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**CIVIC  
RESEARCH  
SERVICES,  
INC.**

EVALUATION REPORT:  
PLACE-BASED STEWARDSHIP EDUCATION AT  
VANDERBILT: A GREAT LAKES FISHERY TRUST  
GRANT

*FOR HURON PINES*

SUBMITTED JUNE 2018

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## OVERVIEW AND INTRODUCTION

Huron Pines’ grant application to the Great Lakes Fishery Trust (GLFT) was entitled, “Woodlands and Waters—Three Tiers of Stakeholder Engagement in the Heart of the Great Lakes.” The 20-month grant was originally scheduled to run from April 1, 2016 through December 31, 2017 and was extended through June 30, 2018. The project proposed to build on Huron Pines’ existing partnership with the Northeast Michigan Great Lakes Stewardship Initiative (NEMIGLSI) to support place-based stewardship education (PBSE) in schools in the interior counties of the hub’s service area. In addition, Huron Pines proposed to engage adult citizens and Michigan leaders in local public events and learning opportunities that would build knowledge and engagement in the work of conservation and environmental protection. Approximately 55% of the grant budget supported school-focused work, while 28% supported work with adult citizens and recreationalists, and 17% supported work with leaders. Through co-hosted events and dissemination of project outcomes, Huron Pines hoped that one grant outcome would be to “link the tiers”—that is, to engage these three target groups with one another and build awareness of how each contributes to local stewardship.

This evaluation has focused exclusively on Huron Pines’ work in schools. As noted in its grant proposal to the GLFT, Huron Pines is positioned to help the NEMIGLSI extend its reach more effectively into the relatively underserved interior counties of its range—counties like Cheboygan, Otsego, or Presque Isle. Since the start of the grant, Huron Pines has targeted this effort to the Vanderbilt Area School. The village of Vanderbilt lies in Otsego County, and its population at the 2010 census was 562. The school district for the community has a single K-12 school. As of fall 2017, enrollment was 80 students, with grade groups ranging in size from 2 to 11 students; enrollment was 122 students in fall 2013. The school was previously designated a “Priority School” (i.e., among the lowest-achieving 5% of Michigan schools as measured by a combination of achievement and student growth) by the State of Michigan, but that designation was lifted in early 2017. The district owns 110 acres of forestland immediately adjacent to the school and hoped to use it as a resource for learning.

Huron Pines also has many ongoing activities that “perfectly complement the proposed community engagement activities” (proposal). For example, the organization has recently removed an important dam, is working to enhance open land for elk habitat in the Pigeon River Country State Forest, is planning an “AmeriCorps Signature Service Effort,” has organized events focused on frogbit and the Kirtland’s warbler, is hosting tours for elected officials and other leaders, and hosts events like a regional BioBlitz or workshops for gardeners. The organization has an eleven-year-old AmeriCorps program that places full-time volunteers at conservation organizations throughout Michigan. In 2017, 30 recent college graduates were placed in 10-month positions, most in northern Michigan.

# EVALUATION APPROACH

## Evaluation Questions

The evaluation explored a four key questions:

1. What have students learned, and how have their stewardship attributes changed because of the PBSE? What feedback do they offer on the experience?
2. How prepared were teachers to field PBSE efforts? What hopes and expectations did they have?
3. What do teachers believe to be the strength and limitations of PBSE work this year, and what do they see as the benefits for students?
4. How did the grant affect the partnership between Huron Pines and the NEMIGLSI?

## Evaluation Methods

The evaluation approach included the following activities and measures:

1. **Teacher-selected pre and post assessments of student learning.** Teachers chose from among concept maps, pre/post quizzes, and K-W-L charts. Vanderbilt teachers chose concept mapping (1<sup>st</sup> grade, 7<sup>th</sup> grade and up) and K-W-L charts (2<sup>nd</sup> and 3<sup>rd</sup> grades).
2. **A pre/post survey (7<sup>th</sup> grade and up).** The pre- and post-experience student surveys were adapted from surveys previously used to evaluate student outcomes for hubs of the Great Lakes Stewardship Initiative, including NEMI GLSI, and were conducted online. Student pre and post responses were matched based on name. Pre-experience surveys with no post-experience match could not be used. Post-experience surveys without a pre-experience match were used in analysis of “post-only” questions, for which no comparison to an earlier date is required. (See Appendix A)
3. **A brief post-only write/draw assignment for younger students,** in lieu of a formal survey. Teachers distributed the worksheet, which asked, “What about our forest stewardship project makes you happy or proud?” Teachers were instructed that they might tell their students to write a response or to draw a picture in response, or teachers could leave it up to each student how to respond.
4. **A teacher focus group** in fall 2017. The focus group explored teachers’ background with Huron Pines and PBSE and their plans for the coming school year. (See Appendix B.)
5. **An end-of-year, integrated teacher survey and interview.** The survey and follow-up interview focused on teacher growth, the nature and value of support they received in the most recent school year, strengths and weaknesses of and plans for PBSE in the future. (See Appendix B)
6. **Interviews with Huron Pines staff and NEMIGLSI staff.** These interviews explored the roles played by each partner over the course of the grant and expectations for the partnership in the future. (See Appendix C.)
7. **A supplemental written question for selected juniors/seniors.** Four high school students who played an active role in designing building the Vanderbilt outdoor classroom were asked

to respond to a written prompt focused on their growth through these experiences in relation to themselves, the forest, and their community.

Four teachers participated meaningfully in the grant activities, including the first-grade teacher, a teacher with both second- and third-grade students, the secondary science teacher, and a K-12 teacher with numerous assignments including art, physical education, technology, and industrial arts.

Because the secondary science teacher reached all secondary students, the K-12 teacher with numerous teaching assignments was not asked to collect most forms of student data. This teacher also did not participate in the teacher focus group in fall 2017. However, as the evaluation team interviewed Huron Pines staff, the team learned that this teacher was central to PBSE efforts at Vanderbilt Area School (VAS), as she taught a small group of high school students who played a critical and substantial role in developing VAS's outdoor classroom. Accordingly, the evaluation team asked this teacher to participate in the end-of-year survey and interview, and further asked that any appropriate students respond to a post-only written prompt in which they could detail the value of their PBSE experiences.

# 2017-18 PBSE ACTIVITIES AT VANDERBILT AREA SCHOOL

An understanding of the PBSE activities pursued at the Vanderbilt Area School (VAS) in 2017-18 sets a context for the evaluation findings that follow. Although there are many grade levels involved in this work, many of the activities were the same across the grade levels but with adjustments made for the different ages. It should be noted that for all grades the weather, particularly the late spring snowstorms, kept students from spending as much time in the forest as the teachers had intended.

All grade levels were able to get into the forest in February by snowshoe using snowshoes supplied by a local land conservancy. Additionally, Emily Vogelgesang from Huron Pines worked with the teachers and students on a BioBlitz and assisted teachers in organizing their activities. The art teacher worked with multiple grade levels on nature related art projects including drawings for an Earth Day paper bag project and Kirtland Warbler's calendar contest.

## *Elementary*

Additional activities at the elementary level included walks in the forest, scavenger hunts (e.g., looking for a purple flower, pine cone, etc.), collecting leaves for a fall themed sun catcher, learning about the Kirtland Warbler, making cast of animal footprints, focusing on a particular tree to see what happened to it from fall to spring, and making short videos of the students for the spring showcase event. K-6 students also did some brainstorming about what to include on the trail signage for the school forest. Teachers tied the stewardship work to other school activities, for example, including a trail race in the forest for field day, and connecting stewardship to the school's family reading night by working with Mark Newman, who has written a book called *Sooper Yooper: Environmental Defender* about caring for Michigan's natural resources.

## *Secondary*

High school students are developing the outdoor classroom, including building and installing benches, hauling and spreading wood chips on the trail, building a dry erase board center with storage for the teachers, and creating signage. Secondary students also have been involved in weekly recycling at the school. They then take the recycling to the township recycling center once a month.

Secondary students also were involved in picking up garbage along the trail, discussions of pollution, conservation and recycling as it related to the forest, and a presentation on forestry and invasive species. One invasive species in the school forest is the Scotch pine. Students tagged these trees and intended to have these removed for Christmas trees; however, the weather this past December did not allow for them to follow through with this plan.

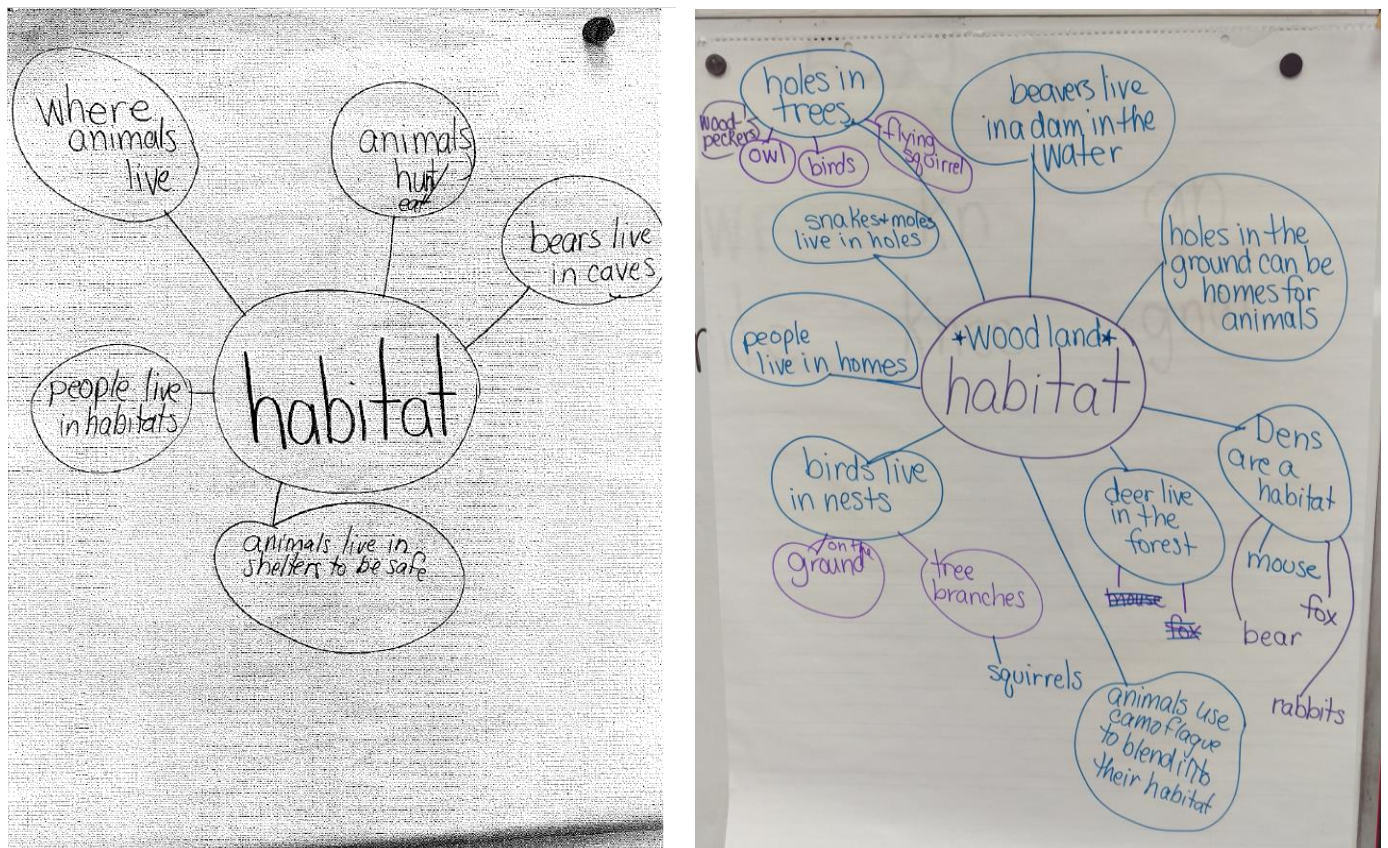
The Michigan Department of Natural Resources (DNR) provides various curricula related to teaching about wildlife in the classroom. Through the DNR students in grades 9-12 were involved in a DNR program called Elk University- Educating Tomorrow's Wildlife Managers. The DNR describes this program as touching on "Michigan history, forest management, elk biology, wildlife disease, and social considerations for wildlife management," as well as learning about how the DNR manages the elk herd in Michigan. Students at VAS learned about food chains, forest habitat, biomes, carrying capacity, predator-prey relationships, nutrient cycles, and succession, and took a field trip to the nearby Pigeon River Forest.

