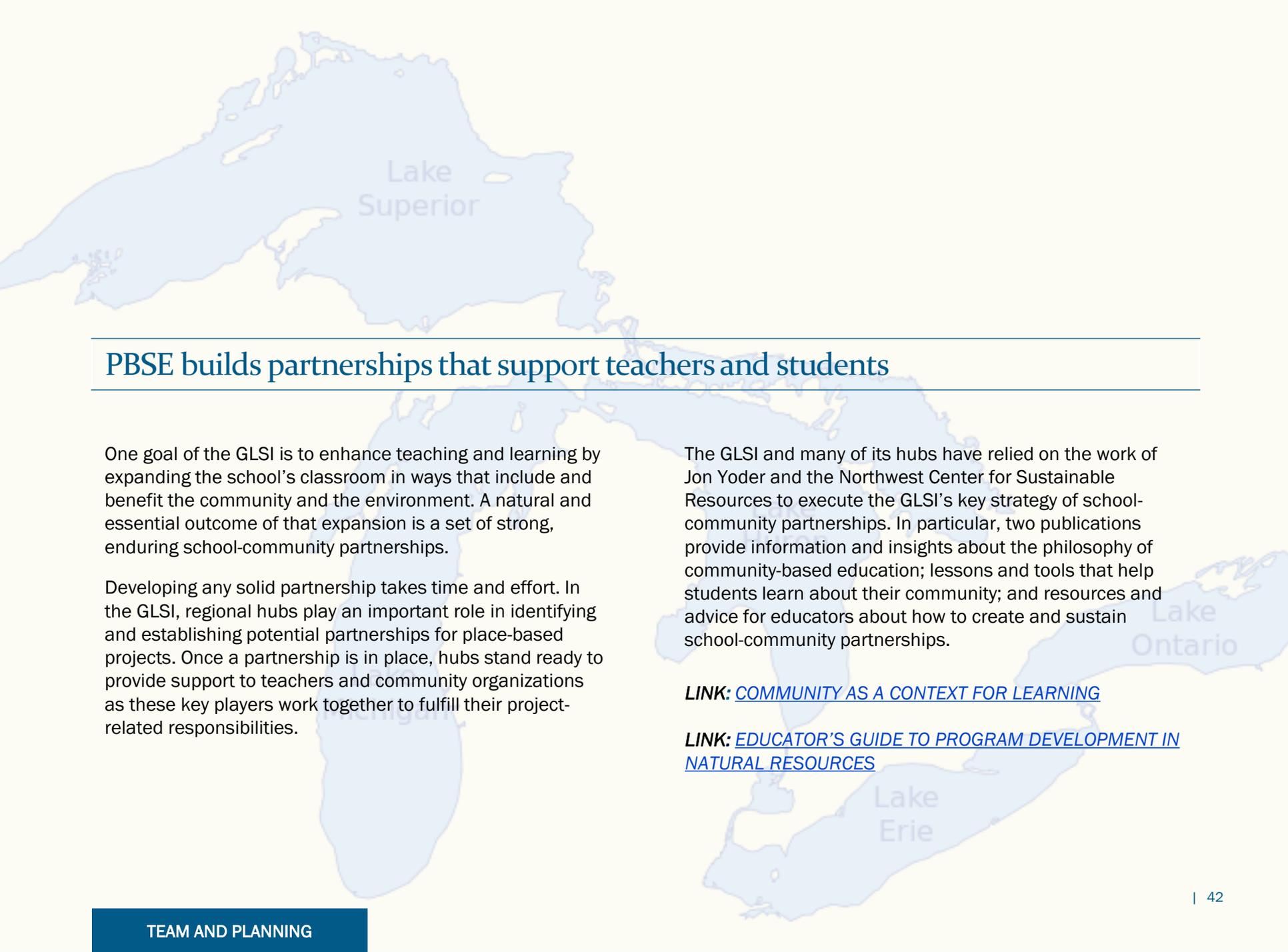
[LINK: ENVIROSCAPES ENVIRONMENTAL EDUCATION PRODUCTS](#)



Students use an EnviroScape model to demonstrate how environmental pollution spreads through a community.



Team and Planning



PBSE builds partnerships that support teachers and students

One goal of the GLSI is to enhance teaching and learning by expanding the school's classroom in ways that include and benefit the community and the environment. A natural and essential outcome of that expansion is a set of strong, enduring school-community partnerships.

Developing any solid partnership takes time and effort. In the GLSI, regional hubs play an important role in identifying and establishing potential partnerships for place-based projects. Once a partnership is in place, hubs stand ready to provide support to teachers and community organizations as these key players work together to fulfill their project-related responsibilities.

The GLSI and many of its hubs have relied on the work of Jon Yoder and the Northwest Center for Sustainable Resources to execute the GLSI's key strategy of school-community partnerships. In particular, two publications provide information and insights about the philosophy of community-based education; lessons and tools that help students learn about their community; and resources and advice for educators about how to create and sustain school-community partnerships.

LINK: [COMMUNITY AS A CONTEXT FOR LEARNING](#)

LINK: [EDUCATOR'S GUIDE TO PROGRAM DEVELOPMENT IN NATURAL RESOURCES](#)

Four Scott Elementary teachers were involved in PBSE in 2014–15

Cammie Jones served as the teacher leader for the school's work in place-based stewardship education. During the 2014–15 school year, she received an Excellence in Education Award from the Michigan Lottery. She teamed with Sally Fizzell to field the fourth graders' PBSE effort described in this case. Ms. Fizzell taught for more than 30 years and retired at the end of the 2014–15 school year.

Third-grade teachers Lisa Waterson and Monique Zarotney worked together on butterfly-themed learning and service in 2014–15. Their frequent participation in GRAND Learning Network Summer Institutes has enabled them to share their resources with fellow teachers and the school. They have since expanded the butterfly garden project to include more native plants in various places on the school grounds.



Cammie Jones talks with Michigan State University basketball coach Tom Izzo prior to accepting her Excellence in Education Award from the Michigan Lottery. Photo and caption: Michigan Lottery webpage.

Community partner Jon Morrison helped Mrs. Jones get to the next level in using the gully in her teaching

Mrs. Jones had used the gully and playground in previous years to help students see how water moves and to illustrate the process of erosion.

Each year, she added another layer of study and investigation, often inspired by professional development offered by the GRAND Learning Network, her regional GLSI hub. For example, after learning about chemical and biological tests she could use with young children to assess water quality, she and Ruth Pearson supported students' investigations of the Looking Glass River. And after sailing with other teachers on the *W.G. Jackson* research vessel operated by Grand Valley State University, Mrs. Jones arranged a similar trip for her students so they, too, could learn more about the concept of a watershed.

Each year, the gully on the school's playground grew larger. Mrs. Jones had met Jon Morrison at a Friends of the Looking Glass River meeting. It occurred to her that he could help her and her students solve the ongoing erosion problem at the school.

She developed a plan to embed her fourth graders' work at the gully in a larger, year-long study of watersheds and ecosystems.



“I didn’t know how to solve the gully problem, but I was confident I could find local experts who would help. I thought about my local contacts and called Jon Morrison, whom I had met through the Friends of the Looking Glass River and who is the deputy drain commissioner...I was going to learn along with these fourth graders.”

—Cammie Jones, Scott Elementary teacher



“The partnership with Scott Elementary has been a great experience. The kids have been really enthusiastic and really made it their own. The kids have taken ownership.”

—Jon Morrison, Clinton County Deputy Drain Commissioner

Many other partners contributed to the projects and the broader practice of PBSE at Scott Elementary

Vern Stephens of Designs by Nature provided the native plants used to replant the gully. Schlegel Sand and Gravel donated fill soil, and the City of DeWitt donated compost.

The Friends of the Looking Glass River hosted students at their Earth Day event. Janet Vail and others at the Annis Water Resources Institute at Grand Valley State University provided students with the opportunity to sample water in Lake Michigan and Muskegon Lake on the research vessel *W. G. Jackson* and offered additional instruction at the institute.

Many parents, including those who worked in engineering, heavy-equipment operation, and grant writing, volunteered their services to help with the gully project. A few families donated fieldstone.



Dave Reicosky, a volunteer with Monarch Watch, consulted with Lisa Waterman on the design of the butterfly garden.

Ruth Pearson helped facilitate water quality tests on the Looking Glass and Red Cedar rivers. Ms. Pearson also works with other teachers in the GRAND Learning Network and mentors and assists educators who take part in Annie's BIG Nature Lesson, a five-day immersion experience at local nature centers.

