2015 05d Project Abstract
For the Period Ending June 30, 2017

PROJECT TITLE: Students Engaging Local Watersheds Using Mobile Technologies
PROJECT MANAGER: Joan Freese
AFFILIATION: Twin Cities PBS (aka Twin Cities Public Television or TPT)
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FUNDING SOURCE: Environment and Natural Resources Trust Fund
LEGAL CITATION: M.L. 2015, Chp. 76, Sec. 2, Subd. 05d
APPROPRIATION AMOUNT: $147,000

Overall Project Outcomes and Results

Splash Screen: Students Engaging Local Watersheds Using Mobile Technologies environmental education pilot was designed to foster stewardship of water resources in middle school youth living in urban Minnesota communities. Ran in partnership with urban 4H clubs in the Twin Cities and Duluth, the project combined Place Based Education (project based learning experienced outside the classroom alongside community experts) with Mobile Learning, or education that uses portable technology, to teach about watersheds.

Project goals were for participating youth to:

- understand the importance of water resources in their community ;
- be able to describe the major features of their local watershed;
- develop a basic understanding of some ways that humans can help and/or hurt this important resource;
- become acquainted with storm water runoff and what people can do to prevent it; and
- experience environmental advocacy first-hand by developing a public information campaign to share with their peers, family, and community, educating them about their watershed.

A total of 20 educators in Duluth and St. Paul were trained in: Splash Screen hands-on curriculum (Project Wet activities); place-based education, including working with community experts; and mobile technology. Bi-monthly webinars were held to provide updates and hear feedback from sites. Additionally, TPT and 4H held in-person meetings for educators prior to implementation for updates and technology distribution.

Two 4-H programs in Duluth and eleven in the Twin Cities implemented the Splash Screen curriculum during the spring and summer of 2016, reaching 107 youth participants with 25 hours of hands on learning per student.

Summative Evaluation of Splash Screen was conducted by the Science Museum of Minnesota's Evaluation and Research in Learning group and measured the overall impact of the project on the educators and youth compared to project outcomes. The evaluation was guided by four questions, three aligned with project outcomes for educators and one aligned with project outcomes for youth. Project evaluation results, which showed that overall the project was more successful at addressing educator outcomes than it was at addressing youth outcomes, will guide TPT and 4H as the project staff plans scale-up of the program for youth. (See *Splash Screen Summative Evaluation* for an overview of the project evaluation.)

Project Results Use and Dissemination

On Saturday, October 8, 2016, Twin Cities PBS hosted a Splash Screen event at the station for project participants to share their watershed media project with family, friends, and community members. Youth presented a total of 9 final projects from 5 project sites, sharing their media-rich projects and discussing the importance of urban watersheds health for Minnesota communities.

In addition, SciGirls staff presented at TIES 2016 Education Technology Conference on Monday, December 12, 2017, in downtown Minneapolis. The session, titled *Splash Screen: Engaging Local Watersheds Using Mobile Technologies*, was attended by approximately 50 teachers, technology integrationists, and other education professionals from the formal education sector. Here is a description of our offering:

> Combine Place Based Education (project based learning experienced outside the classroom alongside community experts) with Mobile Learning to teach about watersheds. You will be given apps and other resources for environmental education, technology integration strategies and lessons learned from the pilot and evaluation done by the Science Museum of Museum. Splash Screen is a pilot project created by Twin Cities PBS in partnership with Urban 4H with funding provide by the Minnesota Environment and Natural Resources Trust Fund, that is designed to foster environmental stewardship of water resources in youth living in urban Minnesota communities.

While our project is now officially closed, TPT and Urban 4H are looking for funding opportunities to provide scale-up of the pilot program.

Environment and Natural Resources Trust Fund (ENRTF)
M.L. 2015 Work Plan Final Report

Date of Report: March 1, 2017

Date of Next Status Update Report: Final Report

Date of Work Plan Approval: June 11, 2015

Project Completion Date: December 31, 2016

Does this submission include an amendment request? Yes (Retroactive)

PROJECT TITLE: Students Engaging Local Watersheds Using Mobile Technologies

Project Manager: Joan Freese

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Location:

St. Louis, Hennepin, Ramsey, Washington and Dakota counties

Total ENRTF Project Budget:		
	ENRTF Appropriation:	**$147,000**
	Amount Spent:	**$133,465**
	Balance:	**$13,535**

Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 05d

Appropriation Language:
$147,000 the first year is from the trust fund to the commissioner of natural resources for an agreement with Twin Cities Public Television to deliver an experiential, project based educational program utilizing mobile technologies to empower at least 200 middle school students in 4-H programs to engage in understanding and protecting local water resources.

I. PROJECT TITLE: Students Engaging Local Watersheds Using Mobile Technologies

II. PROJECT STATEMENT:

Splash Screen: SciGirls Exploring Watersheds Using Mobile Technologies will foster environmental stewardship of water resources in youth living in urban Minnesota communities. *SciGirls* will partner with 4-H programs in Duluth and the Twin Cities to teach middle school youth about water resources in their communities. The program, which is a pilot, will combine Place Based Education (project based learning experienced outside the classroom alongside community experts) with Mobile Learning, or education that uses portable technology, to teach about watersheds.

The curriculum has already been designed and written, and it includes the use of iPads equipped with:

- Geospatial Technologies such as Google Earth and ArcGIS App;
- an Augmented Reality app called ARIS;
- a digital journaling site called Kidblog; and
- media creation tools including SoundCloud, iMovie, and Google Apps for the iPad.

The project also integrates hands-on lessons from *Project Wet*, a well-established water curriculum.

As part of the urban watershed study, participating youth will:

- understand the importance of water resources in their community via an existing curriculum;
- be able to describe the major features of their local watershed;
- develop a basic understanding of some ways that humans can help and/or hurt this important resource;
- become acquainted with storm water runoff and what people can do to prevent it; and
- experience environmental advocacy first-hand by developing a public information campaign, project plan, or augmented reality tour of the watershed to share with their peers, family, and community, educating them about the watershed.

The SciGirls staff at Twin Cities Public Television will host a two-day training in St. Paul and in Duluth for 4-H educators to prepare them to run the project, with ongoing support offered online. Ten 4-H sites will implement the program in the Twin Cities and Duluth metro areas between April and September 2016, reaching 200 middle school students, providing 25 hours of hands on learning per student, or 5,000 student hours. This pilot project will be evaluated by the Science Museum of Minnesota's Department of Evaluation & Research in Learning and will serve as a model for future scale up programs at 4-H and other organizations in communities across Minnesota.

SciGirls is an Emmy Award-winning PBS Kids television series, website and on-the-ground educational outreach initiative, which is produced for PBS by Twin Cities Public Television. *SciGirls* is made possible with funding from the National Science Foundation. The SciGirls mission is to

- inspire, enable and maximize learning and participation in Science, Technology, Engineering and Math, or STEM;
- encourage greater interest in STEM careers; and
- promote positive impressions of STEM, and STEM identity development.

III. OVERALL PROJECT STATUS UPDATES:

Amendment Request (11/18/2015)

1) We were budgeted for a 2-day professional development training in St. Paul. However, after beginning the project, including early partner meetings, we determined it would be better for the two communities to have their own trainings, so that the watershed experts can attend the professional development to become familiar with the project and begin making connections with the 4H educators, thus fulfilling the place-based expert roles in both Duluth and the Twin Cities. This change works out for us, budget wise, as we would just use the travel money to bring our staff and Janine Kohn, the state Project Wet coordinator to Duluth for the second training, instead of traveling Duluth participants to St. Paul for the training as planned.
2) We are planning to use a contractor to help us find existing and/or develop screen-capture tutorials that will help 4H Club Leaders and 4H youth participants learn how to use the technology integrated into the curriculum. This work was planned as TPT project staff work, but between LCCMR submission and funding, we've had additional projects come in and our staff is not fully available to accomplish this deliverable in a timely fashion. We would also have the contractor help with the tech training as part of the trainings in Minneapolis and Duluth. We will use TPT project staff money to pay for this contractor.

Approved by LCCMR 12-15-2015

Project Status as of January 1, 2016:
Splash Screen work is progressing nicely. The bulk of our work to date has focused on: planning the educator trainings; engaging a consultant (Heather Benedict) to create technology tutorials; working with Science Museum of Minnesota to plan evaluation; and recruiting 4H club participants in TC and Duluth. See activity updates below for details regarding this work.

Amendment Request (June 30, 2016)
1) TPT requests 40 additional contractor hours to provide ongoing tech support of projects in the field. This support includes: attending kick-off meetings for educators prior to their inaugural sessions, participating in biweekly check-in webinars, and answering educator tech questions that arise during project implementation. TPT will move project staff funds of $1,805 to Professional Contracts to cover this cost.
2) TPT request 2 additional daytrips to Duluth to support education staff with meetings and tech support (i.e., wiping Apps from tablets and reloading them for another session.) TPT will move $400 project staff money to pay for this travel.

Approved by LCCMR 8-26-2016

Project Status as of June 30, 2016:
In the first six months of 2016, Splash Screen trained 4H educators in Duluth and the Twin Cities, bought and readied the tablets (technology was purchased with non-LCCMR funds), began program implementation, and provided ongoing support for programs via webinars, emails, phone calls, and face-to-face meetings. The Science Museum of Minnesota research staff conducted formative evaluation and began summative work.

Retroactive Budget Amendment Request (March 1, 2017)
1) TPT retroactively requests re-allocation of funds for additional for Activity 2 Other - Data and Technology usage costs, which were higher in the field than anticipated. This expense can be re-allocated from Activity 2 Professional Service Contracts and Activity 1 Other Expenses where we underspent.