## FINDINGS

### ***Evaluation Question 1: What have students learned, and how have their stewardship attributes changed because of their PBSE experiences?***

#### LEARNING

**First grade.** In 2017-18, there were seven students in the first grade. In fall 2017, as a class and before any substantial instruction on habitats, students created a concept map with their teacher (see Figure 1) in which they articulated anything they felt they knew about habitats and used lines to connect related concepts. In the fall, students could only indicate that animals hunt, eat, and live in shelters, and that people live in habitats, too. The only shelter specified was that bears live in caves.



**Figure 1: The start-of-year (left) and end-of-year (right) concept maps for the first grade**

In spring 2018, the students, as a class, again completed a concept map related to habitats. The students' map indicates an increase in knowledge about habitats, with a particular emphasis on how habitats provide shelter. From the fall to the spring, the number of concepts recorded increased from five to approximately 20. Also, in contrast to the general comments about animals that were given in the fall, spring responses were more specific with comments given about various types of animals and various types of shelters and habitats that are used by these animals. The examples of shelters and the animals that use them provided by the students included:

- ◆ Holes in trees – woodpeckers, owls, birds, flying squirrel
- ◆ Dams – beavers
- ◆ Holes in the ground – snakes and moles
- ◆ Nests (on the ground and in tree branches) – birds and squirrels
- ◆ Dens – mouse, fox, bear, rabbits

**Second and third grade.** In fall 2017, there were nine students in the second and third grades. Over the course of the school year, three of these students left the district, leaving a possibility of six students who could participate in the evaluation both in the fall and in the spring. Their teacher selected a K-W-L worksheet for data collection with this age group. On a K-W-L worksheet, students specify “What I Know,” “What I Want to Know,” and “What I Learned.” In the fall, nine students completed the first two sections about what they knew about the forest and what they wanted to know. In the spring, six students completed the last section of their worksheet, noting what they had learned.

In the fall, students noted items that they know are included in forests such as trees, trails, grass, habitats, and animals, but not with details about any of these topics. Things they wanted to know about the school forest included information about the numbers and kinds of animals, the size of the forest, how the forest was made, how the trail was made, and why it was logged at an earlier time.

What I Know	What I Want to Know	What I Learned
trees has a trail Grass Made Habitats	What kind of animals How was it made How big is the Forest why was it logged	I Learned about habitats animal scat, animal tracks trees, the kind of trees animals, the kind of animals

In the spring, the students wrote about what they had learned. They noted that they learned that the forest is quiet and has “lots of habitats” as well as different kinds of animals, trees and grasses. They learned more specifics about these animals including how to identify different animals’ tracks and scat.

**Seventh grade and up.** Twenty-nine students in the seventh through twelfth grades filled in concept-map worksheets related to their knowledge of forest ecosystems. In the fall they specified their definition of a forest, listed biotic (living organisms) and abiotic factors (non-living things) related to forest ecosystems, and indicated how forests could be useful to humans

and animals. In the spring, they focused on positive and negative human impacts on forests, how forests make them feel, and ways that forests are important. The intention had been to have them address the same topics about forests in both the fall and spring concept maps so that the evaluation team could establish changes over the course of the year in their knowledge of these specific topics. Due to some



misunderstandings between the evaluation team and the teacher, she instead had them focus on other topics that they had been studying in relation to the forest. Although it is not possible to assess change in understanding from pre to post, we can summarize what the students chose to focus on this spring in connection to the forest.

Key points students made about forests include:

- ◆ Students are comfortable in the forest and wrote about various feelings they had in relation to the forest. Common feelings expressed were that the forest makes them feel happy, calm, peaceful, alive, alone, and relaxed. Individual students liked the fresh, pure smell of the forest and watching the “trees blow and sing.” One student noted that the forest “is a need for me.”
- ◆ Students noted that humans have both negative and positive impacts on forests. For example, forests provide important habitats for animals. Humans at times destroy those habitats through deforestation and the introduction of non-native species; humans also play a role in conservation and protection of the forests and animal habitats by keeping trees alive, planting trees, and reducing the demand for products made from trees. Also, humans often litter and leave trash in the forest but humans, including these students, are involved in removing trash and litter.
- ◆ Students listed various benefits and products from forests including paper, food from animals that live in the forest, herbal medicines, lumber, and oxygen.

**Selected middle- and high-school students' comments on forests and human impacts on them**

“Forests give a quiet space for me to think and relax where no one will bother me.”

“We kill animals; we pollute; we cut down trees.”

“Cutting down the trees kills habitats.”

“I love being in out in nature watching the trees blow and sing.”

“We can plant more to help out.”

It appeared that a few students did not take the assignment seriously and offered off-topic observations about the forest, particularly about human impacts on the forest. Although responses were not as complete as had been hoped, it is not unusual when looking at student data to see a few such comments, especially when students are asked to complete these assignments at the end of the school year. It should be noted that even the few who made off-topic comments about human impacts on the forest still indicated that the forest made them feel happy and/or relaxed.

### STEWARDSHIP ATTRIBUTES

**Elementary.** Elementary-aged students participating in the project were too young for standard evaluation surveys. In lieu of surveys, ten students in the first, second, and third grades drew pictures and wrote one sentence about something that made them “happy or proud” about their forest stewardship work. Students chose to draw pictures of the trees and plants in the forest and of students making movies for their showcase event, picking up trash, playing in forts in the forest, and walking or running on the trails. The school used the trails for a running race as part of their field day at the end of the year, which likely led one student to caption her drawing of a running girl with, “I’m going to win.” Other examples of student comments under the drawings included:

- ◆ “I’m happy walking on the trail with my friends.”
- ◆ “We learned about safe things to eat.”
- ◆ “What I like about the school forest is that it has many plants and trees”

Overall, students' pictures communicated enjoyment of the forest, fun memories of activities, and in a few cases, connection to nature.

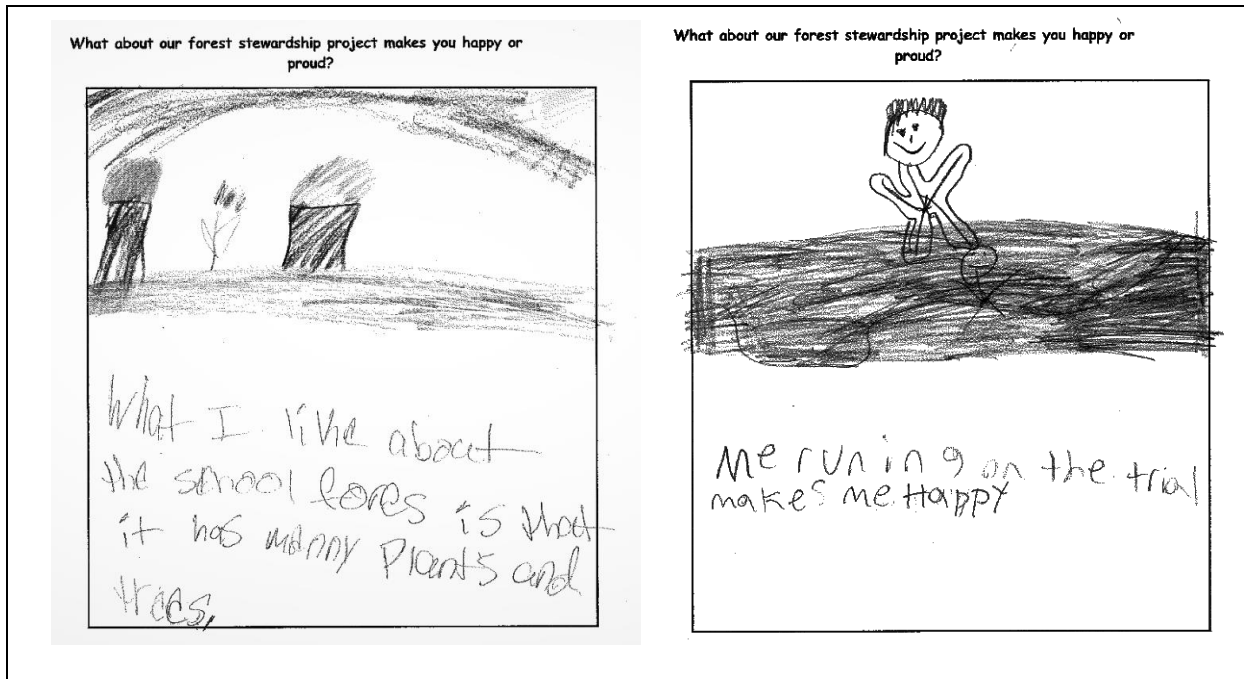


Figure 2: Selected student responses, “What about our forest stewardship project makes you happy or proud?”