[LINK: FIND SOURCES FOR MICHIGAN NATIVE PLANTS AT THE WILDFLOWER ASSOCIATION OF MICHIGAN](#)

Scott Elementary and its district, DeWitt Public Schools, prioritize connecting with local natural assets

The district has its own nature center, managed by Friends of the DeWitt Nature Center.

About 2,900 students attend DeWitt Public Schools. The district places a high priority on connecting teaching and learning to the assets of the local community.

Several school buildings maintain natural areas that are used by classes of students, and the district has its own nature center, which is managed by Friends of the DeWitt Nature Center, a group of community volunteers.

Administrators of Scott Elementary strongly support teachers' participation in workshops and summer institutes offered by the GRAND Learning Network, and recognize the value of students' place-based stewardship work, both on the school grounds and in the community.

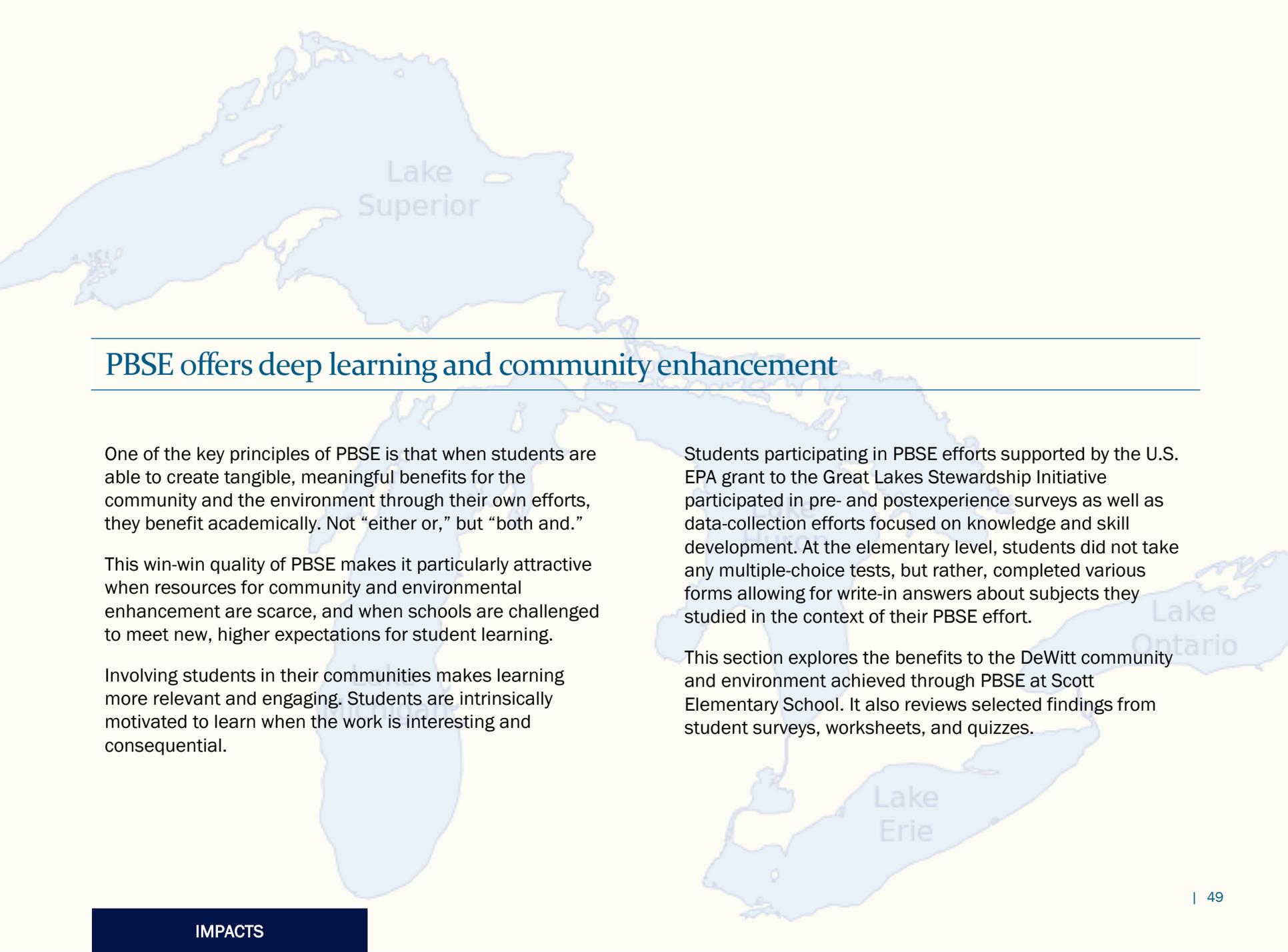
LINK: [DEWITT PUBLIC SCHOOLS](#)



Scott Elementary School serves every third and fourth grader in the district. Elementary students move through four buildings as they advance from kindergarten through sixth grade.



Impacts of the Project



PBSE offers deep learning and community enhancement

One of the key principles of PBSE is that when students are able to create tangible, meaningful benefits for the community and the environment through their own efforts, they benefit academically. Not “either or,” but “both and.”

This win-win quality of PBSE makes it particularly attractive when resources for community and environmental enhancement are scarce, and when schools are challenged to meet new, higher expectations for student learning.

Involving students in their communities makes learning more relevant and engaging. Students are intrinsically motivated to learn when the work is interesting and consequential.

Students participating in PBSE efforts supported by the U.S. EPA grant to the Great Lakes Stewardship Initiative participated in pre- and postexperience surveys as well as data-collection efforts focused on knowledge and skill development. At the elementary level, students did not take any multiple-choice tests, but rather, completed various forms allowing for write-in answers about subjects they studied in the context of their PBSE effort.

This section explores the benefits to the DeWitt community and environment achieved through PBSE at Scott Elementary School. It also reviews selected findings from student surveys, worksheets, and quizzes.

Mrs. Jones' fourth-grade students improved the look and safety of their playground



The gully in fall 2014.



The gully, repaired and enhanced, in summer 2015.

Students in Mrs. Jones' fourth-grade class provided real and tangible benefits to their school's community by repairing a hazardous area on the school grounds, filling a deep rut with soil, and creating an attractive landscape of native plants.

By repairing the gully, students improved the quality of water in the drain, the Looking Glass River, and Lake Michigan

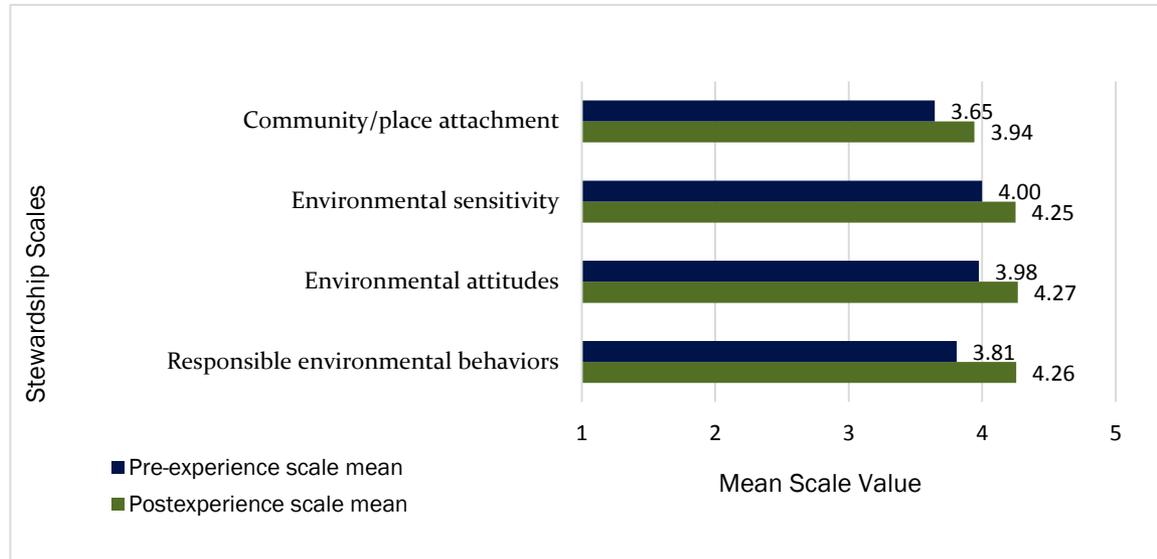
Students at Scott Elementary focused on one of the greatest threats to water quality in the mid-Michigan region and the Great Lakes basin—stormwater runoff. The Healing Our Waters Coalition—a partnership of more than 100 environmental and conservation groups dedicated to Great Lakes restoration—lists polluted runoff as one of six key threats to the Great Lakes. Additionally, the 2008 watershed management plan for the Upper Looking Glass River identifies sediment from stormwater runoff and other sources as the most important pollution priority (Public Sector Consultants 2008).