Retroactive Budget Amendment Request Approved March 9, 2017

Project Status as of December 31, 2016:
Thirteen 4-H programs utilized the Splash Screen curriculum during the spring and summer of 2016, including two in Duluth and 11 in the Twin Cities. Twin Cities programs were held at nine locations, including: Coon Rapids Dam, Heritage Park, Washington County, Packer Pad, the American Indian Magnet School, the Harriet Tubman Center, and three parks in the Minneapolis Parks and Recreation district (Martin Luther King Jr., Pearl, and Pershing). Both Duluth programs were held at Lincoln Park Middle School.

Nine of the programs were delivered over four intensive days that drew almost exclusively from the Splash Screen program and Project WET curricula (see Table 1). The other four programs were delivered over the course of several weeks and were augmented by additional content and experiences.

Table 1. Splash Screen program locations and style of delivery.

	4 Day Program	Multi-Week Program
Coon Rapids Dam	1	1
Heritage Park	1	1
Washington County	1	0
American Indian Magnet School	0	1
Harriet Tubman Center	1	0
Packer Pad	1	0
Martin Luther King Jr. Park	1	0
Pershing Park	1	0
Pearl Park	1	0
Lincoln Park Middle School	1	1
Total	9	4

According to attendance records, 107 youth participated in Splash Screen—lower numbers than anticipated. The change in number of youth engaged from original estimates was due to a number of factors: 1) 4H recommendations for youth/adult ratio was lower than TPT anticipated when doing program design; 2) the program was offered for free, mostly during the summer. Program partners, such as Minneapolis Parks and Rec suggested they experience more program drop out when offered for free than if a fee is involved; 3) early implementation suggested that sharing the technology was not as productive as planned so sites that implemented later in the program closed enrollment with a lower cap; and 4) Duluth found youth recruitment to be tricky because their city typically has no summer middle school programs, so parents are not in the habit of looking for camps for their kids in this age range to attend.

Please see the "ACTIVITY 3: Evaluation of Splash Screen" section below for detailed implementation assessment information.

Overall Project Outcomes and Results:
Splash Screen: Students Engaging Local Watersheds Using Mobile Technologies environmental education pilot was designed to foster stewardship of water resources in middle school youth living in urban Minnesota communities. Ran in partnership with urban 4H clubs in the Twin Cities and Duluth, the project combined Place Based Education (project based learning experienced outside the classroom alongside community experts) with Mobile Learning, or education that uses portable technology, to teach about watersheds.

Project goals were for participating youth to:

- understand the importance of water resources in their community via an existing curriculum;
- be able to describe the major features of their local watershed;
- develop a basic understanding of some ways that humans can help and/or hurt this important resource;
- become acquainted with storm water runoff and what people can do to prevent it; and
- experience environmental advocacy first-hand by developing a public information campaign to share with their peers, family, and community, educating them about their watershed.

A total of 20 educators in Duluth and St. Paul were trained in: Splash Screen hands-on curriculum (Project Wet activities); place-based education overview; mobile technology tutorials; watershed expert information; and an overview of the Science Museum of Minnesota's (Department of Evaluation and Research) evaluation plan. Bi-monthly webinars were held to provide updates and feedback from sites. Additionally, TPT and 4H held in-person meetings for educators who were about to implement for quick reviews/updates and technology distribution.

Two 4-H programs in Duluth and eleven in the Twin Cities implemented the Splash Screen curriculum during the spring and summer of 2016, reaching 107 youth participants with 25 hours of hands on learning per student. Duluth programs were held at Lincoln Park Middle School and Twin Cities programs were held at nine locations, including: Coon Rapids Dam, Heritage Park, Washington County, Packer Pad, the American Indian Magnet School, the Harriet Tubman Center, and three parks in the Minneapolis Parks and Recreation district (Martin Luther King Jr., Pearl, and Pershing).

Summative Evaluation of Splash Screen: Engaging Local Watersheds Using Mobile Technologies was conducted by the Science Museum of Minnesota's Evaluation and Research in Learning group measured the overall impact of the project on the educators and youth in relation to the project outcomes. The evaluation was guided by four questions, two aligned with project outcomes for educators and two aligned with project outcomes for youth. Project evaluation results, which showed that overall the project was more successful at addressing educator outcomes than it was at addressing youth outcomes, will guide TPT and 4H as the project staff plans scale-up of the program for youth in Urban Minnesota. (See *Splash Screen Summative Evaluation* for an overview of the project evaluation.)

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Professional Development

Description: Activity 1 - Professional Development has three parts:

1. 4-H Site Selection
2. Professional Development workshop for 4-H club leaders/instructors
3. Technology Tutorial Creation, iPad Set Up, and Video Content Editing

<u>Professional Development part 1. 4-H Site Selection</u>

Our two partners for ***Splash Screen*** implementation are

1. University of Minnesota Extension Center for Youth Development in Duluth, and
2. Urban 4-H, University of Minnesota, in the Twin Cities metro area.

Both organizations have established youth development programs, whose missions are to "measurably improve learning through youth-centered educational and engagement programs."

The 4-H staff will recruit ten 4-H clubs within Minnesota to participate in ***Splash Screen***. SciGirls staff will provide 4-H project leads Rebecca Meyer in Duluth and Amie Modl in the Twin Cities with a project description and outline of participating club requirements to help them recruit clubs within their organization. Sites can choose to implement the program over six weeks (meeting twice a week) or during a weeklong "camp" format, suitable for summer youth programs. Either option provides 25 hours of hands on learning per child..

Each 4-H club participating must agree to:

- send 2 adult leaders/instructors to the training in St. Paul;
- collaborate with watershed experts in their community;
- participate in ongoing communication with other leaders on the *SciGirls* educators' website; and
- provide feedback as part of the evaluation process with the Science Museum of Minnesota's Department of Evaluation & Research in Learning. (See Activity 3 below.)

SciGirls staff will help the selected site educators localize the ***Splash Screen*** curriculum for the watersheds where they live. For Duluth, the focus will be on:

- Lake Superior
- Great Lakes Basin
- St. Louis River Watershed.

For the Twin Cities, the focus will be on:

- Mississippi River
- Upper Mississippi Basin
- Mississippi Water Management Organization
- Minnehaha Creek Watershed Organization.

To assist with the ***Splash Screen*** curriculum preparation, TPT/SciGirls staff selected Heather Benedict as the consultant both for her qualifications and because she was available and willing to work for $45/hour, a more competitive rate than other candidates. Joan spoke with three qualified consultants, one of whom charges $100-$125/hour for similar work - too expensive, and another at a similar rate scale who wasn't available on our timeline. While TPT purchasing policy doesn't require a full RFP for a contract under $10,000, we typically seek multiple bids or estimates for such work, as we did in this case.

(See the curriculum scope and sequence in Activity 2 below.)

<u>Professional Development part 2. Training for 4-H club leaders</u>

Professional development for 20 4-H club leaders/instructors (2 educators per 4-H site from 10 sites) will be delivered face-to-face in a two-day training at *SciGirl/*Twin Cities Public Television offices in St. Paul, and a second training in Duluth for the Duluth-based educators. This training will take place in early 2016 and project implementation will follow in Spring or Summer 2016. Having more than one educator from each 4-H partner organization attend trainings ensures the fidelity of program because educators will have a knowledgeable support system within their own organization. In addition, give the large size of 4-H clubs/groups (20 youth), two leaders will be required for outdoor lessons held near water and to troubleshoot the tech integration.

The training syllabus will focus on ***Splash Screen*** content that 4-H leaders will need to successfully run the program including:

- Place-based education overview including how to work with community based experts in watershed districts;

- *SciGirls Seven* Strategies - research based best practices for encouraging youth to pursue STEM subjects
- Technology overview and tips for using mobile devices in the field (to be enhanced with online tutorials);
- *Project Wet* hands-on activities;
- Science inquiry overview (to be completed online); and
- Evaluation plans and general project administration requirements.

SciGirls staff will provide ongoing support for the 20 4-H leaders on the scigirlsconnect.org website. This online community offers resources to educators who are implementing *SciGirls* programs in their communities. ***Splash Screen*** project on-line resources for educators will include:

- a collection of screen-capture video tutorials that provide how-to information for each featured technology tool. These video tutorials can be used by educators and shared directly with students on a "just-in-time" basis (when a learner needs to know more to proceed); and
- a series of videos, from *SciGirls* library, that model the inquiry process and will support and enhance both educators' and students' experiences.
- Science inquiry overview

SciGirls will also host a series of monthly webinars for the 20 4-H leaders, during which project participants will discuss implementation successes and setbacks, share tips, and provide feedback for continued refinement of the pilot program.

Professional Development part 3. Technology Tutorial Creation, iPad Set Up, Video Content Editing

Because the ***Splash Screen*** curriculum (outlined below in Activity 2) includes extensive integration of mobile technology, *SciGirls* staff will develop screen capture video tutorials for each featured technology to help 4-H leaders learn to use the software.

The videos will be developed so they can be shared directly with youth, to help them learn new software during the implementation phase of the project. (See Activity 2 for details.)