**Secondary.** Students in the seventh through twelfth grades took a pre/post survey that measured selected stewardship attributes. The concept of stewardship used in pre/post surveys in this evaluation has been informed by the work of Harold Hungerford, Trudi Volk, Tom Marcinkowski, William McBeth, and other researchers involved in the development of such instruments as the Middle School Environmental Literacy Instrument and the National Environmental Literacy Assessment. Stewardship can include:

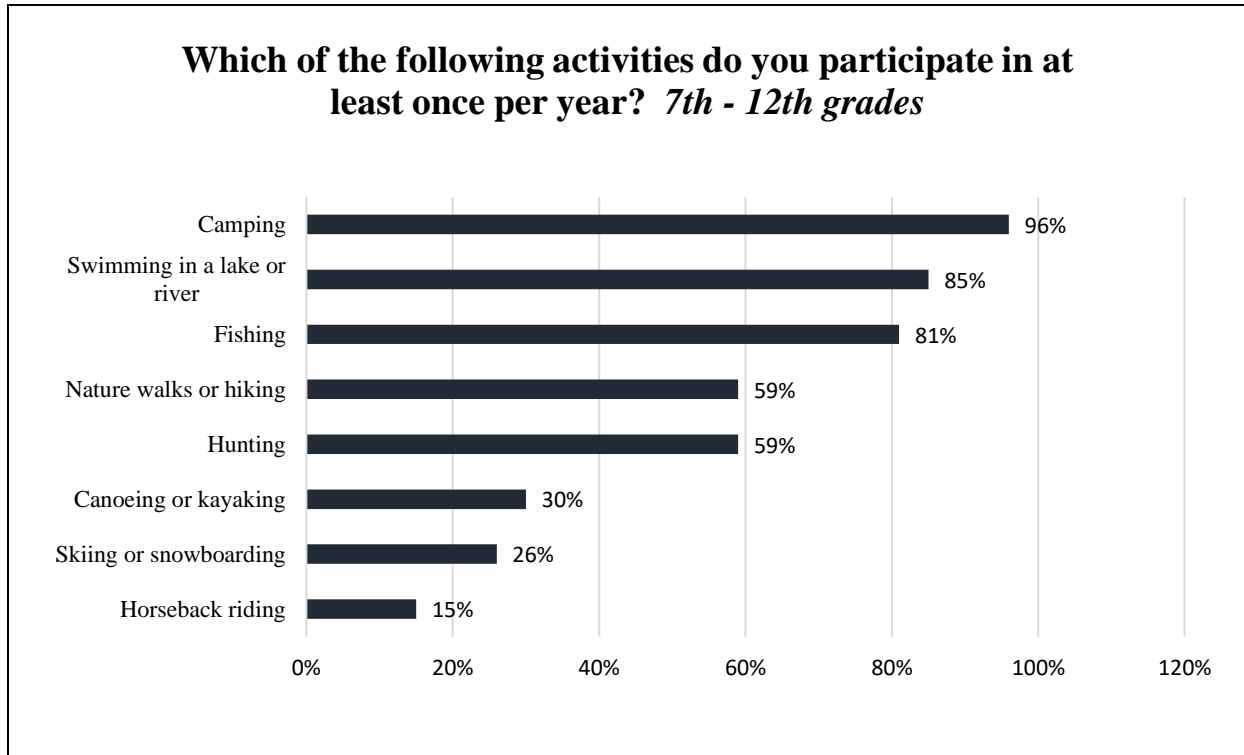
- ◆ Environmental sensitivity, or sense of connection to nature and comfort in natural settings
- ◆ Pro-environmental attitudes
- ◆ Responsible environmental behaviors
- ◆ Capacity for civic action
- ◆ Future behavioral intentions
- ◆ Ecological knowledge

Change was measured using matched pre- and post-experience surveys, using Likert-type survey items<sup>1</sup> that were consolidated into composite scales. Not all possible dimensions of stewardship were included on the surveys. Ecological knowledge was measured through the concept maps and K-W-L worksheets considered earlier in this report.

*Students' baseline environmental attributes.* Some researchers consider participation in outdoor recreation to be a measure of environmental sensitivity. Vanderbilt's secondary students tend to

<sup>1</sup> Likert-type survey items use words to denote the points in a rating scale, such as “agree strongly, agree somewhat, disagree somewhat, disagree strongly” or “very true, mostly true, mostly false, very false.”

participate in a variety of outdoor recreational activities. On the pre-program survey only, they were presented with a set of eight outdoor recreation activities and asked to indicate which activities they participate in at least annually. The average student selected 4.52 of the 8 listed activities.



**Figure 3**

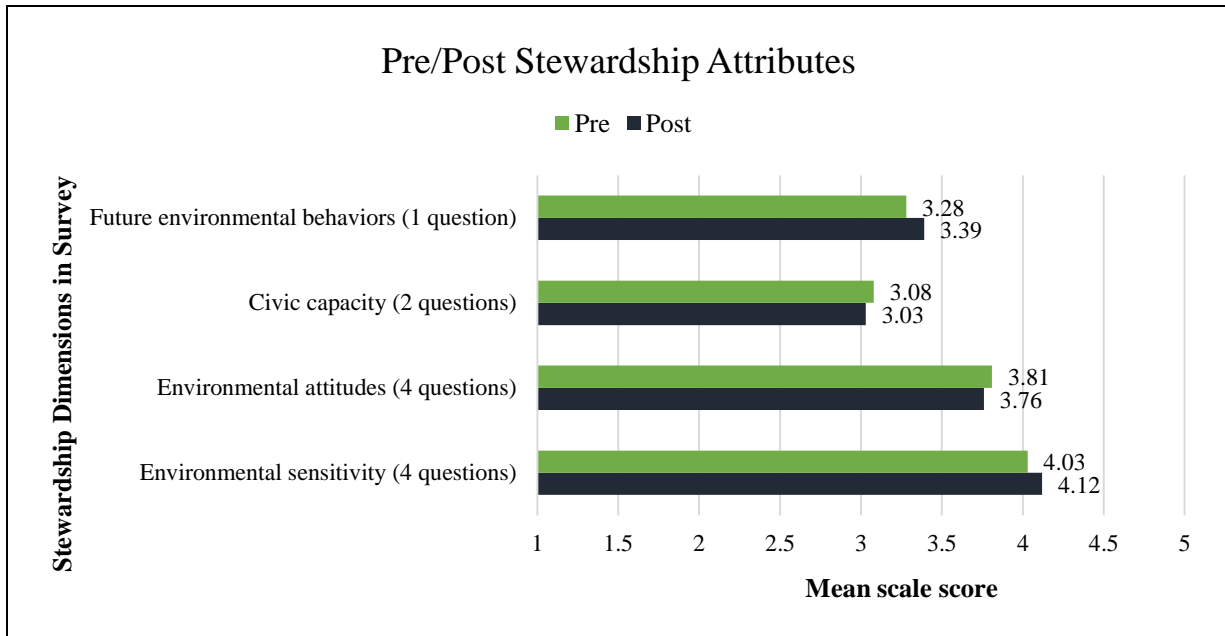
Nine of 27 (33%) students participating in the pre-experience survey indicated that they had “ever volunteered in an effort to protect or improve the environment in your community outside of school, when the volunteering was NOT for a school assignment.” When asked to describe their volunteer activity,

- ◆ Four students talked about volunteering for the school’s summer trail-build day;
- ◆ four students indicated they helped to pick up trash (one said “in the woods,” one said “on the highway,” and one said “trash and bottles/cans with my friends”);
- ◆ one “helped clean a baseball field”;
- ◆ one indicated, “taking pop cans back”; and
- ◆ two had other activities: “I volunteer to plant more trees” and “Community service through 4-H.” Both students also listed other forms of volunteering.

These baseline measures suggest that Vanderbilt students are relatively likely to participate in outdoor recreation, but most are not particularly familiar with volunteer activities focused on the environment. This pattern is very typical of northern Michigan students, with much greater participation in activities like camping, hunting, and fishing than is true of urban and downstate students, and somewhat lesser familiarity with volunteering for the environment.

*Impacts on students.* On the pre- and post-program surveys, students were presented with varied statements related to environmental beliefs or experiences and asked to indicate their agreement or disagreement on a scale of 1 to 5. Where appropriate, questions focused on the same underlying construct were combined into summary scales. Each summary scale also ranges between 1 and 5, and higher scores are associated with more desirable responses, i.e., more environmental sensitivity, more pro-environmental attitudes, more pro-environmental future intentions, or more civic skills. To see the specific survey questions, please consult Appendix A.