Many mid-Michigan waterways, including the John Voltz Drain that abuts Scott Elementary School, are managed by county drain commissions. These entities welcome committed partners to help with real-world stewardship that benefits rapidly suburbanizing communities like DeWitt.



The students' work at Scott Elementary School (upper right) affects the water flowing through the John Voltz Drain (inset), which flows into the Looking Glass River (inset), which flows to the Grand River, and ultimately to Lake Michigan. Imagery: © Google 2016. Map data: © Google 2016.

Fourth-grade students' pre- and postexperience surveys revealed growth in all measured stewardship attributes



Pre- and postsurvey results for Scott Elementary fourth-grade students. Only students with a matched pair of surveys are included in the analysis.

Students took surveys before and after their work on the gully project. The surveys contained multiple agree-disagree questions that, as a group, measured key aspects of environmental stewardship (see box, right). Each scale ranges from one to five, with larger values representing a stronger stewardship position. The scales each represent a student's averaged responses to several thematically related questions.

Students improved on all four stewardship attributes. The effect size of the changes ranged from 0.29 (small) to 0.64 (large). An effect size is a standardized measure of change based on the standard deviation—an effect size of 0.5 is a change equal to half the standard deviation of the underlying scores. These increases occurred even though the students began with stewardship scores that were already quite high.

Meaning of the Scales

Community/place attachment includes the sense that a place or community is “part of me,” that one is known in the community, and that the community is a good place to do “what I like to do.”

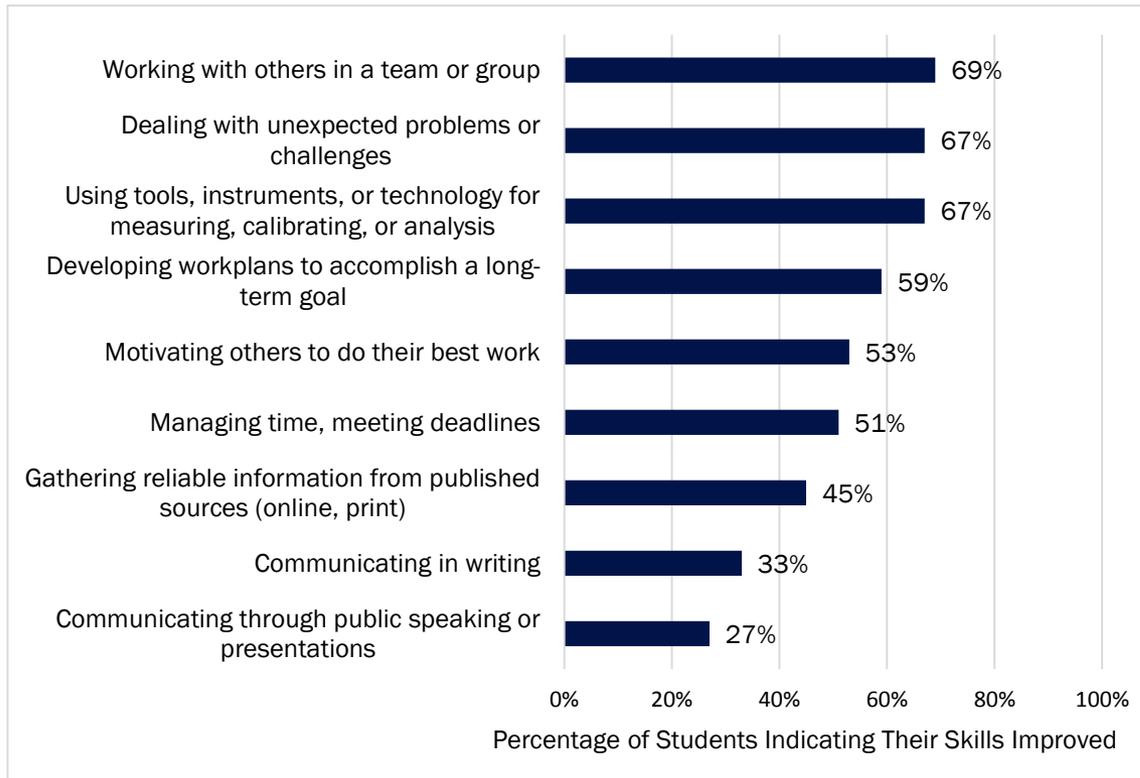
Environmental sensitivity is a feeling of care for nature and connection to nature.

Environmental attitudes are a set of beliefs about the importance of environmental protection and conservation.

Responsible environmental behaviors are choices (such as turning off the water when brushing one's teeth) that are within our capacity to make, and that are beneficial for the environment.

Fourth-grade students reported gains in many different professional skills

Students responding to the survey checked more than four skills, on average, that they felt they had developed through stewardship work.



Results from the post-only portion of the stewardship survey taken by fourth graders at Scott Elementary.

In the postexperience survey (after students had completed their stewardship projects), students were presented with a list of skills and asked to check any that their stewardship work helped them develop.

Scott Elementary School students were particularly likely to say they learned to collaborate with others, use technology or tools for measuring and analysis, deal with unexpected challenges, develop work plans, motivate others, and manage their time to meet deadlines.

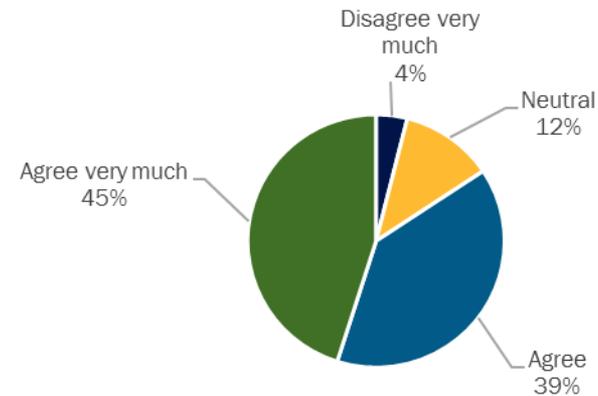
Fourth graders overwhelmingly agreed that, through PBSE, they learned about things they can do to protect the environment

In the postexperience survey, 84 percent of the students agreed “strongly” or “somewhat” with the statement, “By working on our stewardship project, I learned about things I can do to protect the environment.”

“I want children to come away from our year together believing they matter and that the thoughts, words, and actions they choose each day are powerful. PBSE experiences provide evidence for kids that this is true.”