Videos will be created for the following technologies:

- **Google Earth and ArcGIS App**—Known as geospatial technologies, these applications include graphic information system (GIS), global positioning system (GPS), and virtual globe features.
- **ARIS Augmented Reality Platform—**ARIS is a user-friendly, open-source platform for creating and playing mobile games, tours and interactive stories. Using GPS and QR Codes, ARIS players experience a hybrid world of virtual interactive characters, items, and media placed in physical space.
- **Kidblog—**This safe and simple blogging software, which was designed for educational environments, lets learners practice digital journaling in nature. Science journals are a major focus of science education initiatives as they prompt observation and reflection for youth.
- **SoundCloud, iMovie, and Google Apps for the iPad**—Digital creativity tools will foster "4 C skills" (communication, collaboration, critical thinking, and creativity—aka "Twenty-first Century skills"). They allow youth the opportunity to synthesize what they learn as part of this project and use digital technologies (video, audio, websites) to communicate their learning to their communities and other ***Splash Screen*** project sites. Youth will have some determination in the technologies they employ.

In addition to creating technology tutorials, *SciGirls* staff will purchase iPads for the project and deploy the software on these devices. (Note: the iPads will be purchased with non-LCCMR funds.) We will also research and create a student user policy for youth participating in the ***Splash Screen*** program.

SciGirls staff will also gather and edit existing video content from the *SciGirls* library of 28 half-hour shows to create an online resource for educators on the basics of inquiry-based science education. These videos will be shared on the project portal, which will be located at our *SciGirls*' educator website: www.scigirlsconnect.org.

Summary Budget Information for Activity 1:

ENRTF Budget: $ 81,000
Amount Spent: $ 78,437
Balance: $ 2,563

Outcome	Completion Date
1. Create 7 screen capture video tutorials for Apps/software used in **Splash Screen**.	January 15, 2016
2. Download necessary software onto mobile devices.	January 15, 2016
3. Research and create an iPad user policy for student participants/parents to sign.	March 31, 2016
4. Select and edit a series of existing SciGirls videos on the scientific inquiry process.	January 15, 2016
5. SciGirls develops marketing materials for 4-H project leads for recruiting sites/clubs.	November 30, 2016
6. SciGirls develop contracts for Duluth and Twin Cities 4-H commitment.	November 30, 2016
7. 4-H leads in Duluth and Twin Cities recruit a total of 10 clubs (20 leaders) to participate.	January 15, 2016
8. Once the clubs are selected, SciGirls staff will identify community based watershed expert resources for the 10 sites.	February 1, 2016
9. Two 2-day trainings, one for Twin Cities area and one for Duluth area, for a total of 20 4-H educators in the Splash Screen curriculum completed.	March 31, 2016
10. Educators completed online training.	May 15, 2016
11. Evaluation for the 2-day training is completed and provided to evaluators (pre-post program survey for educators).	April 30, 2016
12. Monthly webinars are held for all participating educators to discuss challenges, successes and program implementation.	August 31, 2016

Activity Status as of January 1, 2016:

1. Hired Heather Benedict to find existing video tutorials or create original screen-capture videos for the Apps/software being used as part of the Splash Screen curriculum.
2. TPT fundraising staff secured private grant for purchase of mobile devices. We made decisions regarding make/brand of tablets and will purchase in the New Year and equip with software.
3. Heather Benedict is researching user policies for youth who will be participating in project using TPT equipment.
4. Sarah Carter is selecting existing videos that model the inquiry process to include in training.
5. TPT developed recruitment materials, which 4H staff distributed in their networks to find club partners.
6. 4H in the process of recruiting—it's looking like it will be 3 clubs in Duluth and 7 in the Twin Cities. Clubs will implement in a variety of ways (over six weeks and week-long summer camps, for example).
7. We decided to hold 2 trainings—one in Twin Cities (February 19-20) and another in Duluth (March 11-12).
8. We held a kick-off meeting for partners – 4H, Science Museum of Minnesota, and DNR.
9. We held follow up meetings with 4H and DNR (Project Wet Coordinator).
10. We created a draft agenda for the educator trainings.

Activity Status as of June 30, 2016:
Splash Screen educator trainings were held in Duluth on March 11-12 and St Paul on March 18-19 at the Great Lakes Aquarium and Twin Cities PBS offices respectively. The Duluth training totaled 4 educators along with support from the local 4H office and watershed expert participation from the Great Lakes Aquarium and St. Louis River Estuary laboratory education staff. The St. Paul training was attended by 16 educators, with support from Urban 4H staff and expert participation from the Minnehaha Creek Watershed District's Master Water Steward program. Janine Kohn, MN Project Wet Coordinator, attended both sessions. The training agenda included: Splash Screen hands-on curriculum (Project Wet activities), place based education overview, mobile technology tutorials, watershed expert information, and an overview of the SMM's evaluation plan.

Bi-monthly webinars were held to provide updates and feedback from sites. In addition, TPT and 4H held in person meetings for educators who were about to implement. These sessions were used for quick reviews/updates and technology distribution.

Activity Status as of December 31, 2016:
After the initial face-to-face trainings, TPT held bi-monthly webinars with educators to provide updates and feedback from sites. In addition, TPT and 4H held in person meetings for educators who were about to implement. These sessions were used for quick reviews/updates and technology distribution.

Final Report Summary:
TPT has great depth of experience in professional development work – especially for informal educators. This was our first experience integrating substantial technology into the training and we learned from our experience. We will make tweaks to future iterations of the project, but in general our training was successful and valued by the educators who participated.

ACTIVITY 2: Program Implementation at 10 sites in Duluth and the Twin Cities

Description: Sites will implement the ***Splash Screen*** curriculum between April 1 and August 31, 2016. Support for 4-H site leaders will occur online at scigirlsconnect.org and during monthly webinars.

SciGirls staff will help each site connect with community resources, such as watershed and rain garden experts, as well as other relevant environmental organizations.

Splash Screen Curriculum Outline		
Session	**Lesson**	**Technology**
Day 1 Map Your Watershed	Experiment with a model to see how water runs down hills. Use Google Maps to create personalized maps of their watershed.	• Google Maps • Kidblog
Day 2 A Day in the Field	Bike (or bus) from club site to a major water feature in their watershed.	• iPads for image, video, and audio collection • Kidblog
Day 3 Meet Local Watershed District Expert	Use Project Wet activities to identify parts of a watershed and determine its boundaries. Meet with educator from local watershed district to learn more about the watershed they live in and problems associated with human use.	• ARIS App (to take an augmented reality tour of the watershed they live in) • iPads for video creation • Kidblog
Day 4 Just Passing Through	Participate in hands-on inquiry activities (also from Project Wet) to experience how water travels on land.	• iPads for image collection and note taking • Kidblog

Day 5 Preventing Run off Solutions	Meet with community members to learn about practical solutions (rain gardens, pervious pavement, green rooftops) for preventing runoff.	• Google Maps • Kidblog
Day 6 Site Runoff Surveys	Work in small groups to survey sites in their neighborhood, determining the percentage of each site that contributes to storm water runoff and the percentage that encourages water infiltration.	• ArcGIS app • Kidblog
Day 7 Site Survey Debrief	Students share and discuss data from site surveys.	• Google Maps • Kidblog
Day 8 Project Selection and Planning	Work together in groups to determine a creative project that will educate others about watersheds, advocate on behalf of the environment, or improve the local environment (could be plans only and would not need to be completed).	• Google Docs • Kidblog • New Media Creation tools
Days 9, 10, & 11 Project Development	Work on advocacy/education/service projects/project plans.	• Google Docs • Kidblog • New Media Creation tools

Upon completion of the project, each 4-H student participant and 4-H club leader will participate in evaluation (as described below in Activity 3).

A poster session event will be held in the Twin Cities and Duluth for clubs to share their projects with other 4-H clubs, family, and the broader community. Potentially, these events could be held on the same day and connected via technology so that all participants can see each other's work.

Summary Budget Information for Activity 2:

ENRTF Budget: $ 40,250
Amount Spent: $ 32,658
Balance: $ 7,592

Outcome	Completion Date
1. Each 4-H site completes the 6 week program.	August 31, 2016
2. All girls complete a pre-post program survey for the evaluators.	August 31, 2016
3. Poster session events held for clubs to share their work.	August 31, 2016
4. Each 4-H site reports participation through final program evaluation.	September 30, 2016

Activity Status as of January 1, 2016:
No program implementation activity to report at this time.

Activity Status as of June 30, 2016:
As of June 30, two sessions have implemented in Duluth, both at Lincoln Middle School, and seven sites in the Twin Cities at Heritage Park 4H, Coon Rapids Dam Regional Park, Pearl Park through Minneapolis Parks and Rec, Washington County 4H, American Indian Magnet School, West St. Paul Packer Pad, and Martin Luther King Jr. Park through Minneapolis Park and Rec. (The last three listed are still in implementation.) A total of 94 youth have participated in Splash Screen to date. Educators have mentioned that the youth especially enjoy spending time outside and working with technology.

Activity Status as of December 31, 2016:

As outlined above in the general project status, thirteen 4-H programs utilized the Splash Screen curriculum during the spring and summer of 2016, including two in Duluth and 11 in the Twin Cities. Twin Cities programs were held at nine locations, including: Coon Rapids Dam, Heritage Park, Washington County, Packer Pad, the American Indian Magnet School, the Harriet Tubman Center, and three parks in the Minneapolis Parks and Recreation district (Martin Luther King Jr., Pearl, and Pershing). Both Duluth programs were held at Lincoln Park Middle School.

Nine of the programs were delivered over four intensive days that drew almost exclusively from the Splash Screen program and Project WET curricula (see Table 1). The other four programs were delivered over the course of several weeks and were augmented by additional content and experiences.