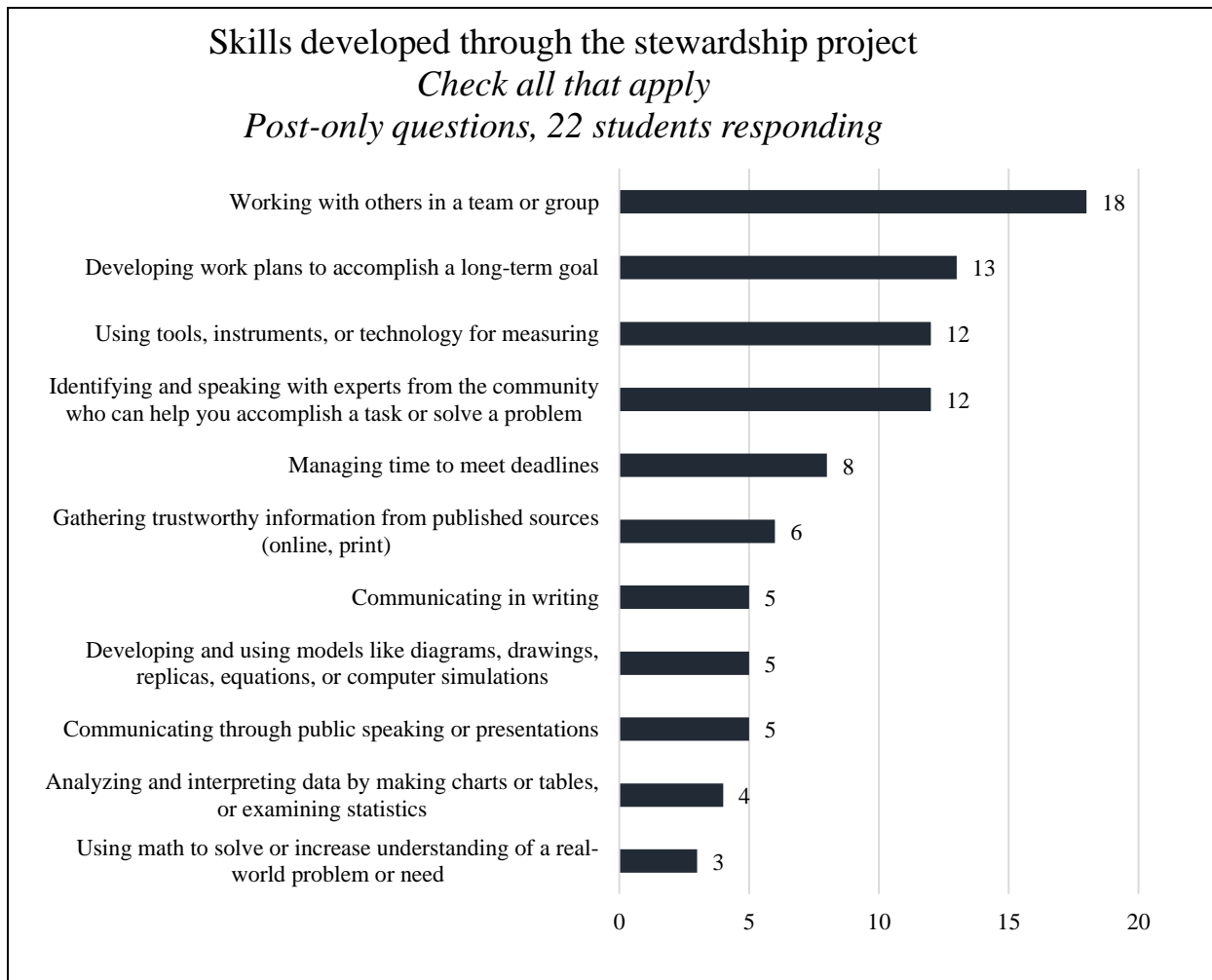
Figure 4 compares pre-program and post-program scale scores for the 18 students that completed both surveys. Results are shown for the constructs of environmental sensitivity, environmental attitudes, civic capacity, and future environmental intentions.



**Figure 4**

As shown in the graphic, two scales showed modest pre-to-post gains and two scales showed modest pre-to-post declines. None of these changes was statistically significant, meaning that the difference between pre- and post-experience scores could be attributable to chance.

In the post-program survey, students were also presented with a list of professional and science-process skills, and they were asked to check all the skills that they felt they had developed through forest stewardship activities. Figure 5 shows the results for all 22 students taking the post-experience survey. The average student checked 4.14 of the 11 skills listed. The most commonly checked skills were working in a team or group (18 of 22, 82%); developing work plans to accomplish a long-term goal (13, 59%); using tools, instruments, or technology for measuring (12, 55%); and identifying and speaking with experts from the community who can help you accomplish a task or solve a problem (12, 55%).



**Figure 5**

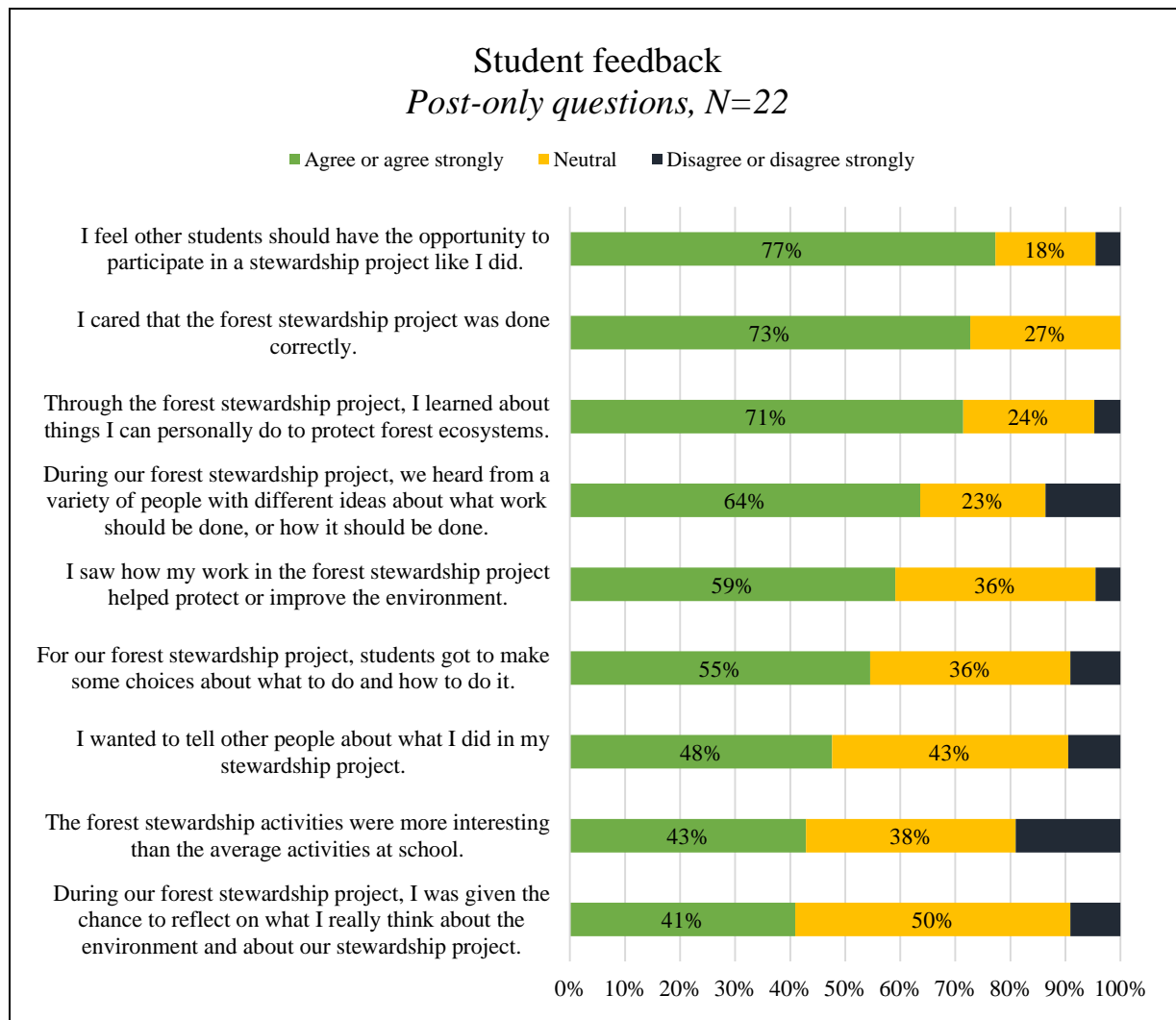
FEEDBACK

**All secondary students.** Findings from a series of agree-disagree questions in the post-program survey on student enjoyment and place-based learning experiences are shown in Figure 6. The questions in this series either focused on whether students enjoyed and would recommend the forest stewardship activities, or on whether specific best practices in place-based stewardship education were present in students’ learning experiences.

In the category of student enjoyment, most students (77%) agreed that they “feel other students should have the opportunity to participate in a stewardship project.” Most also agreed (73%) that they “cared that the forest stewardship project was done correctly.” Just under half (48%) agreed that they wanted to “tell other people about what I did in my stewardship project,” and 43% agreed that the “forest stewardship activities were more interesting than the average experiences at school.” This pattern of responses indicates that many students took some enjoyment from the work, but there is room to expand their engagement.

The remaining questions in this series were focused on specific best practices in place-based stewardship education.

- ◆ Students were likely to “agree” or “agree strongly” that they had “learned about things I can personally do to protect forest ecosystems” (71%).
- ◆ Nearly two-thirds “agreed” or “agreed strongly” that “we heard from a variety of people with different ideas about what work should be done, or how it should be done”—a practice focused on democratic decision-making about environmental use and interventions.
- ◆ Fifty-nine percent “agreed” or “agreed strongly” “with the statement, “I saw how my work in the forest stewardship project helped protect or improve the environment.” This important question speaks to students’ ability to see tangible, meaningful results in the real world that stem from their work—an important motivator in place-based education.
- ◆ Fifty-five percent “agreed” or “agreed strongly” that “students got to make some choices about what to do and how to do it”—a question focused on student voice, also a great practice for increasing engagement.
- ◆ Finally, 41% of students “agreed” or “agreed strongly” that they had a “chance to reflect on what I really think about the environment and about our stewardship project.” Research on the closely related pedagogy of academic service-learning has found that students offered reflection opportunities in the context of academic service-learning exhibit greater academic gains than students not offered such reflection opportunities.



**Figure 6**

**Outdoor classroom developers.** Four high school students who had been heavily involved in developing the outdoor classroom completed a worksheet on which they described the most important thing they learned about themselves, their forest and their community through their stewardship work this year.

Their experiences were clearly of value to them personally (as well as resulting in something of value for the school and community). Important things that students learned about themselves included that they could take a leadership role, confidently use power tools, and work with their classmates (and even enjoy doing so). These gains were noted by their teacher also, who saw students begin to enjoy working together and to like being in school.

“I didn’t think I’d be able to work with the classmates I have.”

“I did not know that I could take on a leadership role. I was not aware of that.”

Students gained information about the history of the forest and how it had developed. Two expressed surprise at the size of the forest and amount of land that the school owns. Students also saw the importance of the work they had done in cleaning up the forest and clearing trails.

“I never knew that our little school could put something this big together.”

Three students noted that they had not known there were so many different organizations in Otsego County so this work was of value in teaching them about the area in which they live. Students also valued their contribution to the community by creating the outdoor classroom for use by the school and the community.

“I had never known how many different organizations we had in Otsego county.”

Even though there were only four students involved in this development of the outdoor classroom, the process clearly had positive impacts on these students in terms of expanding their learning about themselves, the forest, and the community.

***Evaluation Question 2: How prepared were teachers to field PBSE efforts? What hopes and expectations did they have? What support do they need looking forward?***

1. HOPES AND EXPECTATIONS

Three teachers attended the fall focus group, including the secondary science teacher (who was new to the building and district in 2017-18) and two elementary teachers. Vanderbilt’s principal/superintendent sat in on the meeting.