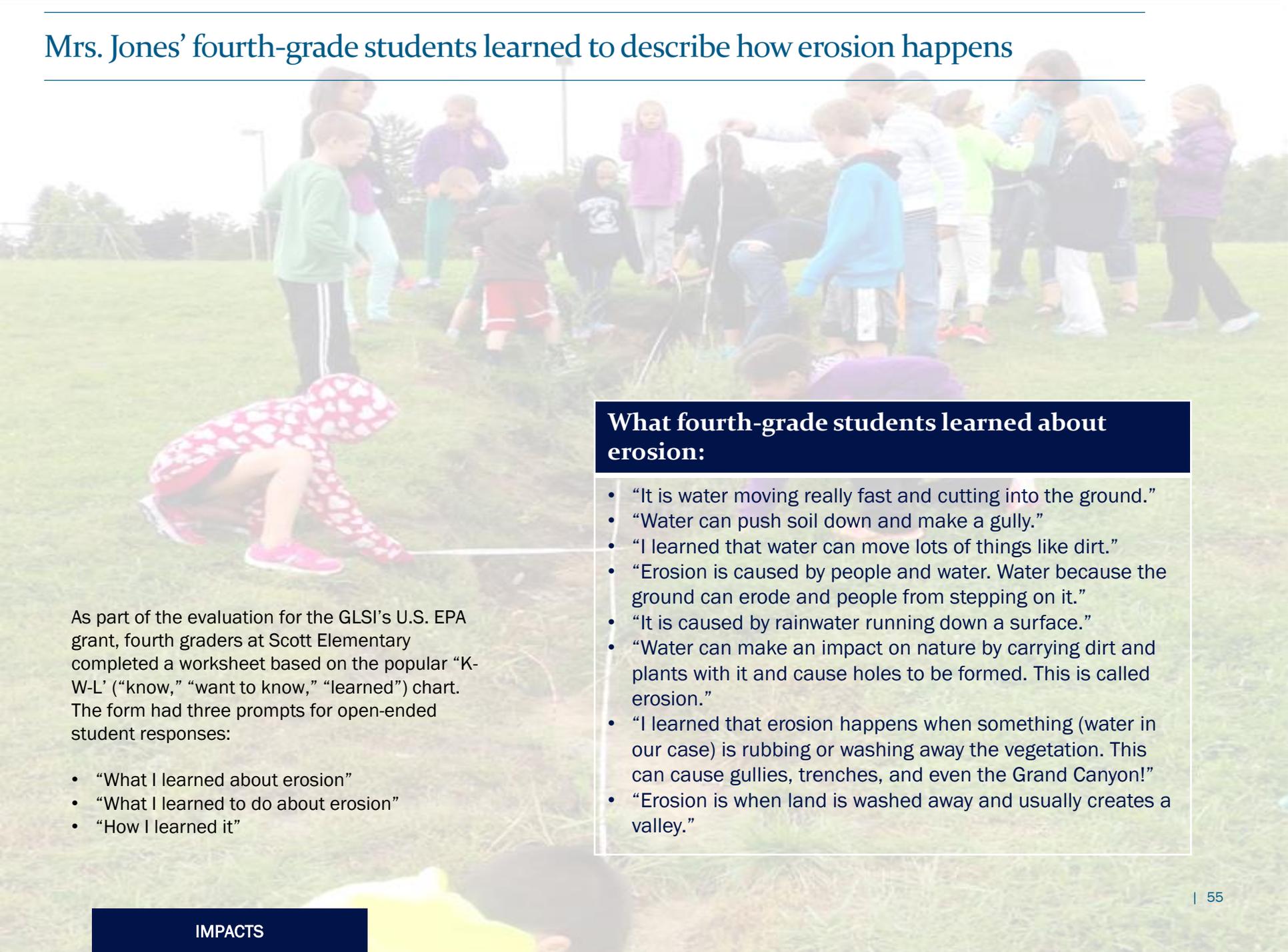
—Cammie Jones, Scott Elementary teacher

By working on our stewardship project, I learned about things I can do to protect the environment.



Results from the post-only portion of the stewardship survey taken by fourth graders at Scott Elementary.

Mrs. Jones' fourth-grade students learned to describe how erosion happens



What fourth-grade students learned about erosion:

- “It is water moving really fast and cutting into the ground.”
- “Water can push soil down and make a gully.”
- “I learned that water can move lots of things like dirt.”
- “Erosion is caused by people and water. Water because the ground can erode and people from stepping on it.”
- “It is caused by rainwater running down a surface.”
- “Water can make an impact on nature by carrying dirt and plants with it and cause holes to be formed. This is called erosion.”
- “I learned that erosion happens when something (water in our case) is rubbing or washing away the vegetation. This can cause gullies, trenches, and even the Grand Canyon!”
- “Erosion is when land is washed away and usually creates a valley.”

As part of the evaluation for the GLSI's U.S. EPA grant, fourth graders at Scott Elementary completed a worksheet based on the popular “K-W-L” (“know,” “want to know,” “learned”) chart. The form had three prompts for open-ended student responses:

- “What I learned about erosion”
- “What I learned to do about erosion”
- “How I learned it”

Students learned how to address an erosion problem and said their learning came through experts, their own efforts to repair the gully, their teacher, high school students, and research



Students and volunteers working to repair the gully on their playground.

Students completing the form described how they learned about erosion and what to do about erosion. They cited experts generally, or Jon Morrison specifically, 15 times; their own experiences working on the gully 11 times; their teacher five times; and other sources (including high school students, books, and the Internet) eight times.

What fourth-grade students learned to do about erosion:

- “I learned to put dirt and rocks and mulch in the gully to help it not erode.”
- “I learned to put [down] grass seed and rocks.”
- “I learned that people can fix these gullies by filling them in and sometimes putting plants in to hold it in.”
- “I learned to put mulch along the sides so it soaks up the water, to put rocks in the gully so the water runs over it instead of soaking in, to fill the hole with dirt and plant plants.”

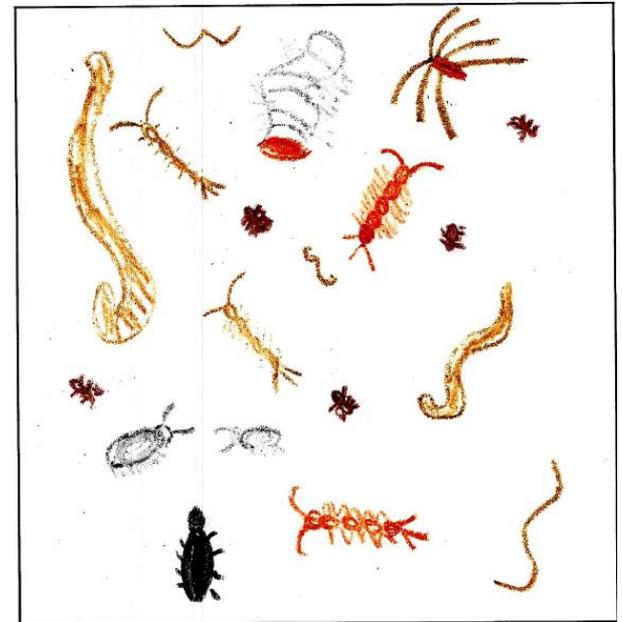
Students expressed pride in seeing the work through to a successful conclusion

Students were proud of their hard work. Many noted that their class would be remembered as the class that did this work. Others were proud to have fixed a problem that might have resulted in injury to one of their peers.

Students felt happy to have spent time outdoors working with friends. A few mentioned the various bugs they found and saved.

What about our stewardship project makes you happy or proud?

What makes me proud is that we made it with just ourselves, tools and a little help. Also because it looks so good and we worked so hard! What makes me happy is we've come so far! At first the gully was huge and then we worked on it. We got a big rain after but it only eroded about a third of the last time. Then finally we worked on it one last time and I believe that we worked so hard and our work paid off.



The final survey question for these elementary students was completed with pencil and paper. While most students wrote out their answers, two students drew a picture to accompany their text. The student whose picture is shown above wrote, "The gully made me feel proud because I got to rescue five worms, two iceopod [sic], one grub, four centipedes, one black beetle, five ants, and a spider with seven legs and had fun doing it!"

All fourth graders described, in their own words, something that they learned about watersheds and water quality

As with the assessment related to erosion, this assessment had three prompts for open-ended student responses:

- “What I learned about watersheds and water quality”
- “What I learned to do to protect our watershed”
- “How I learned it”

Students in both Mrs. Jones’ and Ms. Fizzell’s class completed this form and expressed many points of learning regarding water quality and watersheds.

What fourth-grade students learned about watersheds and water quality:

- Humans have an impact on water quality, and depend on good water quality (26 percent of responding students wrote something related to this theme):
 - “I learned that the water quality is bad because people have been throwing stuff in the rivers and lakes.”
 - “That there are many things you can do to help the watershed.”
 - “That you half [sic] to keep our watershed clean and not dirty.”
- Water quality influences which creatures can be found in water (17 percent): “That there are some...invertebrates that are picky [sic] about the water they live in, or don't care about the water they live in.”
- Water quality is important for plant and animal life (15 percent): “That we have to take care of the water so the plants and animals can survive and thrive.”
- Definition of a watershed (11 percent): “That watersheds are a system of rivers or streams that lead up to a larger body of water.”
- Water quality varies from place to place (9 percent): “That each river lake and ocean have different water qualities [sic] from each other.”
- Other expressions of learning:
 - How to test water quality (6 percent)
 - We all live in a watershed (6 percent)
 - Water quality is good/poor in specific named places (e.g., the Looking Glass River, Muskegon Lake) (6 percent)
- 15 percent of students endeavored to define or describe a watershed, but were not fully accurate in their description of this difficult concept.

Students learned about things they can do to protect the watershed and said their learning came through hands-on water quality testing and from experts and their teachers

What fourth-grade students learned to do to protect the watershed:

- Don't litter (55 percent of responding students wrote something related to this theme):
 - "I learned never to litter or it will be a dump."
 - "Do not litter because wind can blow it in a watershed."
 - "Do not put trash in the water."
- Use less fertilizer, weed killer, or chemicals on lawns (33 percent):
 - "To not put fertilizer on our yards because it can eventually end up in Lake Michigan."
 - "I can protect it by not using chemicals on my grass and plants if I live by a river."
- Don't pollute (12 percent): "Don't put bad things in the water."
- Test the water (10 percent): "To protect our watersheds we have to test the water to learn how to solve the problem."
- Don't spill oil (8 percent): "Try to prevent oil spills."
- All others (29 percent): "Tell your parents, neighbors, and friends to protect our watersheds and how;" use less water; don't let cows roam freely at the water's edge; don't locate factories near the water's edge; don't disturb wildlife; "make sure there is no mud coming in to the watershed."