Final Report Summary:

Eighteen educators and 107 youth were directly impacted at 13 program sites. Educators had approximately 25 contact hours with Splash Screen staff through training and spent an additional 16 hours of planning and prep time for each program. The 107 youth had between 25 and 32 contact hours (depending on site implementation). Programs were delivered in either four-day intensive or multi-week sessions. Nine of the programs were delivered over four intensive days that drew almost exclusively from the Splash Screen program and Project WET curricula. The other four programs were delivered over the course of several weeks and were augmented by additional content and experiences.

Educators adapted how they implemented the order of the Splash Screen lessons. While all of the programs began by implementing Lessons 1 and 2 and concluded with the final presentation share-out in Lesson 13, there was a lot of variability in the order of delivery for the rest of the lessons in the program guide. During webinars, educators shared that this flexibility of program design helped them to implement Splash Screen in the context of the ever-changing weather, the availability of local experts, and their access to other programming resources.

There was variation in daily youth attendance and overall attendance based on the program type. Daily attendance was higher for four-day programs than multiweek programs. Overall attendance was also higher for four day programs (70% of youth attended all four days) compared to multiweek programming (22% of youth attended all days of multiweek programming).

A total of 18 content experts (water resources specialists, watershed management organization representatives, aquatic invasive specialists, etc.) were directly engaged in the program, presenting and interacting with youth as expert guests (2-5 hours each).

And approximately 125 family members (parents, grandparents, and siblings) were indirectly impacted by attending end of program presentations by youth and the final project celebration at Twin Cities PBS. In addition, 150 people were introduced to the Splash Screen program at the Minnesota State Fair by participating in activities at a booth during STEM Day at the Fair.

ACTIVITY 3: Evaluation of Splash Screen

Description: Science Museum of Minnesota's Evaluation and Research in Learning group will focus on measuring the overall impact of the project on the educators and youth in relation to the project outcomes.

Evaluators will work with *SciGirls* and 4-H staff during each phase of development, implementation, and refinement of the ***Splash Screen*** project. The evaluation will monitor and document the project in relation to the project's outputs and outcomes with the ultimate aim of capturing knowledge to inform what is needed for others to implement the ***Splash Screen*** materials.

The evaluation will be guided by a number of overarching questions, which are aligned with project outcomes for educators and youth. The questions and data collection methods used to answer each question are outlined below.

Evaluation Questions	Data Collection Methods
1. How prepared are educators and what support do they need to implement the ***Splash Screen*** curriculum, integrate technology into the curriculum, and use the *SciGirls Seven* strategies? To what extent do educators integrate both technology and the *SciGirls Seven* strategies into their use of the curriculum?	• Observe two-day training • Post-training debrief with *SciGirls* staff • Pre-interview with Site Teams • Mid check-in online survey
2. To what extent does the project increase educator awareness and knowledge of issues around watershed health and environmental stewardship?	• Pre/Post interviews with site teams • Mid check-in online survey
3. To what extent does the project increase educator knowledge and skills around the integration of technology into environmental education?	• Pre/Post interviews with site teams • Mid check-in online survey
4. To what extent do youth increase their awareness and knowledge about watersheds, issues and decisions that affect watershed health, and actions they can take to be stewards of watersheds in their community?	• Pre/post youth survey • Youth digital journals

The formative evaluation will focus on improvement of the educator training and support components of the project, which can in turn impact the educator and student outcomes. An evaluator will attend the two-day professional development training for 4-H leaders and, at the end of each day, debrief with *SciGirls* staff to identify immediate, actionable improvements to the project.

Between their training and on-site implementation of the project, evaluators will interview each pair of educators. This interview will assess how prepared educators feel to implement the curriculum and identify key areas for educator support. The pre-interview will also have retrospective questions to serve as a baseline for gauging increases in educator awareness, knowledge and skills as a result of the project.

Evaluators will check in with each of the teams halfway through project implementation to identify additional supports and measure each site's progress towards meeting program outcomes. Throughout the project, the evaluators will meet with *SciGirls* staff to share formative evaluation findings and offer recommendations for improvements, where appropriate.

Summative evaluation will focus on measuring the overall impact of the project on the educators and youth in relation to the project outcomes. To measure achievement of educator outcomes, post-interviews will be conducted with site teams, which will be compared to the pre-interview and mid-survey data.

Youth outcomes will be measured through pre- and post-surveys, and findings will be triangulated through reviewing a sample of youth journal entries and related youth projects.

To develop the youth pre/post surveys, we will draw from scales the Science Museum of Minnesota helped to develop as part of the NSF-funded *Developing, Validating, and Implementing Situated Evaluation Instruments* project, specifically the Self-Efficacy for Environmental Action and Behavioral Intention scales because they measure aspects of environmental stewardship. These scales are in the final development stages and will be completely validated in advance of the ***Splash Screen*** project.

Pre/post surveys will also include questions specific to watershed awareness, knowledge, and stewardship.

An Internal Review Board through the Science Museum of Minnesota will ensure the privacy and confidentiality of all participants through proper oversight of this study.

Summary Budget Information for Activity 3:

ENRTF Budget: $ 25,750
Amount Spent: $ 22,370
Balance: $ 3,380

Outcome	Completion Date
1. SciGirls provides Science Museum of Minnesota research staff with project materials	January 1, 2016
2. Plan formative evaluation with Science Museum of Minnesota staff.	February 15, 2016
3. Science Museum of Minnesota executes formative evaluation.	March 31, 2016
4. SciGirls project staff review formative results and look for additional training needs and ways to improve support.	April 31, 2016
5. SciGirls plans summative evaluation with Science Museum of Minnesota staff.	July 31, 2016
6. Science Museum of Minnesota executes summative evaluation.	October 31, 2016
7. SciGirls review summative results, shares results with 4-H partners and integrates ideas into dissemination work and future implementations of **Splash Screen**.	December 31, 2016

Activity Status as of January 1, 2016:

1. We held a series of meetings with SMM staff to plan the evaluation work.
2. We are finishing work on sample project materials for handoff to SMM in January. (This will aid their continued design of the evaluation.)

Activity Status as of June 30, 2016:

Since January the evaluation team has completed the formative evaluation of the Splash Screen project and has embarked on summative evaluation collection. During the formative phase, evaluators observed the two-day trainings and webinars, collected surveys from educators before and after the trainings, and asked educators to answer more in-depth questions via an online written reflection. Observations and findings were shared through meetings, conversations, and a written report with the project team, and provided the group with actionable ideas at different stages of project development, as well as measures of how the training may have impacted educators' awareness and knowledge of watershed health issues and stewardship, as well as using scientific inquiry, place-based education methods and new technology in 4-H programs. Some of this data will also be used in the summative, to think about how educators' familiarity and knowledge around these topics changed throughout their experience with the program. Pre and post program surveys are also being collected from youth to better understand the impact of Splash Screen programs; these surveys will be administered with each group of participants until the programming ends in August.

Activity Status as of December 31, 2016:

Between June 30 and December 31, 2016, the SMM evaluation staff completed the planned evaluation with Splash Screen educators and student participants. See below for an overview of the Summative Evaluation. See the full evaluation, which is being submitted as a separate document.

Final Report Summary:

Summative evaluation of the Splash Screen program was guided by four overarching evaluation questions that are aligned with project outcomes for educators and youth.

1. To what extent does the project increase <u>educator</u> awareness and knowledge of issues around watershed health and environmental stewardship?

This evaluation question was answered by measuring educators' awareness and knowledge of what a watershed is, sources of watershed pollution, and best management practices. All three of these topic areas were related to

Splash Screen educator outcomes. The Splash Screen project successfully met these three outcomes for all seven educators.

2. To what extent do educators integrate inquiry place-based education strategies into their use of the Splash Screen program?

This question was answered by understanding educator knowledge and implementation of place-based strategies, including bringing in local experts. The question aligns with one of the project outcomes stating that educators would increase their understanding of place-based education and how to implement it within an environmental education setting. The program was slightly more successful in increasing educator knowledge of how to engage youth in environmental science in their own community, than how to engage local experts to facilitate learning experiences with youth. Almost all the educators successfully described strategies to integrate place-based education practices into their programming, including the use of watershed experts.

3. To what extent does the project increase educator knowledge and skills around the integration of technology into environmental education?

The third evaluation question was answered by asking educators about their knowledge of the benefits and drawbacks of using technology in environmental education, as well as the skills they gained around using technology with youth in environmental education. Educators were knowledgeable of a wide range of benefits and drawbacks to integrating technology into environmental education programming. The Splash Screen project was successful in increasing educators' skills around the use of technology in environmental education and facilitating technology experiences with youth.

4. To what extent do youth increase their awareness and knowledge about watersheds, issues and decision that affect watershed health, and actions they can take to be stewards of watersheds in their community?

The fourth evaluation question was answered by asking questions to measure Splash Screen's youth outcomes around knowledge of the definition a watershed, understanding of actions that hurt and help a watershed, and awareness of storm water runoff and what people can do to prevent it. There were some areas where the program was successful in increasing youth's awareness and knowledge, and other areas where the program wasn't as successful in doing so. The program was successful in increasing youth's understanding of a variety of actions that could help or harm a watershed. Two-thirds of youth were able to suggest best management practices to reduce runoff at local sites, but a third were unable to. The program was successful in increasing Twin Cities youth's understanding of their local watershed, but less so in increasing Duluth youth's knowledge of their local watershed. A majority of youth understood that storm drains lead straight to nearby waterways, but a quarter of youth still had misconceptions that storm drains lead to water treatment plants. The program was unsuccessful in helping youth obtain an accurate definition of a watershed at an early stage in the program, with less than a tenth of youth being able to describe a watershed after Lesson 2 of the curriculum.