Teachers were asked what they hoped and expected their students to gain from PBSE. They indicated that they hoped to engage students in the care of the forest and community, and to instill and foster within

students a sense of ownership of the forest and community, which might reduce vandalism on the property. Teachers also noted that, in the forest, they could address topics of invasive and native plants and habitats. They felt that students prefer to be outside, and that data gathering in the forest could happen over a period of years, yielding time-phased data sets useful in education.

When asked what they hoped to gain for themselves, the teachers indicated they would like to be more comfortable educating students outdoors and more confident in answering student questions about the forest's ecology. Some wanted more formal training, and some mentioned their desire to teach required content outdoors, so time outside is "more than just a walk in the woods."

## 2. PREPAREDNESS FOR PBSE

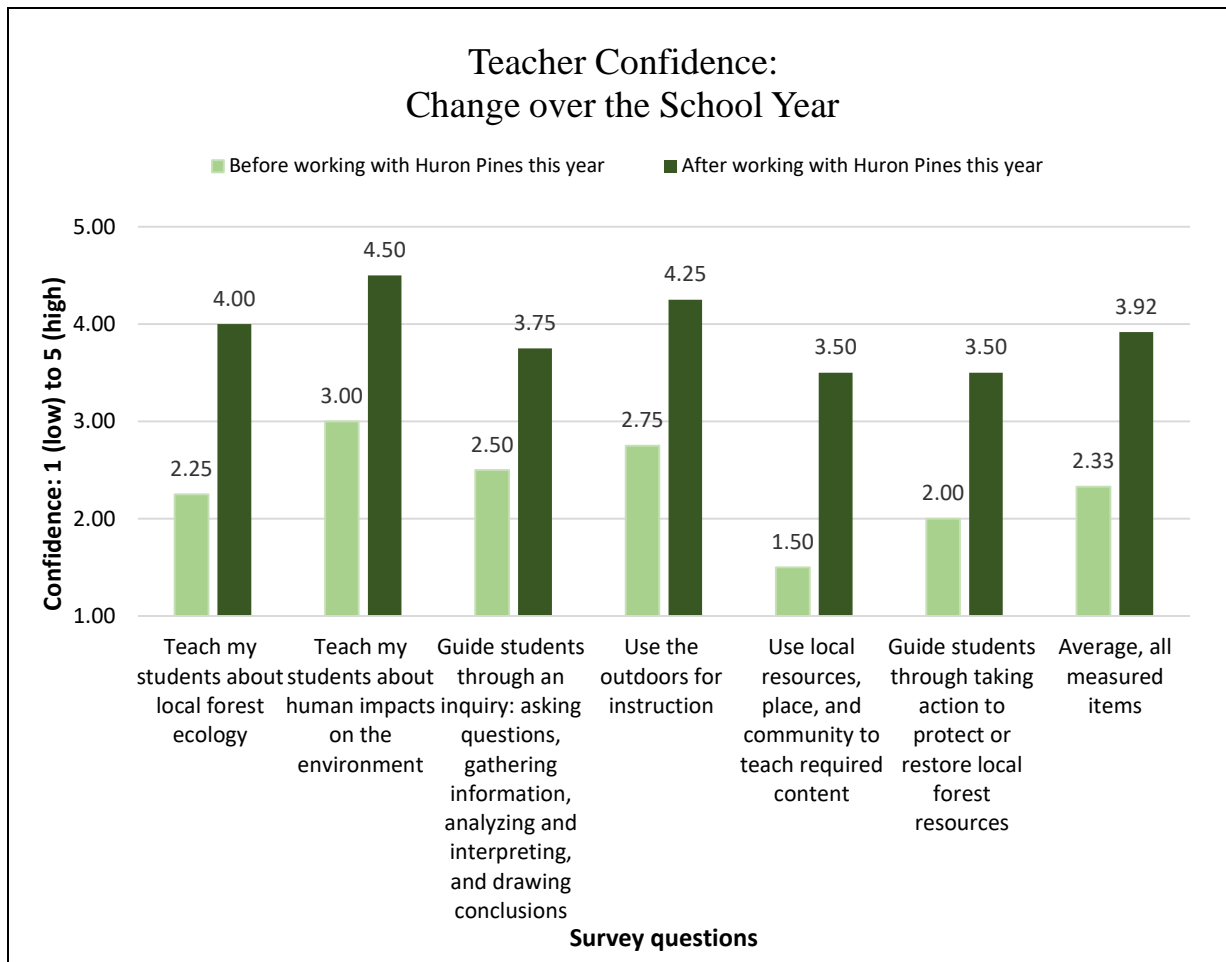
**Fall 2017.** Teacher readiness was an intended topic for the fall focus group. The evaluation team prepared a template for teachers to use to characterize their planned PBSE efforts for the upcoming school year. Huron Pines helped to distribute the form well in advance of the planned meeting. Although the evaluation team had intended to use teachers' written plans to spark discussion in the fall meeting, the teachers had only general plans to create trails and an outdoor classroom; to cover forest stewardship, habitats, and native and invasive plants; and for students to "learn the importance of taking care of the forest and obtain a pride of ownership in the community." The teachers also indicated that they saw 2017-18 as a planning year with full implementation coming in the 2018-19 school year. They indicated they were relying on Emily Vogelsgang at Huron Pines for continuing help with planning and executing on PBSE, including continuing help with grant writing and with making connections to community partners. It was clear that the teachers placed a great deal of trust in Huron Pines and particularly in Emily.

Teachers were also asked what they considered to be the "defining characteristics of place-based education," and none of those present could offer any characteristics. As one noted, "the lack of response is the answer."

**Spring.** In the end-of-year survey, teachers were asked to rate their confidence to carry out a variety of tasks at two points in time: reflecting back to the *beginning of the year* and now, at the *end of the year*. This kind of pre/post comparison is called a retrospective pre/post test and is often used in training situations when respondents may overestimate their baseline knowledge (because they "don't know what they don't know," as the expression goes). Teachers rated their confidence on a scale of 1 ("not at all confident") to 5 ("very confident") on six items. Pre/post comparisons for each item are shown in Figure 7. The final pair of bars shows the average confidence level on all items combined, again comparing self-rated confidence at the beginning of the year to self-rated confidence at the end of the year.

On all items combined, teachers increased their confidence about 1.6 points on the five-point scale—a substantial change. Teachers were most confident, at the end of the year, in their ability to teach students about human impacts on the environment (4.5 average) and to use the outdoors for instruction (4.25 average); teachers were relatively more confident on these items at the beginning of the year as well. Both at the beginning of the year and at the end of the year, teachers were least confident in their ability to use local forest resources, place, and community to teach required content and to guide students through taking action to protect or restore local forest resources. The greatest reported gains came in an area where teachers needed a lot of confidence building: teachers' confidence in their ability to use local resources to teach required content increased by two full points. Teachers also reported strong gains in their ability to teach students about local forest ecology.





**Figure 7**

We looked at individual teachers’ responses to explore whether the increases in average reported confidence shown in Figure 7 were consistent across the teachers. We saw that every teacher reported some increases in confidence, but the magnitudes differed. The smallest reported change was +0.83, and the largest was +2.33. One teacher’s change was +1.00, and the teacher marked every pre/post item pairing as a +1.00.

It is encouraging to see the increases in teacher confidence shown in this survey. However, it is also important to realize that a change in confidence is not the same as an achieved change in skill sets in these areas. Based on the evaluation team’s conversations with these teachers as well as the survey results, it is apparent that additional professional development is needed, as described in the next section.

### 3. FUTURE SUPPORT NEEDS

Two of the four teachers made relatively strong statements to the evaluation team about their needs for more training and education related to pedagogy, environmental content, and using the forest to address required standards (see Appendix D for issues related to Michigan content standards and PBSE). They want to continue doing PBSE but see a need for more training to integrate it into additional content areas. Figure 7, in the previous section, documents these needs for PD in the areas of inquiry-based

investigations, using local resources to teach about required content (and connect to standards), and taking action to protect or restore the environment.

Teachers expressed an interest in continuing to have support from Huron Pines. They particularly noted the importance, especially in this first year, of having Huron Pines staff helping them to organize the work for the year, create a timeline, and identify and make contacts with community partners. Although the teachers are doing more of this, they have found this support to be invaluable to get this work off the ground. They would appreciate some degree of continuing support.

A tangible item that teachers would like is snowshoes. The snowshoes used this year were from an outside organization. The teachers envision more winter forest activities if they had their own equipment.

***Evaluation question 3: What do teachers and staff believe to be the strength and limitations of PBSE work this year? What do they see as the benefits for students?***

The teachers were excited about the work that had been done this year, even though the extent of it was curtailed by the weather. They also appreciated learning about the various resources that were available and the support they received from Huron Pines and NEMIGLSI. The guidance from the staff at Huron Pines and “keeping us on track” was essential to initiate the work. The importance of this type of assistance in getting the work off the ground cannot be overestimated; the evaluation team has heard from teachers doing similar work in other contexts how crucial this initial support can be. Another key aspect of the support from Huron Pines staff was connecting teachers with people and resources related to this work. The Vanderbilt teachers noted that the Huron Pines staff intentionally “pulled back” over time so that this work would be owned by the Vanderbilt teachers and students.

The support from NEMIGLSI came primarily in the form of the fall conference in Gaylord. The three teachers who attended this meeting expressed appreciation for the resources and ideas they gained and the contacts they made with other teachers doing PBSE in the region.

As teachers reflected on the year in the course of individual telephone interviews, they said an important part of this first year was simply getting outdoors. Teachers became more comfortable being outside with their students and learning how much freedom they could give them in this context.

Attending conferences and working with experts from various organizations, such as the DNR, provided the teachers with knowledge and numerous ideas about how to do this work both in the forest and in the classroom (e.g., using egg cartons for specimens). Teachers learned along with the students when experts came to the school.

The spring forestry showcase became a time, not only for students to showcase their work, but for the teachers to publicly acknowledge the students’ work and the community’s involvement as well. Community members were acknowledged, in particular, for their assistance in excavating for the trail, providing woodchips, and hauling woodchips.

There were also challenges to doing the forestry stewardship work this year. These included finding time to go outside in light of the required curriculum that needs to be covered. One teacher has talked with the

school superintendent about including more place-based activities in the science curriculum when they rewrite it.

Other frustrations were the late winter weather with snowstorms continuing into April and the lack of training in certain areas.