In response to the question about how they learned, 70 percent of responding students cited some form of active learning, and all but one of these students referred to water testing at the Looking Glass River or on the *W.G. Jackson*, the research vessel at the Annis Water Resources Institute. Fifty-one percent cited some form of passive learning, including teaching received from Dr. Janet Vail from the Annis Water Resources Institute, unnamed "experts," teachers, parents, or unnamed others.

Analysts used a stringent test of students' mentions of active learning: if the student said, for example, "Dr. Vail taught me," the response was coded as passive learning, even if the activities in question may have been hands-on activities.

Responses total more than 100 percent because many students cited both active and passive forms of learning.

“I learned that watersheds are a system of rivers or streams that lead up to a larger body of water. We all live in a watershed! The water quality is the quality of the water and how it affects other living things.

I learned that littering is one thing not to do, because plastic could get wrapped around animals or the animals could eat the litter and die. Litter also lowers water quality and then the living things wouldn't be able to live.

We went to our local river in DeWitt (me and my class) and had an expert bring supplies. We tested the water chemically with all the tablets and small cups. Then we did biotic tests.”

—Fourth-grade student

PBSE delivers multiple forms of learning but challenges teachers to be open to unexpected twists

Mrs. Jones and her students learned much more than they had planned on: they learned about watersheds, ecosystems, erosion, and human impacts on the environment. They learned about practical applications for writing, math, technology, and civics. Most importantly, students learned about teamwork and perseverance. They now know they are members of a community larger than their school.

Students felt proud that they did important work, and that adults trusted them to make decisions and do the actual labor. Mrs. Jones was reminded that even very young students can think about, plan, and execute big ideas. Her willingness to trust her experience and instincts and work toward the goal of repairing the gully without all the answers ahead of time paid off with a meaningful educational journey for her, her students, and their community partners.



“You don’t need to know how it’s going to end when you start! Just start.”

—Cammie Jones, Scott Elementary teacher

Third-grade students in Ms. Waterson’s class exhibited learning through a pre and postprogram quiz on gardens

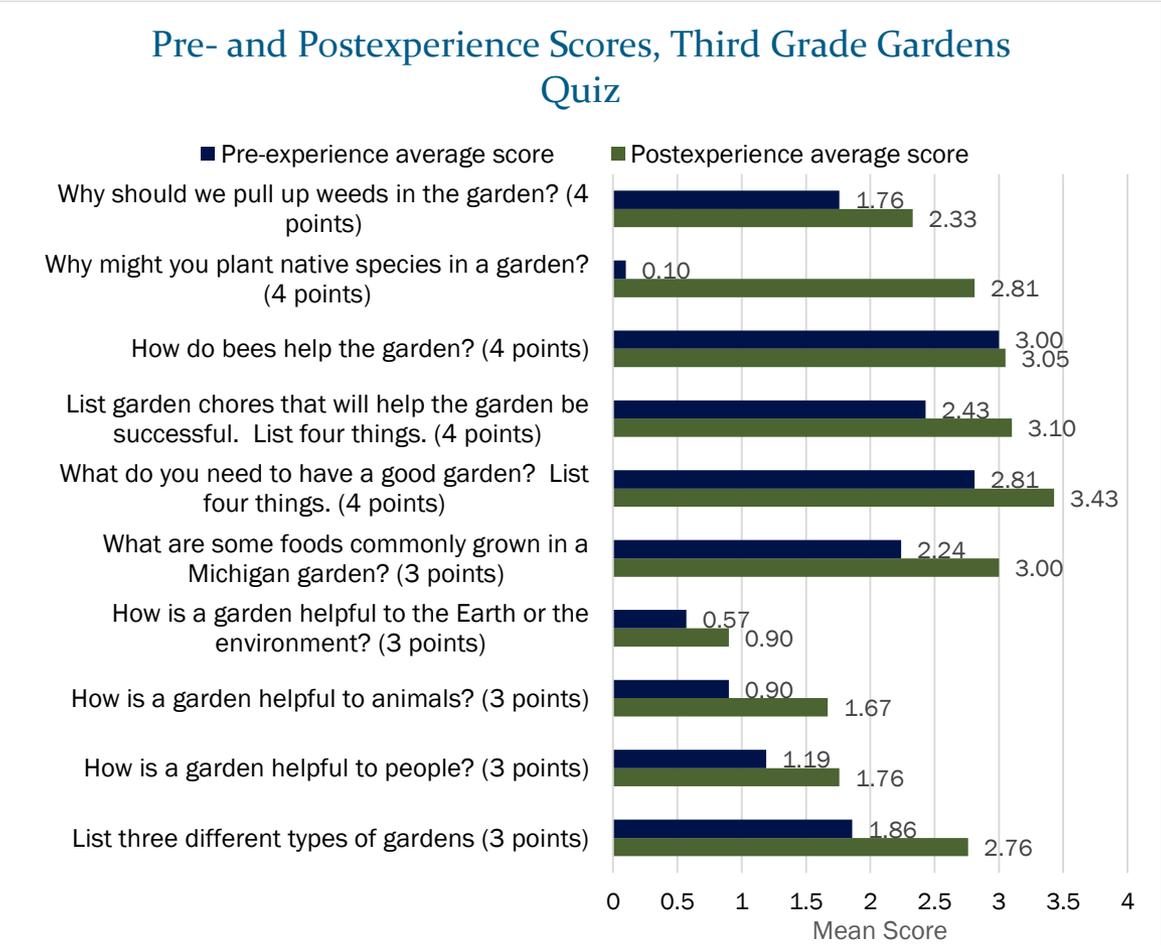
Students improved their scores on each question and showed particularly sharp gains in understanding of native species, types of gardens, and benefits of gardens for people and animals.

The pre- and postquiz for third-grade students who created a butterfly garden had ten open-ended questions. Half had a maximum score of four points and half had a maximum score of three points.

As shown in the graphic at right, third graders exhibited sharp changes in their understanding of native species. Only one student took a reasonable (if incorrect) guess at the meaning of the term on the pre-experience quiz; nearly all students had a solid understanding by the end of the year.

Students’ understanding of the benefits of gardens for animals also expanded. On the pre-experience quiz, “food” was the only common answer, but by the end of the year, several students recognized that a garden can provide habitat for animals as well as shelter and access to prey.

The data shown include only those 20 students who completed both a pre- and a postexperience quiz.



Other PBSE efforts could yield a different set of benefits

There is a lot of freedom within the PBSE framework, and many benefits are possible depending on the direction taken.

BENEFITS OF PLACE-BASED STEWARDSHIP EDUCATION CAN INCLUDE:

STUDENT ACADEMIC GAINS

- Improved academic scores and grades
- Improved critical-thinking skills
- Increased engagement in school and motivation for achievement
- Increased professional skills, such as leadership, persistence, taking responsibility, teamwork, developing plans to reach a solution, managing time, motivating others, and dealing with unexpected challenges
- Deeper learning and action competence
- Increased awareness of career options

POSITIVE YOUTH DEVELOPMENT AND STEWARDSHIP GAINS

- Social-emotional development, including increases in self-esteem, a sense of empowerment and agency, social interaction skills and capital, and awareness of cultural diversity
- Sense of place and community attachment

- Civic-democratic competencies and attributes
- Pro-environmental attitudes
- Environmental sensitivity and awareness
- Responsible environmental behaviors

TEACHER BENEFITS

- Opportunity to pursue their interests and advance their values
- Skill development
- Motivated students

SCHOOL AND DISTRICT BENEFITS

- Teacher engagement and satisfaction
- An integrated option to reach numerous and robust standards and curricular priorities as well as youth development priorities
- Increased awareness from the community of the conditions, needs, and efforts of the schools
- Stronger connections with community-based organizations, parents, and