V. DISSEMINATION:

Description: *SciGirls* will share project findings on informalscience.org, at conferences, such as:

- Minnesota Association for Environmental Education;
- Minnesota National Science Teachers Association; and
- The Minnesota' Naturalists Association.

SciGirls will also share project findings via established 4-H Youth Development channels and established *SciGirls* outreach partnerships. *SciGirls* staff will conduct a series of three webinars about the project for the *SciGirls* CONNECT network of formal and informal educators nationwide.

Status as of January 1, 2016:
No dissemination activity to report at this time.

Status as of June 30, 2016:
No dissemination activity to report at this time.

Status as of December 31, 2016:
SciGirls staff presented at TIES 2016 Education Technology Conference on Monday, December 12, 2017 in downtown Minneapolis. The session, entitled Splash Screen: Engaging Local Watersheds Using Mobile Technologies was attended by approximately 50 teachers, technology integrationists, and other education professionals from the formal education sector. Here is a description of our offering:

Combine Place Based Education (project based learning experienced outside the classroom alongside community experts) with Mobile Learning to teach about watersheds. You will be given apps and other resources for environmental education, technology integration strategies and lessons learned from the pilot and evaluation done by the Science Museum of Museum. Splash Screen is a pilot project created by Twin Cities PBS in partnership with Urban 4H with funding provide by the Minnesota Environment and Natural Resources Trust Fund, that is designed to foster environmental stewardship of water resources in youth living in urban Minnesota communities.

Final Report Summary:
While our project is now officially closed, TPT and Urban 4H will continue to present about the project at Minnesota conferences as appropriate.

VI. PROJECT BUDGET SUMMARY:
A. ENRTF Budget Overview:

Budget Category	$ Amount	Overview Explanation
Personnel:	$60,495	1 Project Manager/Web & Print Producer 13.5% FTE for 1.5 Years; 1 STEM Content & Outreach Specialist 15% FTE for 1.5 Years; 1 Outreach Coordinator 6% FTE for 1.5 Years, 1 Director of STEM Education & Outreach 2% FTE for 1.5 Years; 1 Managing Producer 2% FTE for 1.5 Years, 1 Asst Editor/Media Manager 5% FTE for 1.5 Years
Professional/Technical/Service Contracts:	$72,428	4H Partner Coordination $10,000 (4-H staff coordination est 370 hours @ $27/hour) ; Science Museum of Minnesota Evaluation $18,000 (quote) ; 4H Club Leader fees $40,000 10 sites, 2 Leaders per site = 20 people x est 100 hours @ $18/hour + fringe = $40,000) Curriculum Implementation & Technology Consultant $4,000 (up to ~~89~~ 129 hours at $45/hour)
Equipment/Tools/Supplies:	$2,950	Training event supplies - Curricula materials; Poster session event supplies; field kits
Travel Expenses in MN:	$7,000	2 State educational conferences for presenting; Mileage; three evaluator trips to Duluth training and out-of-metro sites; TPT staff travel to out-

		of-metro training workshop
Other:	$4,127	Content Experts for professional development; Data Plan for 4H Group Activities; 4H site blog storage fees; training facility rental in Duluth
TOTAL ENRTF BUDGET:	**$147,000**	

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than $5,000: N/A

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 0.75 FTE

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.2 FTE

B. Other Funds:

Source of Funds	$ Amount Proposed	$ Amount Spent	Use of Other Funds
Non-state			
Corporate & foundation support	$ 6,780	$15,000	Tablets - 6 per mobile lab (rate includes also a hotspot) - 12 units at $565 per unit
Twin Cities Public Television (In-Kind Support)	$31,250	$29,325	General and administrative support and overhead expenses not allowable expenses in ENRTF budget, calculated at 21.26%, Twin Cities Public Television's federally negotiated rate. (Note: includes $950 of G&A in-kind on non-ENRTF expenses, the tablets paid for with Corporate support.)
Twin Cities Public Television (In-Kind Support)	$30,000	N/A	Instructional video clips, 10 clips of 3 minutes each. (Note: instead of using Twin Cities Public Television owned video clips as planned, we used no-cost open source video.)
TOTAL OTHER FUNDS:	**$68,030**	**$44,325**	

VII. PROJECT STRATEGY:

A. Project Partners:

Project Partners Not Receiving Funds

- Misc. Watershed District education staff: connect with 4-H educators to provide "community expert" knowledge for Place Based nature of the project (individuals may receive $100 honoraria)
- Minnesota Project Wet Coordinator: attend Professional Development training to represent Project Wet curriculum

Project Partners Receiving Funds

- Urban 4-H, University of Minnesota: $5,000 to facilitate group sign up; $20,000 for 5 clubs to run programs
- University of Minnesota Extension Center for Youth Development in Duluth: $5,000 to facilitate group sign up; $20,000 for 5 clubs to run programs

- Science Museum of Minnesota's Department of Evaluation & Research in Learning $18,000 for formative and Summative evaluations

B. Project Impact and Long-term Strategy:
Splash Screen integrates current goals within the field of environmental education in terms of reaching urban audiences and integrating technology. The opportunity to run the program with accomplished youth educators at the University of Minnesota's 4-H sites and evaluate our efforts with Science Museum of Minnesota education researchers allows project staff to implement a new curriculum and best learn from the experience. In addition, because the program is replicable, it has potential for future scale-up across the state, through the 4-H networks working in collaboration with community-based watershed educators.

Water quality is a topic of universal interest as it is relevant statewide. Because of the ubiquity of this important resource in Minnesota, what we learn from this project will be of interest to other educators across the state, where many communities feature prominent water resources that impact community life.

C. Funding History:

Funding Source and Use of Funds	Funding Timeframe	$ Amount
N/A		

VIII. FEE TITLE ACQUISITION/CONSERVATION EASEMENT/RESTORATION REQUIREMENTS:

A. Parcel List: N/A

B. Acquisition/Restoration Information: N/A

IX. VISUAL COMPONENT or MAP(S): See attached

X. RESEARCH ADDENDUM: N/A

XI. REPORTING REQUIREMENTS:

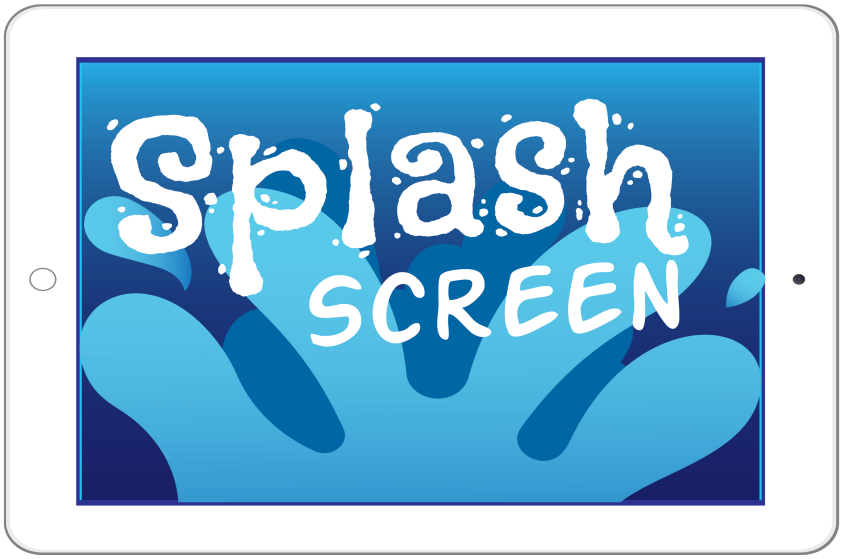
Periodic work plan status update reports will be submitted no later than February 1, 2016; July 31, 2016; and January 31, 2017. A final report and associated products will be submitted between April 1, 2017 and June 30, 2017.

Environment and Natural Resources Trust Fund
M.L. 2015 Project Budget

Project Title: Students Engaging Local Watersheds Using Mobile Technologies
Legal Citation: M.L. 2015, Chp. 76, Sec. 2, Subd. 05d
Project Manager: Joan Freese
Organization: Twin Cities Public Television
M.L. 2015 ENRTF Appropriation: **$** 147,000
Project Length and Completion Date: *1.5 Years, December 31, 2016*
Date of Report/Amendment Request 3/1/2017