**Huron Pines.** Huron Pines staff interviewed for the evaluation were most excited about the progress made by one of the teachers who developed new community partnerships this year, and about a presentation that four Vanderbilt high schoolers made to the Huron Pines organization about their work to develop an outdoor classroom. Staff noted the enthusiasm of these students, their confidence and competence in presenting, and the degree to which these qualities impressed other Huron Pines staff who have not been directly involved in this project.

Staff at Huron Pines hoped that, through this grant, teachers at Vanderbilt would become more independent in planning and organizing place-based education in their school forest, and that the Huron Pines role would evolve from a driver of PBSE to a supporter of PBSE. Huron Pines staff saw clear growth of confidence and independence in at least two or three of the four teachers.

Staff at Huron Pines saw the greatest deficiency in the work this year as the limited success in delivering professional development to the teachers. Three teachers attended the fall NEMIGLSI networking meeting, and the first-grade teacher attended a workshop on facilitating outdoor learning hosted by Kids Outdoor Otsego, a local nonprofit. Huron Pines staff and Vanderbilt teachers discussed additional workshops like Project Learning Tree or Project WILD several times, and NEMIGLSI staff indicated that any network workshops would have been open to the Vanderbilt teachers. However, Huron Pines indicated these options “didn’t work out,” in part due to other training requirements for the Vanderbilt teachers.

#### ***Evaluation question 4: How did the grant affect the partnership between Huron Pines and NEMIGLSI?***

Both Huron Pines staff and NEMIGLSI staff expressed strong satisfaction with way their partnership has developed over the course of this grant.

In separate interviews, each group described how Huron Pines had become a member of NEMIGLSI’s leadership and administrative teams. NEMIGLSI is organized as a community coalition, with key members including Michigan Sea Grant, NOAA’s Thunder Bay National Marine Sanctuary, US Fish & Wildlife Services, the two intermediate school districts in its service area, and now, Huron Pines. Each leadership organization contributes skills and resources to the NEMIGLSI effort. Each organization’s mission emphasizes local environmental stewardship, local education, or both, making NEMIGLSI a highly mission-relevant effort to support.

Learning has occurred for both Huron Pines and NEMIGLSI. The NEMIGLSI staff person interviewed for the evaluation described changes in Emily Vogelsgang, the day-to-day lead staff on the grant at Huron Pines: “She more deeply understands place-based education and our goals, she’s done a lot of critical thinking, and I don’t know for sure, but I think she’s had many conversations at Huron Pines to help others there develop their understanding.” In turn, Huron Pines staff indicated that the grant helped give them “a better understanding of what it means to meaningfully engage with a school to do place-based education” and “a huge shift in recognizing what students can do.” The learning can be used and built on as Huron Pines works to support other schools in the future. Huron Pines also developed a more nuanced

appreciation of some of the ways conservation work can impact education—for example, how conservation easements negatively affect school funding.

Huron Pines has not only learned about the general tasks and dynamics of supporting a school’s entry into place-based learning but has also developed specific expertise around place-based education in school forests. This expertise has positioned the organization to partner with staff at the Michigan Department of Natural Resources who are working on an extension to the popular Project Learning Tree curriculum, an extension focused on school forests. In addition, Huron Pines’ expertise is benefiting NEMIGLSI schools and districts that have school forests but are not always sure how to use them in education. Thinking beyond school-owned forests, northeast Michigan is home to Pigeon River Country, an extensive forest resource with great potential for teaching and learning and many potential partners to draw on.

For NEMIGLSI, having Huron Pines on board allows the coalition to reach school districts that would otherwise go unserved. NEMIGLSI staff noted, “Early on, Vanderbilt was somewhat interested but we didn’t have capacity to take it further or circle back around. With Huron Pines, we had opportunity to reengage.” NEMIGLSI went on to note that, with the support and effort of Huron Pines, this past year the network expanded its traditional networking meetings from two to three, adding a fall meeting in the inland regions—accessible to communities like Vanderbilt, Inland Lakes, Onaway, Gaylord, and Wolverine that have historically been difficult for NEMIGLSI to serve. Having a networking meeting in an inland location expanded participation: “We may have had a lead teacher [in the past], but these meetings brought out more teachers. And, places like Alpena and Alcona sent different teachers to the inland meeting than had turned out previously.” NEMIGLSI stressed the importance of Huron Pines being “on these schools’ doorsteps” for providing quality support.

# CONCLUSIONS

Conclusions of the evaluation are presented below in association with the key evaluation questions.

***Evaluation Question #1: What have students learned, and how have their stewardship attributes changed because of their PBSE experiences? What feedback do they offer on the experience?***

- 1.1 Elementary students increased their knowledge of how different animals shelter in a northern Michigan forest habitat, and they learned more specific information about those animals such as how to identify different animals' tracks and scat.
- 1.2 Elementary students enjoyed spending time in the forest and caring for the forest.
- 1.3 Secondary students exhibited knowledge of both positive and negative human impacts on forests and also about the importance of forests in providing various products for human use (e.g., paper, food from animals that live in the forest, herbal medicines, lumber, and oxygen).
- 1.4 Secondary students expressed comfort with the forest and positive feelings from being in the forest. Common feelings expressed are that the forest makes them feel happy, calm, peaceful, alive, alone, and relaxed. Even students who did not respond to prompts about what they learned did comment on their positive feelings about the forest.
- 1.5 Even though there were only four students heavily involved in development of the outdoor classroom, the process clearly had positive impacts on these students in terms of expanding their learning about themselves, the forest, and the community.
- 1.6 Secondary students completing a pre/post survey did not exhibit change in the stewardship attributes of environmental sensitivity, environmental attitudes, civic capacity, or future intentions for responsible environmental behaviors.
- 1.7 Secondary students completing the post-program survey indicated, on average, that they enhanced four of a set of eleven possible skills through their PBSE experiences, with the most common choices relating to working in teams, using tools or instruments for measurement, identifying and meeting with community experts who could help with a problem, and developing work plans to meet a long-term goal.
- 1.8 Feedback from middle- and high-school students indicated some level of enjoyment of forest-based activities and room to further develop their engagement.

***Evaluation Question #2: How prepared were teachers to field PBSE efforts? What hopes and expectations did they have? What support do they need looking forward?***

- 2.1 Teachers at Vanderbilt considered themselves novices in PBSE at the beginning of the year, without real understanding of the distinguishing characteristics of place-based education. They were both excited about the possible benefits to them and their students and wary of how it might work out in practice.

- 2.2 As the year progressed teachers gained increased understanding of PBSE and, as they worked outdoors, they also gained confidence in outdoor teaching. The spring teacher survey showed increases in confidence for all four teachers, some greater than others. However, teachers are still not overly confident regarding several elements of PBSE.
- 2.3 Looking forward, teachers have expressed a need for more training in pedagogy and content, and challenges in connecting PBSE work to instructional standards are apparent. Teachers are also hopeful for continuing support from Huron Pines and are beginning to consider equipment needs, such as snowshoes.

***Evaluation Question #3: What do teachers and staff believe to be the strength and limitations of PBSE work this year? What do they see as the benefits for students?***

- 3.1 Some strengths of the PBSE work included increasing student comfort with being in the forest and with learning in the forest, as well as increasing teacher comfort with these same things. One teacher made positive strides in developing her own community partnerships.
- 3.2 Limiting external factors this year included the weather and new, more stringent regulation by the Michigan Department of Education related to third-grade achievement in reading. Students did get into the forest on snowshoes once during the winter, but this equipment is not owned by the school and was only available on this one occasion.
- 3.3 Insufficient training and experience in connecting educational standards and lessons to the PBSE effort was seen as a limiting factor by teachers. Staff at Huron Pines also noted professional development as a challenge this past year, with a less-than-optimal set of local opportunities for teachers and, at the same time, challenges for teachers to participate in school-day opportunities.
- 3.4 Benefits to all the students included the opportunity to be outdoors and to learn and work together in the forest. The high school students who worked on the development of the outdoor classroom also indicated that they developed leadership and other skills and were able to do something that benefited the school and community. Some also noted an increased enjoyment of being in school.

***Evaluation Question #4: How did the grant affect the partnership between Huron Pines and NEMIGLSI?***

- 4.1 Both Huron Pines staff and NEMIGLSI staff expressed strong satisfaction with the way their partnership has evolved and deepened over the course of this grant.
- 4.2 Learning has occurred for both Huron Pines and NEMIGLSI. Huron Pines staff indicated that the grant helped give them “a better understanding of what it means to meaningfully engage with a school to do place-based education” and “a huge shift in recognizing what students can do.”
- 4.3 Huron Pines also has developed specific expertise around place-based education in school forests. This expertise is benefiting NEMIGLSI schools and districts that have school forests but have struggled to use them educationally.
- 4.4 Having Huron Pines as part of the NEMIGLSI coalition allows the coalition to reach inland school districts that otherwise might not be served by the coalition.

## RECOMMENDATIONS

Place-based stewardship education at Vanderbilt Area School is still in an early phase of development. The following recommendations suggest options and strategies for continuing the positive development achieved in 2017-18.

1. ***Build on teachers' foundation of understanding with specific and targeted professional development tied to their learning needs.*** All teachers need to have professional development that is tied to their specific learning needs with an awareness of their existing knowledge and comfort in teaching in an outdoor setting.
  - a. All of the VAS teachers need additional professional development about how to tie their PBSE work to the content standards that need to be addressed for their grade level. Such PD would cover inquiry-based investigations in the forest environment—a teaching and learning priority at every grade level—and offer ongoing opportunities to gain content knowledge about northern Michigan ecosystems. The need to crosswalk to content standards is present at every grade level but typically becomes of increasing concern at the secondary level. See Appendix D for additional information related to content standards.
  - b. Such PD should also provide teachers with planning tools that help them identify where and how they can use PBSE to address learning goals drawn from state and local curricular priorities in science, social studies, language arts, math, technology, and the arts. Planning tools should also help teachers identify “big questions” or “essential questions” that provide focus for their PBSE efforts. Backward design may be a helpful approach for their planning; see <https://cft.vanderbilt.edu/guides-sub-pages/understanding-by-design/> for an introduction and guide.
  - c. Given the challenges for teachers in rural northeast Michigan to participate in face-to-face professional learning with local peers, Huron Pines and NEMIGLSI may need to consider alternatives including written tools and templates that they (as the hub) develop and share; Web-based/remote participation in PD for northeast Michigan teachers; teacher-led book groups; review of model projects and case studies; and other options that reduce reliance on face-to-face meetings that entail significant travel. This issue is very challenging for many who work with teachers in rural settings.
  