- individual community members
- Access to grants, funders, and recognition

PARTNER ORGANIZATION BENEFITS

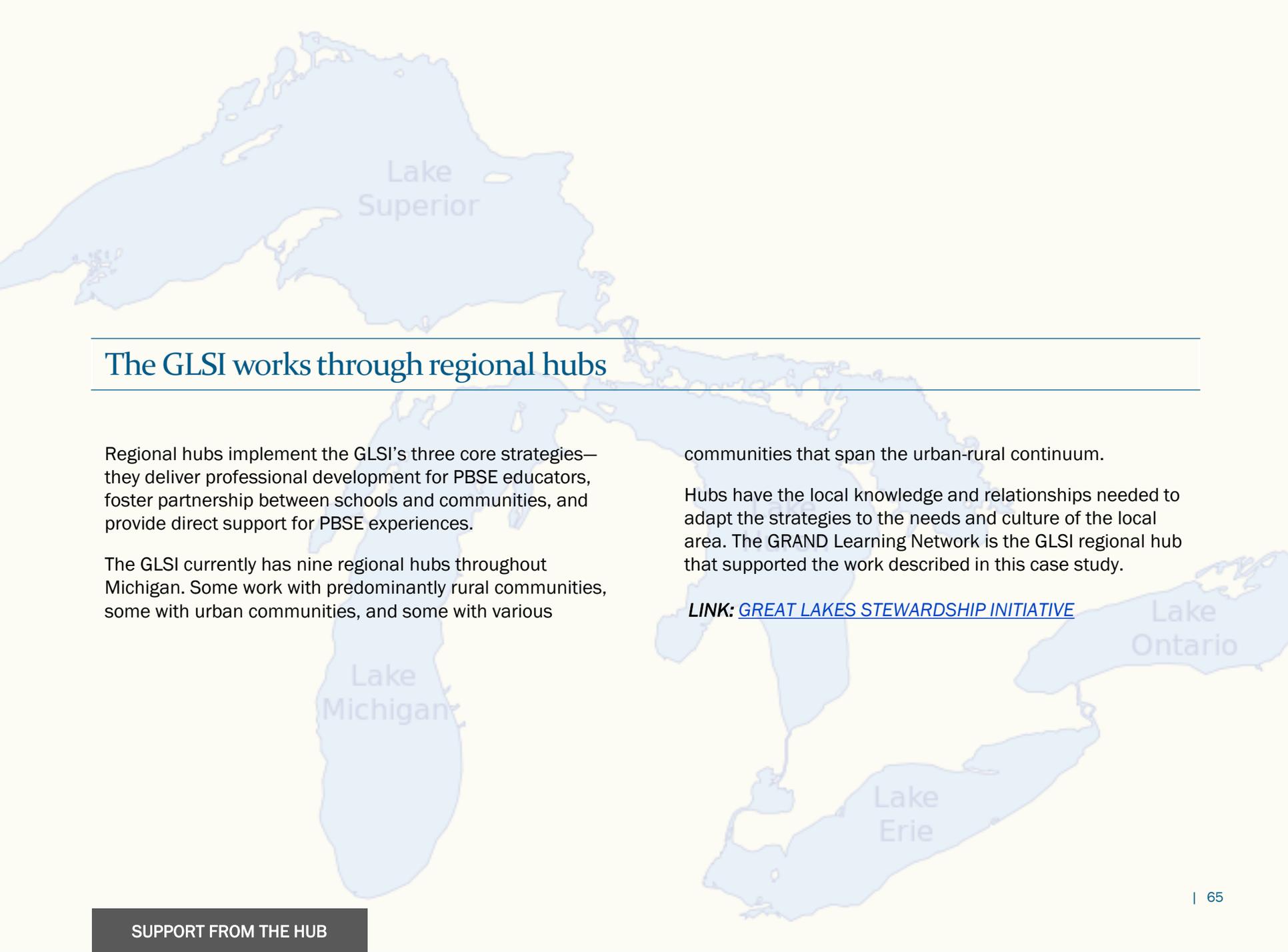
- Engaged youth and schools in their work
- Raised awareness of the mission
- Increased capacity
- Networks with other organizations in the field
- Access to grants, funders, and recognition

LOCAL BENEFITS

- Community revitalization and environmental improvements
- Sense of place
- Social capital and community capacity



Support from the Hub



The GLSI works through regional hubs

Regional hubs implement the GLSI's three core strategies—they deliver professional development for PBSE educators, foster partnership between schools and communities, and provide direct support for PBSE experiences.

The GLSI currently has nine regional hubs throughout Michigan. Some work with predominantly rural communities, some with urban communities, and some with various

communities that span the urban-rural continuum.

Hubs have the local knowledge and relationships needed to adapt the strategies to the needs and culture of the local area. The GRAND Learning Network is the GLSI regional hub that supported the work described in this case study.

LINK: [GREAT LAKES STEWARDSHIP INITIATIVE](#)

Hubs implement three core strategies for stewardship

Each GLSI hub provides a program of sustained professional development, brokers school-community partnerships, and supports place-based education. Their strategies are not inherently tied to environmental stewardship—that theme and content must be infused into each aspect of the work.

The GLSI’s hubs have developed approaches that reflect the environmental character and needs of their respective communities, the interests and goals of their school districts, the strengths of the hub staff and the host organization, and the mix of community organizations engaged in stewardship work with youth.

Every hub shapes their strategies to meet the needs of its people and places.



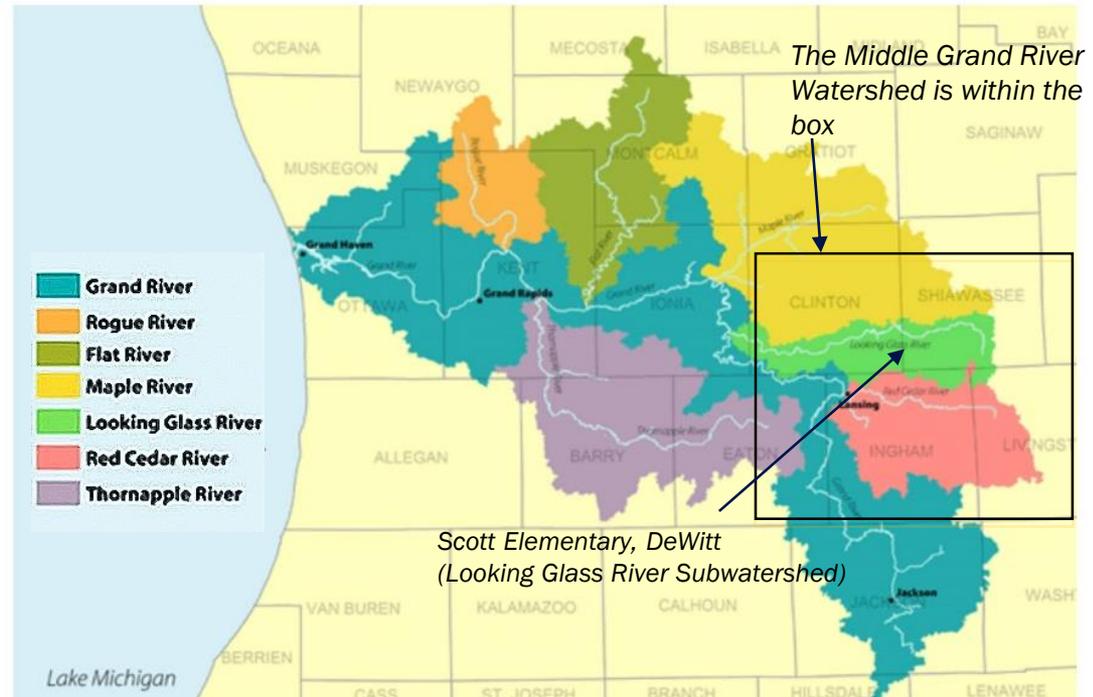
The GRAND Learning Network serves mid-Michigan communities in the Grand River Watershed

The hub has strategic priorities related to pedagogy and content.

The GRAND Learning Network, with visioning by teachers and community partners, is building relationships and improving the watershed. Since 2007, this GLSI hub has partnered with the school districts of Bath, DeWitt, Haslett, Holt, Laingsburg, and Lansing, all of which are located in the Middle Grand River Watershed.

The GRAND Learning Network has focused on:

- The headwaters of the Great Lakes region
- A collection of schools that spans urban, suburban, and rural contexts
- The elementary grades
- Teacher leadership, whereby educators are intentionally recruited and supported as leaders within their grade levels, buildings, districts, and communities
- Reflective practice and community engagement



The Grand River watershed, its subwatersheds, and the GRAND Learning Network's focal area—the Middle Grand River Watershed (in the box).

LINK: [GRAND LEARNING NETWORK](#)

LINK: ["BECOMING A REFLECTIVE TEACHER," AN ARTICLE FROM THE NATIONAL ASSOCIATION FOR THE EDUCATION OF YOUNG CHILDREN](#)

The hub is housed at Michigan State University and operated in partnership with BIG Lesson Programs

At Michigan State University (MSU), the hub has access to faculty in the Department of Community Sustainability and other related academic departments, as well as access to the MSU Extension system. MSU Extension has offices in every county and works to bring the knowledge of the university to bear on opportunities and challenges faced in Michigan communities. It is part of the Cooperative Extension service established in the early 20th century and overseen by the nation's land grant colleges.