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Revised Activity 1 Budget 3/1/17	Amount Spent	Activity 1 Balance	Activity 2 Budget	Revised Activity 2 Budget 3/1/17	Amount Spent	Activity 2 Balance	Activity 3 Budget	Amount Spent	Activity 3 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM					***Site Program Implementation***				***Evaluation***				
Personnel (Wages and Benefits)	**$50,595**	**$50,595**	$49,350	**$1,245**	**$5,750**	**$5,750**	$4,461	**$1,289**	**$4,150**	$3,919	**$231**	**$60,495**	**$2,765**
Joan Freese, Project Manager/Web & Print Producer $24,700 (74% salary, 26% benefits) 13.5% FTE for 1.5 Years													
Sarah Carter, STEM Content & Outreach Specialist $19,000 (74% salary, 26% benefits) 15% FTE for 1.5 Years													
Niki Becker, Outreach Coordinator $5,000 (74% salary, 26% benefits) 6% FTE for 1.5 Years													
Rita Karl, Director of STEM Education & Outreach $4,000 (74% salary, 26% benefits) 2% FTE for 1.5 Years													
Emily Stevens, Managing Producer $4,000 (74% salary, 26% benefits) 2% FTE for 1.5 Years													
Kyle Blakeborough, Asst Editor/Media Manager $6,000 (74% salary, 26% benefits) 5% FTE for 1.5 Years													
Professional/Technical/Service Contracts	**$25,805**	**$25,805**	$24,984	**$822**	**~~$30,000~~**	**$28,623**	$23,248	**$5,375**	**$18,000**	$18,000	**$0**	**$72,428**	**$6,197**
4H Partner Coordination Fee (U of M Twin Cities & Duluth) $10,000													
Science Museum of Minnesota Evaluation $18,000													
Curriculum Implementation & Technology Consultant $5805 (up to 129 hours @ $45/hr)													
4H Staff Leader fees for 10 sites @ $4,000 each													
Equipment/Tools/Supplies	**$700**	**$700**	$447	**$253**	**$2,250**	**$2,250**	$1,322	**$928**				**$2,950**	**$1,181**
Training event supplies - Curricula materials $700													
Poster session event supplies (2 events) $1,000													
25 field kits, allow $50 per educator & staffer $1,250													
Travel expenses in Minnesota	**$3,400**	**$3,400**	$3,157	**$243**	**$0**	**$0**	$0	**$0**	**$3,600**	$451	**$3,149**	**$7,000**	**$3,392**
2 State educational confs for presenting (includes conf fees) $1,900													
Mileage @ federal mileage rate (100 miles/month) $700													
Two evaluator trips to out-of-metro sites $1,000													
TPT Staff day trips/mileage to assist Duluth educators $400													
TPT Staff travel to Out of Metro training workshop $1,200													
Other	**~~$750~~**	**$500**	$500	**$0**	**~~$2,000~~**	**$3,627**	$3,627	**$0**			**$0**	**$4,127**	**$0**
Content Experts for professional development (5 x $50 honoraria)													
Training facility rental for Duluth training $500 **11/18/2015**													
Data & Technology Usage for 4H Group Activities ~~$1,500~~ $3,627 **12/31/16**													
4H site blog storage fees ~~$500~~ incl in Data & Technology Usage													
COLUMN TOTAL	**$81,250**	**$81,000**	**$78,437**	**$2,563**	**$40,000**	**$40,250**	**$32,658**	**$7,592**	**$25,750**	**$22,370**	**$3,380**	**$147,000**	**$13,535**

SPLASH SCREEN



10/28/16

Summative Evaluation

By Zdanna King and Amy Grack Nelson
Department of Evaluation and Research on Learning
Science Museum of Minnesota

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Overview

Summative evaluation of the Splash Screen program was guided by four overarching evaluation questions that are aligned with project outcomes for educators and youth.

1. To what extent does the project increase educator awareness and knowledge of issues around watershed health and environmental stewardship?
2. To what extent do educators integrate inquiry place-based education strategies into their use of the Splash Screen program?
3. To what extent does the project increase educator knowledge and skills around the integration of technology into environmental education?
4. To what extent do youth increase their awareness and knowledge about watersheds, issues and decisions that affect watershed health, and actions they can take to be stewards of watersheds in their community?

At the beginning of the project, we worked with the Splash Screen team to develop a logic model (see Appendix A) that identified the project activities, audience for the activities, and outcomes for both educators and youth. The logic model's outcomes provided insight into the kinds of data we needed in order to address the evaluation questions.

Methods

A mixed-methods approach (using both quantitative and qualitative data) was used to provide the depth and breadth of information necessary to answer the evaluation questions (see Table 1). We gathered data from educators leading Splash Screen programming and the youth participating in the programs.

Table 1. Planning matrix for establishing data collection methods for addressing each of the evaluation questions.

Evaluation Questions	Data Collection Methods
1. To what extent does the project increase educator awareness and knowledge of issues around watershed health and environmental stewardship?	• Pre/Post-training surveys • Post-training online reflective questions • Post-implementation survey
2. To what extent do educators integrate place-based education strategies into their use of the Splash Screen program?	• Post-implementation survey
3. To what extent does the project increase educator knowledge and skills around the integration of technology into environmental education?	• Pre/Post-training surveys • Post-training online reflective questions • Post-implementation survey
4. To what extent do youth increase their awareness and knowledge about watersheds, issues and decisions that affect watershed health, and actions they can take to be stewards of watersheds in their community?	• Pre/post youth surveys • Youth KidBlog posts

Data collection with educators

Data collection methods
Data was collected from educators over the course of the project through a variety of surveys. Educators completed a written survey at the beginning and end of their two-day training. A few weeks after the training, they were emailed a link to an online survey that asked more detailed reflective questions about their experience, specifically in relation to place-based education, inquiry, and the use of technology in environmental education. In the fall, after educators finished implementing the Splash Screen program, they were sent a post-implementation online survey with some questions from the prior educator surveys to measure change over time and questions related to program implementation.

Sample
Educators were recruited to participate in the evaluation of the Splash Screen program on the first day of their training. One training took place March 11 – 12, 2016 in Duluth. An additional training occurred March 18 – 19, 2016 in St. Paul. Educators indicated their agreement to participate in the evaluation through a signed consent form. A total of 18 educators consented to participate. Two individuals that participated in the training ended up not implementing a Splash Screen program so they were taken out of the sample for the summative evaluation. This left 16 educators for the summative evaluation sampling frame. These educators were sent the post-implementation survey with multiple reminders from evaluation and 4-H staff. The people who responded to the survey make up the educator sample for the summative evaluation. A total of seven educators completed the post-implementation survey. When looking more closely at who responded, these seven individuals included all of the staff who had main leadership roles in implementing Splash Screen programming in the Twin Cities (five educators), along with two staff who were involved in program support roles (leading and planning some activities with youth). Missing from the sample are educators from Duluth and additional people who provided support to implementation in both metro areas. So, even though only seven people responded, they included main programming leads for the projects and thus more representative of people who might use the Splash Screen curriculum in the future to lead programming

Data collection with youth

Data collection methods
Quantitative data was gathered through youth pre- and post-surveys. The surveys were composed of multiple choice questions that were identical from pre to post in order to measure knowledge gains as a result of participating in the program. The surveys were administered electronically on tablets and took around five minutes to complete. The pre-survey was administered during Lesson 1 of the Splash Screen curriculum or immediately preceding Lesson 2, while the post-survey was completed after Lesson 12 when the youth had completed programming and final projects. We administered the post-survey in this way because we did not want to disrupt the celebration portion of the program, when youth presented their final projects to each other and the community (Lesson 13).

Qualitative data was gathered through embedded assessments. Each lesson in the curriculum includes a journal prompt at the end of the lesson. Youth responded to these prompts on KidBlog as part of their program. Two of the lessons' prompts aligned with program outcomes that were being measured as part of the evaluation. One of the prompts in Lesson 2 asked youth, "What is a watershed?" The prompt in Lesson 8 asked, "What best management practices (BMPs) could help reduce the amount of runoff at the site (if needed)?" Instead of asking about watersheds and best management practices through the youth surveys, youths' journal entries for these two questions were used as evaluation data.

Sample

Parents or guardians and youth were notified of the Splash Screen program evaluation in a letter from our evaluation team that was included in the 4-H registration materials. The letter was a means for passive consent, meaning if parents or guardians did not want their child to participate in the evaluation they had to contact the evaluation team. We did not receive any requests from parents or guardians to exclude their child from data collection, so all 107 youth participants were the sampling frame for the evaluation. Of these youth, we ended up with 56 matched pre- and post-surveys, representing all 13 Splash Screen programs. Some youth did not attend the days when the pre- or post-survey was administered, which is why the sample for the matched surveys is less than the number of youth participants. There were also instances where youth may not have responded to all of the questions on a pre- or post-survey, which is why the "n" value may vary for results of individual questions. The samples for the embedded journal prompts were 71 responses from 10 programs for Lesson 2 and 45 responses from 9 programs for Lesson 8. Youth attendance sometimes varied over the course of a program, and due to technical difficulties, three of the 13 Splash Screen programs did not complete the journaling activity for Lesson 2 and four programs did not complete the activity for Lesson 8.

Program Delivery and Attendance

Thirteen 4-H programs utilized the Splash Screen curriculum during the spring and summer of 2016, including two in Duluth and 11 in the Twin Cities. Twin Cities programs were held at nine locations and included the Coon Rapids Dam, Heritage Park, Washington County, Packer Pad, the American Indian Magnet School, the Harriet Tubman Center, and three parks in the Minneapolis Parks and Recreation district (Martin Luther King Jr., Pearl, and Pershing). The Lincoln Park Middle School was the only location in Duluth. Nine of the programs were delivered over four intensive days that drew almost exclusively from the Splash Screen program and Project WET curricula (see Table 2). The other four programs were delivered over the course of several weeks and were augmented by additional content and experiences.

Table 2. Splash Screen program locations and style of delivery.