2. ***Increase Huron Pines staff members' understanding of various views of place-based education pedagogy and of standards-based educational policy and practice and consider how this expanding knowledge can be embedded in the Huron Pines organization.*** Huron Pines staff noted, in an interview with the team, that this year's work helped staff develop a deeper understanding of the pressures within schools. This is a wonderful start and the effort to see things from schools' and teachers' perspectives should continue in a way that ensures continuity of learning and organizational knowledge at Huron Pines; we suggest that two fruitful areas of inquiry to pursue next could be a) expectations teachers face related to integrating standards, and tools that help them do so, and b) principles and practices for advanced PBSE, so that Huron Pines will be ready to help VAS teachers reach the next level. The GLSI's Guiding Principles for Exemplary Place-based Education, and the accompanying rubric, provide guidance on PBSE and its implementation in schools (this evaluation team played a significant authorship role in these products) and could be one source considered (see these tools on the GLSI Web site: <https://greatlakesstewardship.org/guiding-principles-of-place-based-stewardship-education/>).

3. ***Support teachers in ways that help them to increase student voice in PBSE.*** The VAS teachers and students have been developing an outdoor classroom in the school forest. It is not clear what students might wish to do in the outdoor classroom or to explore in the forest, or what goals they might set if given the chance to participate in the selection of environmental topics and of service activities. For example, would they like some type of recreational facility in the community that would focus on the forest? Or are their other environmental issues that students would like to address in their community? Student voice is one of the most powerful tools available to teachers to increase student engagement in place-based environmental learning. A focus on student voice can also help us recognize opportunities to address standards and build skills beyond science, as when students author opinion papers on a potential direction, research and develop credible evidence on the viability of a desired project, work in groups to develop concepts, and come to a group decision with their teachers and community partners. Appropriate PD for teachers is necessary if they are to develop skills for honoring and cultivating student voice, and this is a practice that can start in small ways and grow with increasing teacher confidence. For a useful blog entry defining and describing student voice, see the Edutopia Web site here: <https://www.edutopia.org/blog/sammamish-2-including-student-voice-bill-palmer>.
4. ***Include additional activities that focus on creating benefits for the school and the community.*** In addition to student voice, one of the best-documented ways of increasing student learning through place-based education is to ensure that students deliver real and tangible benefits to the environment and community—benefits that go beyond them and their learning process and that are not token “benefits,” but of honest worth to others. A handful of secondary students who were intensely involved in developing the outdoor classroom model the point: these students developed an increased understanding of their community and its resources and were highly motivated by the knowledge that they were creating something that would be valued and respected by others in their school and community. To strengthen the PBSE work at VAS, it is important to consider activities that will reach beyond the students and their learning process to benefit others in the community, including the natural world.
5. ***Give students an authentic audience for their ideas and work.*** Students shared their work with parents and community members through videos and at the May 2018 showcase event. Such efforts provide opportunities for students to strengthen their technology and public speaking skills. “Authentic” audiences are those who will appraise students’ work by community standards...for example, those who know and can advise on whether the trail will last, whether the signage is appropriately placed and covers appropriate content, and whether the structures for the outdoor classroom are stable. Engagement with community partners who can advise students and cheer their successes is an important method to offer students authentic audiences. Developing such partnerships, and continuing outreach to the community through showcases and other public presentations, can help make the work real for students and provide important validation that their ideas have worth to adult audiences.
6. ***Explore opportunities for cross-grade work.*** As VAS has a small number of students, there are opportunities for cross-grade level work in which students can share their learning with one another and teachers can co-plan and support one another. Cross-grade collaboration can increase student engagement and teams of teachers are better able to navigate a new pedagogy like PBSE than are teachers working alone.



7. ***Build on the strengths of Huron Pines and NEMIGLSI to continue to benefit this coalition.***

The partnership between Huron Pines and NEMIGLSI is mutually beneficial, as NEMIGLSI has more experience in implementing PBSE overall and Huron Pines is developing expertise related to school forests and also has connections to, and the right location to serve, inland schools. Continuing to build on the strengths of both partners can lead to stronger work in all currently involved schools as well as expansion into more inland schools. Continuing the engagement of Huron Pines in the NEMIGLSI leadership and administrative teams seems tailor-made to supporting quality communication in the partnership.

# APPENDIX A: POST-EXPERIENCE STEWARDSHIP SURVEY FOR SECONDARY STUDENTS

## \* Required Information

### Post-Experience Survey for Vanderbilt Students

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page 1

Dear student,

This survey is about your feelings about the environment, your community, and school. It matches a survey taken by Vanderbilt students in the fall. Your responses are confidential: your name will be kept separate from your answers to the questions. Your name is used only to match what you have to say now with what you said earlier in the school year. Even if you didn't take the survey in the fall, your responses to this survey will be helpful. Please know that your teacher will see results for the full group only. Nothing you say can affect your grades. Thank you, in advance, for the time you will spend on the survey. If you have any questions about this survey, please contact Lisa Marckini-Polk, Civic Research Services, Inc., at 24eight.75two.0471. When you are ready to begin, please click "next" or >.

### Post-Experience Survey for Vanderbilt Students

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page 2

This page asks for some information about you. We will use this information to connect what you have to say now with what you had to say in the fall. Please provide the information even if you did not take the survey in the fall.

\* 1. Your name (first and last):

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\* 2. Your teacher's name:

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**\* 3. What grade are you in this year?** (Select one option)

- 6
- 7
- 8
- 9
- 10
- 11
- 12
- Other grade (please enter the grade) \_\_\_\_\_

**Post-Experience Survey for Vanderbilt Students**

page 3

How much do you agree or disagree?

**4. Please answer all of the questions.**

	<b>Disagree very much (1)</b>	<b>Disagree (2)</b>	<b>Not certain (3)</b>	<b>Agree (4)</b>	<b>Agree very much (5)</b>
(a) Humans have the right to modify the natural environment to suit their needs. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) I would enjoy a career in science that focuses on environmental issues. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) The balance of nature is very delicate and easily upset. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) We must take stronger measures to conserve our nation's resources. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) By working with others in the community I can help make things better. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) In the future, I would be willing to work with others to solve an environmental problem in the community where I live. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

How much do you agree or disagree?

**5. Please answer all of the questions.**

	<b>Disagree very much (1)</b>	<b>Disagree (2)</b>	<b>Not certain (3)</b>	<b>Agree (4)</b>	<b>Agree very much (5)</b>
(a) I know how to talk to other people about environmental issues in our community and the things we should do to solve those problems. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) I know how to gather information about an environmental problem in my community. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) I really enjoy nature. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) I like to watch what birds, wildlife, and insects do outside. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) I visit parks, playgrounds, empty lots, forests, creeks, ponds or other natural areas by myself, or with people my own age. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) People should be able to cut down trees whenever they want to. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(g) I like places where there are lots of different plants and trees. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Post-Experience Survey for Vanderbilt Students**

page 4

**The following questions ask about your "forest stewardship project" or "forest stewardship work" or "activities." By "forest stewardship project, work, or activities," we mean whatever you, your teacher, and your classmates did in this class to protect or improve the local forest and environment. If you are not sure which school activities were part of your forest stewardship project, ask your teacher before answering these questions.**

**6. Did your forest stewardship work this school year help you develop any of the following skills? Please check all that apply.**

- Working with others in a team or group
- Developing work plans to accomplish a long-term goal
- Managing time to meet deadlines
- Communicating through public speaking or presentations
- Communicating in writing
- Gathering trustworthy information from published sources (online, print)
- Using tools, instruments, or technology for measuring
- Analyzing and interpreting data by making charts or tables, or examining statistics
- Developing and using models like diagrams, drawings, replicas, equations, or computer simulations
- Using math to solve or increase understanding of a real-world problem or need
- Identifying and speaking with experts from the community who can help you accomplish a task or solve a problem

How much do you agree or disagree? For each sentence, select only the one answer that best matches your answer. Please do not leave any blanks.

**7. Please select only the one answer that best matches your answer.**

	<b>Disagree very much (1)</b>	<b>Disagree (2)</b>	<b>Not certain (3)</b>	<b>Agree (4)</b>	<b>Agree very much (5)</b>
(a) I feel other students should have the opportunity to participate in a stewardship project like I did. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) I cared that the forest stewardship project was done correctly. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) I wanted to tell other people about what I did in my stewardship project. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) The forest stewardship activities were more interesting than the average activities at school. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) I saw how my work in the forest stewardship project helped protect or improve the environment. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

(f) For our forest stewardship project, students got to make some choices about what to do and how to do it. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(g) During our forest stewardship project, I was given the chance to reflect on what I really think about the environment and about our stewardship project. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(h) During our forest stewardship project, we heard from a variety of people with different ideas about what work should be done, or how it should be done. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(i) Through the forest stewardship project, I learned about things I can personally do to protect forest ecosystems. (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Post-Experience Survey for Vanderbilt Students**

\_\_\_\_\_

**page 5**

**8. How have your feelings about being a steward of the environment in your community changed, if at all, because of your work on the forest stewardship project?**

\_\_\_\_\_

\_\_\_\_\_

**9. Do you have suggestions to make the forest stewardship project more interesting or useful for students like you?**

\_\_\_\_\_

\_\_\_\_\_

# APPENDIX B: TEACHER FOCUS GROUP, SURVEY, AND INTERVIEW PROTOCOL

## Fall Focus Group

### INTRODUCTIONS

1. Please introduce yourself. In addition to your name, please tell us the grade(s) and subject(s) you teach and the length of time you've been teaching in this district.

### PBE BENEFITS AND CHARACTERISTICS

2. What do you hope to gain for your students from involvement in this work? *We will refer to your planning template for this discussion and explore how your goals translate across the grade levels.*
3. What do you hope to gain for yourself from your participation?
4. What is your understanding of the distinguishing characteristics of PBE?
5. Prior to this project, what has been your experience in implementing PBE in your teaching, if any? *Including: What was the extent and nature of your involvement in this PBE work in the 2016-17 school year?*

### SUPPORT RECEIVED AND/OR NEEDED TO IMPLEMENT PBE

6. What PD or other training have you participated in regarding PBE, whether through Huron Pines, the Northeast Michigan Great Lakes Stewardship Initiative, your ISD or ESA, conferences, or other sources?
7. What additional PD related to PBE would you find useful this year?
8. What plans do you have, if any, to participate in any PD related to PBE outside of your involvement with Huron Pines?
9. Thank you for completing the planning template. We have a couple of clarifying questions for you:
  - a. Are we correctly understanding that students did planning last year by interviewing fellow students and teachers, and collecting baseline data? (If needed)
  - b. How much work has been done with students (at the various grade levels) this school year already?
  - c. To what extent have you involved, or thought about and discussed, other community partners who could be helpful to your ongoing project? *e.g., natural resources experts, forestry experts, potential sources of donated material, local businesses, etc.*
  - d. How much developmental work have you done on assessments so far?