The BIG Lesson Programs was established in 1999 by Margaret Holtschlag, Michigan teacher of the year in 1999–2000. BIG Lesson Programs are weeklong immersion experiences in which students and their teachers and parent volunteers learn off-site for a week at the nature center, the zoo, or the history or science museum. Teachers are supported with professional development on immersion and experiential learning, and students engage in service as part of their week in the community.

LINK: [MICHIGAN STATE UNIVERSITY EXTENSION](#)

LINK: [THE BIG LESSON PROGRAMS](#)



MSU Extension districts across Michigan.

The GRAND Learning Network provides sustained professional learning through a variety of events and opportunities

Hub-sponsored professional development focuses on four themes: the Grand River watershed, sense of place, community engagement, and stewardship.

The GRAND Learning Network's professional development offerings include an annual summer institute and experiential learning opportunities featuring such topics as robotics, art, fishing, and canoeing.

From 2007 through 2016, the hub involved 260 teachers in professional development. Those teachers spent more than 7,700 hours in professional learning and reached more than 13,000 students in mid-Michigan.



GRAND Learning Network teachers and hub staff participate in a watershed-themed excursion on Lake Michigan during a summer institute.

Teacher leadership is central to the hub’s professional learning and PBSE strategies

Teacher leaders are developing leadership skills and using them to support other teachers’ PBSE efforts.

The GRAND Learning Network has emphasized teacher leadership since its inception in 2007. Teacher leaders seek to influence their colleagues in the classroom as well as the administrators of their buildings and districts. One of the important benefits of teacher leadership for organizations like the GRAND Learning Network and the GLSI is that teacher leaders can provide continuous, onsite support for the practice of PBSE in school buildings and districts.



GLSI Guiding Principle 3e.1: GLSI PBSE informs school building and district priorities.

LINK: [TEN ROLES FOR TEACHER LEADERS](#)

LINK: [TEACHER LEADERSHIP THAT STRENGTHENS PROFESSIONAL PRACTICE—AN ASCD BOOK](#)

“The term ‘teacher leadership’ refers to that set of skills demonstrated by teachers who continue to teach students but also have an influence that extends beyond their own classrooms to others within their own school and elsewhere. It entails mobilizing and energizing others with the goal of improving the school’s performance of its critical responsibilities related to teaching and learning.”

—Charlotte Danielson, from Teacher Leadership that Strengthens Professional Practice

Teacher leaders meet often to support each other and the hub

When teacher leaders in the GRAND Learning Network meet, they reflect upon their shared learning experiences, discuss and develop strategies to support teachers who are new to PBSE, and help hub staff identify and plan the hub's upcoming offerings in professional development.

In addition, a subset of teacher leaders who are retired from the classroom provides coaching and support to teachers and community partners who work with the GRAND Learning Network.



Teacher leader Jill Tribell demonstrates experiential learning by using the EnviroScape model of a watershed during a foundational professional development session.

The GRAND Learning Network provides small grants to offset PBSE costs

Quality PBSE actively involves collaboration among the students, teachers, and partners who carry out purposeful work to address local stewardship needs or opportunities. The focus of a PBSE effort is determined in part by students who work with community partners and the school to identify learning that will be meaningful to them and work that will benefit the local community, its watershed, and the Great Lakes.

The hub provides modest funding for PBSE efforts. Teachers who have attended professional development supported by the GRAND Learning Network are eligible to apply for grants of up to \$400 per year. These small grants help offset the costs of transportation, materials, equipment, or other expenses related to a PBSE effort. Many teachers receive additional cash or in-kind support for stewardship projects from or through their community partners.



Mid-Michigan students who participate in the GRAND Learning Network proudly show the result of their efforts to remove invasive garlic mustard plants from a local site.

The GRAND Learning Network helps teachers learn to build school-community partnerships

The GRAND Learning Network hub is based at MSU's Department of Community Sustainability with MSU Extension ties. Through these ties, the hub can connect educators like Mrs. Jones to state and local agencies, nonprofit organizations, and businesses interested in community stewardship.

During summer institutes, the hub has fostered connections between its teachers and local drain commissioners, the Michigan Departments of Natural Resources and Environmental Quality, regional "friends" groups (such as Friends of the Looking Glass River), native plant growers, native animal experts, and MSU faculty and outreach specialists. At summer institutes, partners have shared ideas about community assets and about watershed challenges that can be addressed through PBSE.

Mrs. Jones attended more than one professional development program focused on stormwater runoff and the Grand River region in Ingham County. Strategies and partners for alleviating the negative effects of stormwater were highlighted in the professional development. Following this experience, she made connections with her own county's drain commissioner and watershed group.

Mrs. Jones displays the unique way that the GRAND Learning Network hub works to foster school-community partnerships—through building the capacities inherent in teacher leadership, as described in Crowther, Kaagan, Ferguson, and Haan (2002):

- Teacher leaders convey a conviction for a positive world
- Teacher leaders facilitate communities of learning through organization-wide processes.



At events like the Earth Day celebration of the Friends of the Looking Glass River, students, their teachers, and the broader community connect with partners that work on environmental issues.

As teacher leaders build partnerships, the hub staff serve as coaches, listening ears, referral-providers, and “guides on the side,” letting the ownership of the PBSE efforts rest with the partners themselves.

The GRAND Learning Network helped Scott Elementary teachers make connections

The ultimate impact of this hub is strong local engagement to improve watersheds and strengthen sense of place among teachers, learners, and community partners.

Through the GRAND Learning Network's professional development offerings, Mrs. Jones and her fellow teachers learned of community partners who were interested in the region's watersheds, such as the Friends of the Looking Glass River. She contacted them and attended one of their meetings. There she met Jon Morrison who played a key role in the gully project.

After Mrs. Jones, her students, and Mr. Morrison planned their stewardship effort, Mrs. Jones applied on behalf of Scott Elementary School for a grant from the hub to offset some of the associated costs.

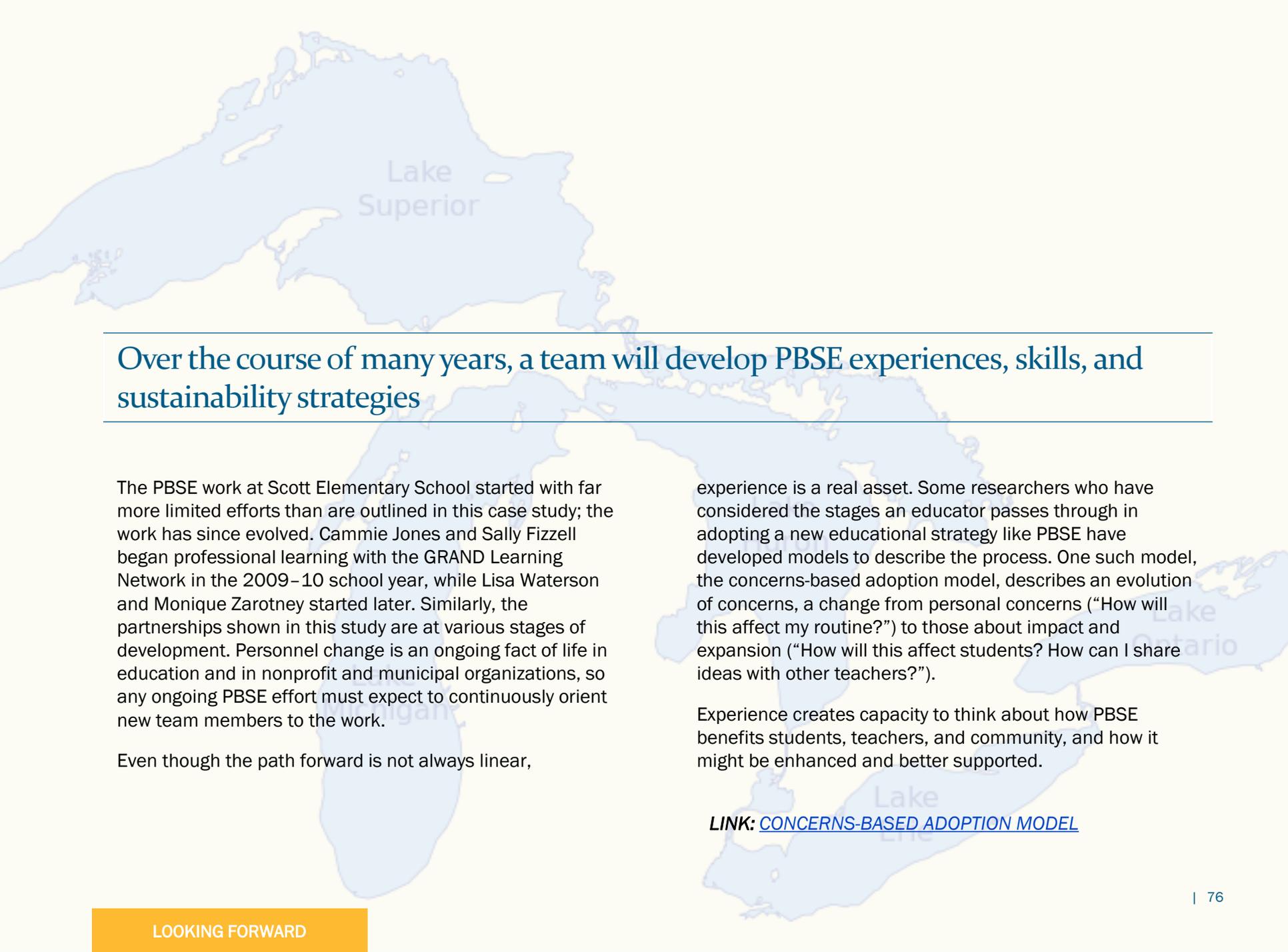
The staff of the GRAND Learning Network served as facilitators, coaches, and helpers to Scott Elementary teachers for more than a year. This sustained support for PBSE from the hub forged a strong relationship between it and the school, which will help ensure the future of PBSE at Scott Elementary.