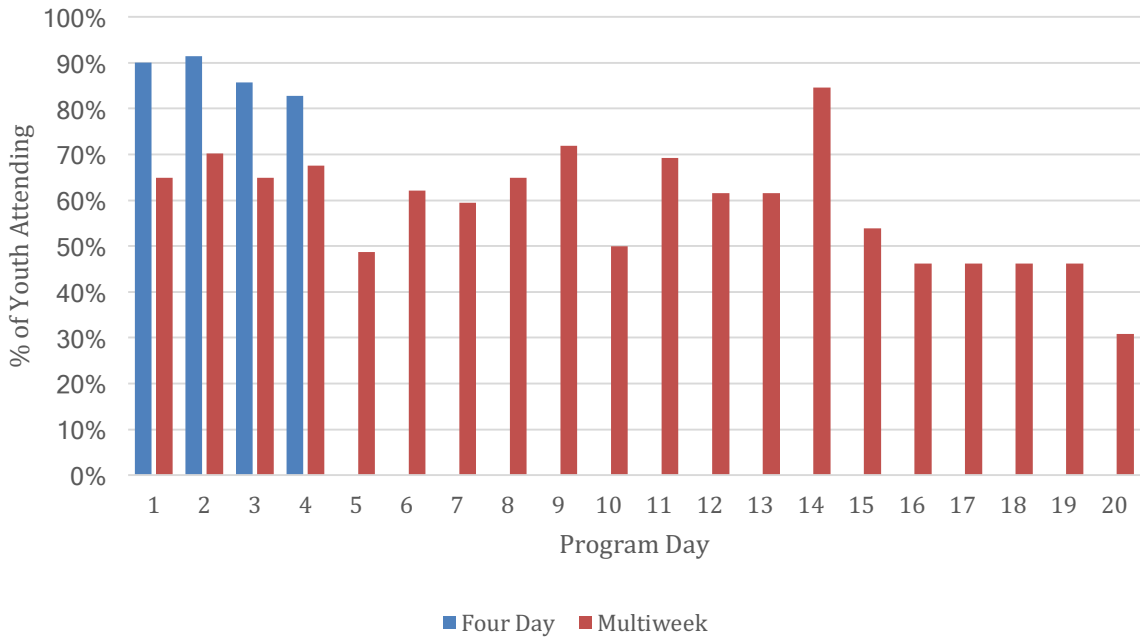
	4 Day Program	Multi-Week Program
Coon Rapids Dam	1	1
Heritage Park	1	1
Washington County	1	0
American Indian Magnet School	0	1
Harriet Tubman Center	1	0
Packer Pad	1	0
Martin Luther King Jr. Park	1	0
Pershing Park	1	0
Pearl Park	1	0
Lincoln Park Middle School	1	1
Total	9	4

While all of the programs began by implementing Lessons 1 and 2 and concluded with the final presentation share-out in Lesson 13, there was a lot of variability in the order of delivery for the rest of the lessons in the program guide. During webinars, educators shared that this flexibility of program design helped them to implement Splash Screen in the context of the ever-changing weather, the availability of local experts, and their access to other programming resources.

Youth attendance

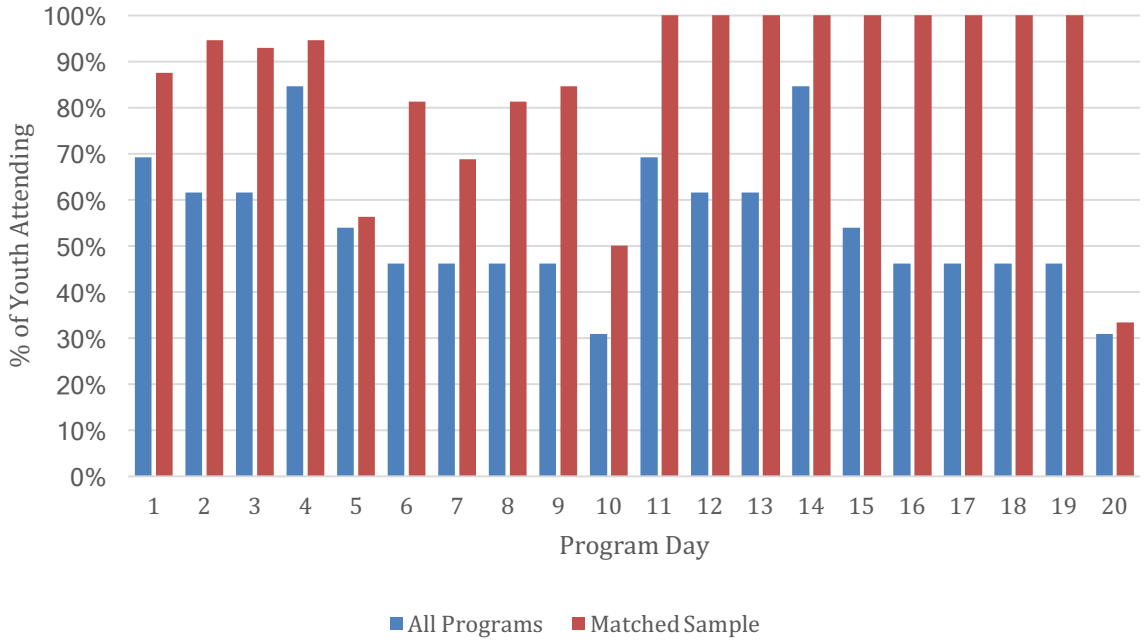
According to attendance records, 107 youth participated in the Splash Screen program in 2016. About two-thirds (65%) of the youth attended intensive four day programs, while the remaining 35% were involved in programs that had 8, 9, 10 and 20 program days held over several weeks. Attendance was relatively higher for youth engaged in the intensive programming, while youth who were engaged in long-term programming had higher absenteeism (see Chart 1). For intensive four day programs, 83% to 91% of youth were present each day, with an average of 83% of the youth attending on any given day. However, for longer term programs, youth attendance ranged from 31% to 85%, with on average 59% of youth attending any one day of the program. Looking at attendance across all days of a program, of the 70 youth participating in four-day programming, 70% of them attended all four days. Of the 37 youth involved in multiweek programming, only 22% of them attended all of the program days (8, 9, 10, or 20 days).

Chart 1. Youth attendance by program day.



The youth responses presented in this report are taken from the matched survey responses of 56 youth. Youth who filled out both a pre- and post-survey tended to be present on programming days more often than their peers (see Chart 2). For the matched sample, each program day had between 33% and 100% of youth attending, with an average of 86% of youth from the matched sample attending on any given day.

Chart 2. Youth attendance by program day for all youth compared with the attendance of youth who had matched survey responses.



Findings from Splash Screen Youth Participants

Youth showed gains in being able to identify the name of their local watershed

On the pre- and post-program surveys, we asked youth, "What is the name of the watershed where your program takes place?" and offered them three plausible options, as well as "I don't know." Before the program, about one quarter of youth in the Twin Cities and Duluth were able to correctly identify the name of their local watershed (see Tables 3 & 4). Afterwards, most of Twin Cities youth (81%) correctly selected "Mississippi River watershed" from the same list of options, but only half of the Duluth youth correctly chose "Lake Superior watershed."

Table 3. For Twin Cities based programs: "What is the name of the watershed where your program takes place?" (n=47)

	Pre	Post	Change
Mississippi River watershed *	26%	**81%**	+55%
Twin Cities watershed	40%	9%	-31%
Minnesota State watershed	-	6%	+6%
I don't know	34%	4%	-30%

* Correct response is marked with an asterisk.

Table 4. For Duluth based programs: "What is the name of the watershed where your program takes place?" (n=8)

	Pre	Post	Change
Lake Superior watershed *	25%	**50%**	+25%
Duluth watershed	-	25%	+25%
Minnesota State watershed	-	-	-
I don't know	75%	25%	-50%

* Correct response is marked with an asterisk.

Less than a tenth of youth could correctly describe a watershed after Lesson 2

During the second lesson of the Splash Screen program, youth mapped their watershed using Google My Maps. Youth were instructed to choose a location of interest on the map and mark notable features including bodies of water, nearby high ground where water might flow down from into the bodies of water, and some structures that impact water flow. The lesson concluded with a journal prompt asking youth, "What is a watershed?" Youth responded to this question on their KidBlog program page using tablets. Of the 13 Splash Screen programs, 10 collected data for this question. Technical difficulties prevented the other three programs from collecting journal responses. In total there were 72 youth responses to this question. One response was off topic so it was removed from analysis, leaving a sample of 71 youth responses.

Youth responses were analyzed based on how well they described a watershed. Analysis was informed by a watershed definition provided to us by the Splash Screen team, "All of the land area that drains into a particular river or lake is called its watershed. The land area includes all the people, animals, and man-made and natural features." This is similar, although less detailed, to the definition of a watershed provided to educators during their initial Splash Screen training, "The land area from which surface runoff drains into a stream channel, lake, reservoir or other body of water; also called a drainage basin" (Project WET Foundation, 2011, p. 591). In addition to the watershed definition, we also looked for youths' use of terms that the Splash Screen team considered watershed vocabulary. These watershed vocabulary terms were described by the Splash Screen team as follows:

- Divides: Marks the high point of land (mountains, hills, ridges) that separate one watershed from another.
- Headwaters: The upper limits of the watershed (highest point, origination point).
- Mouth: The part of a river, creek or stream where it runs into a larger body of water (river, lake, ocean).
- Tributary: A stream or river that feeds into a larger stream, lake or river.
- Main stem: The main body of water (river, stream, lake) in the watershed.
- Erosion: The wearing away of rock and soil due to wind, weathering, water, ice, or other physical, chemical, or biological forces. The rate of erosion may be increased by land-use activities.
- Runoff: Water flowing across the land that does not infiltrate the soil, but drains into storm sewers and moves into surface and ground waters.

Youth responses were sorted into four categories based on how well they aligned with the project's definition of a watershed.

- Completely in line: Response included the relationship of water and land in a way that reflected the project's definition of a watershed.
- Aligns somewhat: Response included partial ideas of what a watershed is and/or used one of the watershed vocabulary terms (without completely describing a watershed).
- Does not align: Response did not align with the definition of a watershed.
- Unsure: Response where youth indicated that they didn't know the answer.