10. Whether prompted by that form or in some other way, what concerns or apprehensions do you have about implementing PBE during the coming year?
11. What is working for you and not working for you in terms of planning for PBE? Is there a further role for students in the planning aspects?
12. What supports would you find useful **now**?
13. What role(s) are you expecting or would you like the Huron Pines staff to play now and as the year goes on?

INTRODUCTION OF EVALUATION ACTIVITIES FOR 2017-18 SCHOOL YEAR

We will discuss student evaluation materials and process. Our goal is to rapidly turn around needed materials for data collection with students.

## Spring Survey

<b>End-of-Year Survey for Vanderbilt Teachers Working with Huron Pines</b>
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<p><b>Dear Vanderbilt Teacher: This brief survey will help Huron Pines better understand how their support has affected Vanderbilt teachers over the course of the most recent school year. It could take about 10 minutes to complete. A few notes before beginning the survey: Your individual responses will be grouped together to form an overall set of responses. No one will be individually identified in reporting to Huron Pines. The Huron Pines organization, and Emily Vogelsgang in particular, invites your candid responses. Without an understanding of your needs and experiences, they cannot know what works, what doesn't, and how to get better—and they want to know this. The evaluation team will be discussing your survey responses with you in the course of your follow-up interview. When you are ready to begin, please click "next" or &gt;.</b></p>

<b>End-of-Year Survey for Vanderbilt Teachers Working with Huron Pines</b>					
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BEFORE working with Huron Pines this past year, how confident were you in your ability to...					
<b>Please rate your confidence to do each listed task or activity before working with Huron Pines this past year.</b>					
	<b>Not at all confident (1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>	<b>Very confident (5)</b>
(a) Teach my students about local forest ecology (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



(b) Teach my students about human impacts on the environment (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) Guide students through an inquiry: asking questions, gathering information, analyzing and interpreting, and drawing conclusions (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Use the outdoors for instruction (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) Use local resources, place, and community to teach required content (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) Guide students through taking action to protect or restore local forest resources (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**End-of-Year Survey for Vanderbilt Teachers Working with Huron Pines**

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AFTER working with Huron Pines this past year, how confident were you in your ability to...

**Please rate your confidence to do each listed task or activity AFTER working with Huron Pines this past year.**

	Not at all confident (1)	(2)	(3)	(4)	Very confident (5)
(a) Teach my students about local forest ecology (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(b) Teach my students about human impacts on the environment (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(c) Guide students through an inquiry: asking questions, gathering information, analyzing and interpreting, and drawing conclusions (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(d) Use the outdoors for instruction (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(e) Use local resources, place, and community to teach required content (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(f) Guide students through taking action to protect or restore local forest resources (Select one option)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**During the time they spent in your classroom this year, about how many hours overall did your average student spend on forest stewardship activities, including in-class and outside activities? Note: by "forest stewardship activities," we refer to anything you did in class or outside that ties to place-based, natural resources-focused learning. Activities such as snowshoeing or Earth Day bag activities or constructing an outdoor classroom are part of what we mean by "forest stewardship activities."**

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\_\_\_\_\_

**Of the hours you reported immediately above, about how many hours were spent outside by the average student?**

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**Do you need to describe or explain anything about the hours spent by the average student? Please do so here if there are complicating factors related to hours spent by students.**

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## Spring Interview Protocol

1. IF NOT RECEIVED BY EMAIL IN ADVANCE, Please tell me a bit about what you and your students did over the course of the year in forest stewardship.
2. In the beginning of this school year, we came to meet with you and talk about the work to be done this coming year. We learned, at that time, that each of you working on this project considered yourselves to be beginners with place-based education. What are one or two of the most important or exciting skills you gained or things you learned about place-based education over the course of the year?
3. Refer to survey.  
I see that you indicated on your survey that you had a (large gain in X/large gains across the board/moderate gain in Y/other pattern).  
  
Who or what helped you most to grow in your ability to X/Y? Tell me a bit about an experience that you found particularly helpful or an example of the ways in which you were helped.  
  
*If no growth reported:* Why do you not feel that you developed skills or knowledge of these kinds this past year?
4. Please describe one of the best experiences you have had in your efforts in place-based education thus far.
5. What is most frustrating or challenging about place-based education thus far for you as a teacher?
6. What community partners beyond Huron Pines or the Northeast Michigan GLSI did you work with, if any? What roles did these other partners play?
7. What forms of support from Huron Pines for your place-based education work have been most valuable to you thus far?
8. What services or support did you receive from the Northeast Michigan Great Lakes Stewardship

Initiative? Which were most valuable for your PBE work?

9. On a scale of 1 to 5, where 1 = “very far from the ideal” and 5 = “ideal,” how would you rate the services you have received from the staff at Huron Pines and the Northeast Michigan GLSI for your work on the forest stewardship project this year?
  
10. What additional support do you need, or would you value, from Huron Pines or the Northeast Michigan GLSI to continue your place-based education work in the future?
  
11. What next steps do you see for yourself in terms of using place-based education with students?

# APPENDIX C: INTERVIEW FOR STAFF AND NEMIGLSI

## INTRODUCTION

1. Please describe one of the most exciting things that has happened in relation to the PBE efforts at Vanderbilt Area Schools this school year.
2. Please describe your role in relation to the PBE efforts at Vanderbilt Area Schools.

## THE PBE PROJECTS AND SUPPORT FOR THIS WORK

3. What did you hope teachers would gain from involvement in this work? What do you think teachers have gained in relation to PBE?
4. What professional development has been offered this year to the Vanderbilt teachers related to PBE?
5. What other support has been provided to the Vanderbilt teachers?

## COLLABORATION

6. In what ways have Huron Pines and NEMIGLSI collaborated to support the teachers at Vanderbilt?
7. In what ways was the collaboration successful, and in what ways was it not as successful as hoped?
8. When we try to partner with another organization there are sometimes people, or events, or situations that make it easy, and sometimes people, or events, or situations that make it hard. What affected the success of your collaboration, do you think?
9. How do you see the roles of Huron Pines and NEMIGLSI as being distinct from the role that would be played by a traditional community partner working with teachers and students on a specific project?
10. Are there any community partners that should be interviewed for the evaluation?

## GAINS FROM INVOLVEMENT IN PBE WORK

11. What have you gained from your involvement in this work?
12. What do you see that your partners have gained from involvement in this work?
13. What do you see that the community has gained/is gaining from the PBE efforts?
14. In what ways has the knowledge gained through these PBE projects been disseminated to others (e.g., other teachers, partners, the community)?

FUTURE

15. In what areas do you think the teachers at Vanderbilt need additional training or support?
16. How would you envision Huron Pines and NEMIGLSI supporting PBE at Vanderbilt in the future?
17. What plans do you have for extending this work in other area schools, either in collaboration or on your own?

## APPENDIX D: SOME NOTES ON CONNECTING PBSE TO MICHIGAN CONTENT STANDARDS

An important, and at times challenging, aspect of PBSE is connecting learning activities to the state of Michigan content standards. Teachers at VAS appeared to approach PBSE in 2017-18 with a science orientation, which is not an uncommon orientation (but is not the only possible orientation). The Michigan science standards, modeled after the Next Generation Science Standards, define what students should know and be able to do in terms of core content knowledge (“disciplinary core ideas”), science process skills (for “doing” science), and cross-cutting concepts, which express foundational ideas in science; for example, patterns, cause and effect, and stability and change within systems. It is important to understand that the standards encourage teachers to develop organized inquiries that integrate science content with the “doing” of science and with the crosscutting concepts. Performance expectations outlined in the standards—which demonstrate assessable competencies, but do not mandate how to prepare students to meet those expectations—demonstrate this integration of content, process, and fundamental concepts. The following examples are 2<sup>nd</sup> and 3<sup>rd</sup> grade performance expectations that incorporate habitat-related content and blend it with the science and engineering practices (observe, argue from evidence, evaluate) and the fundamental concepts (systems, stability and change):

“2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats.”

“3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.”

“3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.”

The challenge of connecting PBSE work to the state standards becomes more difficult in the secondary grades, when the concepts and the process skills become more challenging (and more numerous). Some examples of performance expectations at the secondary level that are germane to the forest context include:

“MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.”

“MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.”

“HS-LS2-7 Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.”

Teachers working with the science standards will find them very well served by PBSE, which is particularly well suited to incorporating the science and engineering practices. However, these standards are new, and teachers

### Science and engineering practices in the Michigan Science Standards and Next Generation Science Standards

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information.

need support to organize inquiries that cover the necessary ground. Many teachers across Michigan were able, during 2017-18, to participate in professional development focused on these new standards, which are generally believed to require changes in the fundamental practices of teaching science.

The Michigan social science standards are also broadly applicable in place-based education focused on the environment. Standards for every grade include participation in projects to help or inform others or to advance a public issue. At various elementary grades, standards emphasize the community's history and how individuals and groups have changed it; local industries including forestry, agriculture, mining, and tourism; people's use of natural resources; and human impacts on the environment. Grades six and seven include strong emphases on geography and on human impacts on the environment as well as investigations of contemporary global issues, including environmental issues that may be of local significance. At the high school level, while students study world-wide phenomena and eras throughout history, there is local flexibility to determine the sequence with which the content is covered, and skill development is also emphasized—reading and communicating about social science concepts; conducting social science inquiries; engaging in public discourse; and engaging in matters of public interest and policy. All of these skills can be thoughtfully developed through PBSE that engages students in their community and connects them with public discussions and decision-makers.

Common core language arts and mathematics can also be addressed in PBSE. Writing and speaking standards can be addressed in nearly any project, as students (even in upper elementary) may write grants to local funders, lobby for a preferred project or solution, request permission of district decision-makers to modify a part of the grounds or take a field trip, research a topic and report findings, and present their work to the school board or to community partners. Mathematics can be worked into projects with needed calculations such as amounts of needed materials, size of area impacted, cost of supplies, or economic impact of an intervention.

The more robust the project, the more content standards it can cover. Multi-member teams of teachers may be needed for robust projects at the secondary level, as teachers typically are responsible for only a single discipline, and eking the maximum value out of a PBSE effort involves capitalizing on the opportunities it creates to address standards across the curriculum.