“My work with the GRAND Learning Network has helped me learn that many people and organizations want to partner with schools, and often all it takes is making a connection.”

—Cammie Jones, Scott Elementary teacher



Looking Forward



Over the course of many years, a team will develop PBSE experiences, skills, and sustainability strategies

The PBSE work at Scott Elementary School started with far more limited efforts than are outlined in this case study; the work has since evolved. Cammie Jones and Sally Fizzell began professional learning with the GRAND Learning Network in the 2009–10 school year, while Lisa Waterson and Monique Zarotney started later. Similarly, the partnerships shown in this study are at various stages of development. Personnel change is an ongoing fact of life in education and in nonprofit and municipal organizations, so any ongoing PBSE effort must expect to continuously orient new team members to the work.

Even though the path forward is not always linear,

experience is a real asset. Some researchers who have considered the stages an educator passes through in adopting a new educational strategy like PBSE have developed models to describe the process. One such model, the concerns-based adoption model, describes an evolution of concerns, a change from personal concerns (“How will this affect my routine?”) to those about impact and expansion (“How will this affect students? How can I share ideas with other teachers?”).

Experience creates capacity to think about how PBSE benefits students, teachers, and community, and how it might be enhanced and better supported.

[LINK: CONCERNS-BASED ADOPTION MODEL](#)

The gully will receive continuing attention

New planning and planting will be done by future fourth graders.

During the summer of 2015, some of the plants students had planted took hold, and many new ones found their way to the gully repair site. The group had achieved the goal of halting the erosion, but the aesthetic nature of this landscape feature still left much to be desired.

The fourth graders of 2015–16 planned the next steps of the project. As third-grade students, they had learned about plants and designed a school butterfly garden; as fourth-grade students, they became the experts as their class considered and worked on improvements to the site. These students were able to establish a good mix of native species with long roots to maintain erosion control, plants to attract butterflies, and plants to attract birds and other pollinators.

PBSE at Scott Elementary will continue to blossom. Students in both grades will identify and consider options for other stewardship projects, both on and off school property, and will expand their stewardship of the county drain. Over time, they will appreciate how their work in one local place can benefit other systems elsewhere.



Students measure the length of the gully and its width at selected locations.

The monarch butterfly garden will also be maintained

Students' work on the butterfly garden and other native plant gardens serves as an example of broadened PBSE at Scott Elementary. Students look forward to creating and maintaining habitat for monarch butterflies and other pollinators, and the spaces and way-stations they have created will serve as powerful demonstration areas where parents and other school visitors can learn about an important stewardship issue and appreciate how they, too, could help address it—either by helping with ongoing efforts at the school or creating similar places near their homes.



PBSE is well established at Scott Elementary and in the DeWitt Public Schools

At all levels within the school, there is much support for continuing PBSE. Students aspire to keep this work alive. They have a sense of ownership and feel proud of their accomplishments. The DeWitt School District seeks and supports the strong connections with community that PBSE fosters.

Dedicated teachers like Mrs. Jones, Ms. Waterson, and Ms. Zarotney are keen to work with students and community partners to do meaningful stewardship work throughout the school year. Mrs. Jones says, “This is why I teach: to make a good day, to make the best school year ever, and to make daily choices with students to get there.”

At Scott Elementary, students ask to be part of maintaining what was started the year before. They have a sense of place and a sense of efficacy. Ongoing support from the GRAND Learning Network and commitment and enthusiasm from teachers and the district will help ensure that future students will have opportunities to not only sustain the good work that has come before, but also expand it in ways that are meaningful to them.



“Scott Elementary has been an exemplary school, since its principal and district have supported sustained PBSE for all students, including this gully project, with significant positive watershed and community impact.”

—Dr. Shari Dann, Michigan State University, Dept. of Community Sustainability and hub cofacilitator



For More Information

Contact us

Teachers

Cammie Jones
Scott Elementary School
jones@dewittschools.net

Lisa Waterson
Scott Elementary School
waterson@dewittschools.net

Partners

Jon Morrison
Clinton County Drain Commission
MorrisonJ@clinton-county.org

Vern Stephens
Designs by Nature
designsbynature@hotmail.com

Hub Staff

Margaret Holtschlag
GRAND Learning Network/BIG
Lesson Programs
biglesson@gmail.com

Mark Stephens
GRAND Learning Network/Dept. Of
Community Sustainability, Michigan
State University
steph143@msu.edu

Shari Dann
GRAND Learning Network/Dept. of
Community Sustainability and MSU
Extension, Michigan State University
sldann@msu.edu

GLSI Staff

Mary Whitmore
GLSI Coordinator
mwhitmore@glft.org

Lisa Marckini-Polk
Evaluation Support
Civic Research Services Inc.
lmарckini@comcast.net

About the Great Lakes Stewardship Initiative

The Great Lakes Stewardship Initiative was launched in 2007 to develop knowledgeable and active stewards of the Great Lakes and their ecosystems.

The GLSI enacts three key strategies (place-based stewardship education, sustained professional development, and school-community partnerships), mainly through the efforts of its nine regional hubs. A small central staff helps coordinate the work and provides technical assistance and support to hubs.

Hubs are funded, in part, by the Great Lakes Fishery Trust, which in 2007 pledged to provide more than \$10 million through 2017 to support the GLSI's work. The GLSI and its hubs solicit and receive additional support from foundations, federal and state agencies, local and regional partners, and individual donors.

From 2007 through the 2014–15 school year, the GLSI has worked with more than 1,500 teachers in more than 280 schools across Michigan, engaged hundreds of community partners, and supported rigorous place-based stewardship experiences for more than 80,000 students—and the work continues.

LINK: [GREAT LAKES STEWARDSHIP INITIATIVE](#)

LINK: [GREAT LAKES FISHERY TRUST](#)



The GLSI's 2014 grant from the U. S. Environmental Protection Agency supported this case study and other knowledge products

In 2014, the U.S. EPA awarded the GLSI a \$150,000 grant through its Environmental Education Grant Program. Through this grant, the GLSI funded a collection of exemplary place-based stewardship projects across Michigan and documented these projects through case studies.

The grant also supported the development of several knowledge products to support the practice and spread of place-based stewardship education in K–12 schools and communities. The first knowledge product is a set of guiding principles that describes the GLSI's vision for place-based stewardship education in K–12 schools and communities. The principles can serve as a compass for practitioners, and also highlight the ways that place-based education connects to important goals and initiatives in education.

The second knowledge product is a rubric that supports the guiding principles. The rubric describes in detail the actions and practices that characterize various developmental stages in place-based stewardship education. It can be used for several important purposes, including a self-assessment of practice.

A third knowledge product is a white paper that focuses on expectations for and the educational, community, and environmental benefits of place-based stewardship education across urban, rural, and suburban contexts.

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[LINK: OTHER EPA KNOWLEDGE PRODUCTS](#)

[LINK: FULL SET OF CASE STUDIES](#)



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With assistance from participating educators, civic leaders, and community partners, the GLSI:

- Helps young people become effective and motivated environmental stewards
- Encourages schools and community organizations to work together for mutual benefit
- Creates a sustained effort across Michigan to expand classrooms, strengthen communities, and improve the environment