Full youth responses, complete with emojis and enthusiastic punctuation, are shared in Appendix B.

After Lesson 2, most youth did not have a full understanding of what a watershed was (see Table 5). Only 8% of youth were able to provide a definition of watersheds that described the land and its relation to water flowing to a particular water body. A third of youth provided definitions that included partial aspects of the definition of a watershed or used watershed vocabulary terms. Partial definitions were further categorized into four subcategories where youth described a watershed in one of four ways: 1) a place where water collects, 2) water flowing or connecting together, 3) an area that divides bodies of water, or 4) water flowing from a high to a low point. Some youth also mentioned watershed terms in their partial responses. When talking about where water collects, two youth mentioned "tributaries." When talking about water flowing or connecting together, two youth talked about the "headwater" and "mouth" of a river. Three youth talked about how a watershed is an area that "divides" water bodies. Looking at the remaining responses, a majority of the youth (57%) were either unsure of the definition of a watershed or provided a definition that did not align with project's definition of a watershed. Definitions that did not align included descriptions such as a place that holds or stores water, a place where water goes, flowing or moving water, or a shed that holds water.

Table 5. Alignment of youth definitions of a watershed with the Splash Screen project's definition. (n=71)

	Percent of Youth
Definition completely in line	8%
Definition aligns somewhat	34%
Definition does not align	46%
Unsure about definition	11%

Youth had a better understanding of actions that could help and harm watersheds

Youth were able to better differentiate between actions that could hurt or harm a watershed after participating in Splash Screen (see Tables 6 & 7). The pre- and post-surveys included a list of actions and youth were asked if each action would help, hurt, or not make a difference to the watershed. They were also provided with the option, "I'm not sure" to prevent them from guessing the answer, and thus providing a more accurate measure of their knowledge. The list of actions included five behaviors that support watershed health and four that would hurt a watershed. The list was developed in collaboration with the Splash Screen team to ensure the options aligned with what was expected to be covered in the Splash Screen program.

Youth came into the program with some familiarity of actions they could take to help a watershed, and left with an increased understanding of helpful behaviors. At the beginning of the program, almost all youth knew that picking up litter off the street helps watersheds and three-quarters understood that picking up dog waste helps. Planting native plants near the side of the road and using a rain barrel to collect water were least familiar to youth. At the end of the program, a majority of youth were able to correctly identify the five actions in the list that help watersheds. Almost all the youth identified planting a rain garden and picking up dog waste as helpful actions. There were large gains in the number of youth understanding that planting native plants near the side of the road, creating a rain garden in someone's yard, and collecting water in a rain barrel would help a watershed.

Over half the youth entered the program unfamiliar with some of the actions that can hurt a watershed, however there were gains in the number of youth being able to identify harmful actions by the end of the program. Most youth entered the program understanding that pouring oil down a storm drain is harmful and by the end of the program almost all the youth could identify this as a harmful action. Close to half the youth entered the program aware that washing a car with soap in the driveway and using salt to melt sidewalk ice were harmful actions, at the end of the program this increased to close to three-quarters of youth for both of these actions. Youth were least familiar with the effects of paving over a gravel lot to make a basketball court at the beginning of the program and only half the youth knew this was harmful by the end.

Table 6. "Does this hurt, help, or not make a difference to the watershed?"

Actions that HELP	**Helps the watershed**			**Hurts the watershed**			**It doesn't make a difference**			**I'm not sure**		
	Pre	**Post**	**Change**	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
Plant native plants near the side of the road (n=53)	32%	**64%**	**+32%**	15%	15%	-	25%	11%	-14%	28%	11%	-17%
Create a rain garden in someone's yard (n=54)	61%	**91%**	**+30%**	2%	-	+2%	15%	6%	-9%	22%	4%	-18%
Collect water in a rain barrel to water a garden (n=53)	49%	**74%**	**+25%**	8%	6%	-2%	32%	17%	-15%	11%	4%	-7%
Pick up dog waste (n=55)	76%	**92%**	**+16%**	7%	-	-7%	9%	5%	-4%	7%	2%	-5%
Pick up litter off the street (n=51)	92%	**94%**	**+2%**	-	6%	+6%	4%	-	-4%	4%	-	-4%

Table 7. "Does this hurt, help, or not make a difference to the watershed?" (n=54)

Actions that HURT	**Helps the watershed**			**Hurts the watershed**			**It doesn't make a difference**			**I'm not sure**		
	Pre	Post	Change	**Pre**	**Post**	**Change**	Pre	Post	Change	Pre	Post	Change
Pave over a gravel lot to make a basketball court	17%	15%	-2%	20%	**50%**	**+30%**	33%	22%	-11%	30%	13%	-17%
Use salt on the sidewalk to melt ice	19%	7%	-12%	48%	**74%**	**+26%**	20%	11%	-9%	13%	11%	-2%
Rinse a soapy car off in the driveway	19%	6%	-13%	48%	**72%**	**+24%**	20%	13%	-7%	13%	9%	-4%
Get rid of old oil by pouring it down the storm drain	4%	4%	-	89%	**96%**	**+7%**	2%	-	-2%	6%	-	-6%

A majority of youth understood that storm drains lead straight to nearby waterways, but some youth still have misconceptions

One of Splash Screen's youth outcomes was that youth would develop an understanding of storm runoff. A misconception some people have is that storm water is treated in a plant after it goes down the storm drain instead of going directly to a nearby river without being treated in any way. We developed a question to gauge youth's understanding of storm water runoff and how many youth entered the program with a misconception of what happens when water goes down a storm drain. As illustrated in Table 8, a little more than half the youth came into the program correctly identifying where water goes after entering a storm drain, and two-fifths had the misconception that water goes to a water treatment plant after entering the storm sewer. Correct understandings of storm water runoff increased to 70% at the end of the program, but a quarter of youth still left the program with a misconception that water is treated after entering the storm drain.

Table 8. "Water is going down into this storm drain. What will happen to the water?" (n=55)

	Pre	Post	Change
It will go into a nearby river. *	55%	**70%**	+15%
It will go to a water treatment plant.	40%	25%	-15%
It will stay in the storm drain system.	5%	5%	-

* Correct response is marked with an asterisk.

Two-thirds of youth were able to suggest best management practices to reduce runoff at local sites

In Lesson 7, youth worked in small groups to survey a local site to determine the amount of permeable and impermeable surfaces and estimate how much runoff the site could generate. During Lesson 8, youth debriefed what they discovered from the runoff surveys. After the conversation, youth were prompted to journal a response to the prompt, "What Best Management Practices (BMPS) could help reduce the amount of runoff at the site (if needed)?" A total of 46 youth, from nine programs, responded to the journal prompt.

Youth responses were categorized into four categories based on how well they aligned with the project's information about best practices to reduce runoff.

- Listed best management practices to reduce runoff: Response included changes to either the landscaping or hardscaping of the site to retain water.
- Did not list a best management practice: Response was off topic or included a general watershed stewardship action that would not impact runoff.
- Unsure: Response where youth indicated that they didn't know the answer.

Full youth responses, complete with emojis and enthusiastic punctuation, are shared in Appendix C.

Almost two-thirds of the youth listed best management practices for reducing runoff at their chosen sites and another one-fifth shared practices that are good for watershed health in general (see Table 9). Around one tenth wrote "I don't know," and over a quarter did not list actions that would reduce runoff. Out of the 29 youth who shared best management practices, over half (55%) offered hardscaping

examples of non-plant features, such as rain barrels, roof design and permeable paving. About three-quarters (76%) of the youth best management responses included changes to landscaping to incorporate more plantings, rain gardens or holding ponds where water could be slowed down.

Table 9. Alignment of youth responses with best management practices to reduce runoff. (n=45)

	Percent of Youth
Listed best management practices to reduce runoff	64%
Did not list a best management practice to reduce runoff	29%
Unsure	9%

Youth Demographics

We received 56 matched pre-post survey responses from youth. Over half of the youth (58%) identified as boys and 40% identified as girls, with 2% selecting "other" to describe their gender. Most youth attended programs in the Twin Cities (85%) and ranged in age from 3rd to 9th grade (see Table 10). Duluth youth ranged from 6t to 9th grades and made up 15% of the matched survey responses.

Table 10. "What grade are you in? (If answering in the summer, what grade will you be in this fall?)"

	Twin Cities (n=47)	Duluth (n=8)
3rd grade	2%	-
4th grade	13%	-
5th grade	11%	-
6th grade	40%	38%
7th grade	23%	38%
8th grade	9%	12%
9th grade	2%	12%

Findings from Splash Screen Educators

Educators had gains in Splash Screen-related content and pedagogical knowledge

Educators were asked to rate how knowledgeable they felt about four different content and pedagogical aspects of the Splash Screen program: 1) what a watershed is, 2) actions youth can take to help improve their local watershed, 3) how to help youth learn about environmental science in the context of their own community, and 4) how to engage local experts to facilitate learning experiences with youth. The sample includes matched responses from the pre-training survey, post-training survey, and post-implementation survey for seven educators.

There were gains in knowledge across all content and pedagogical areas between the time when educators first became involved in Splash Screen to after they had implemented the programming with youth (see Chart 3). Knowledge of what a watershed is had the highest number of educators rating themselves as very knowledgeable at the end of the project. Before the program, only three educators felt very knowledgeable about the definition of a watershed, whereas after the project, six out of seven educators gave this rating.

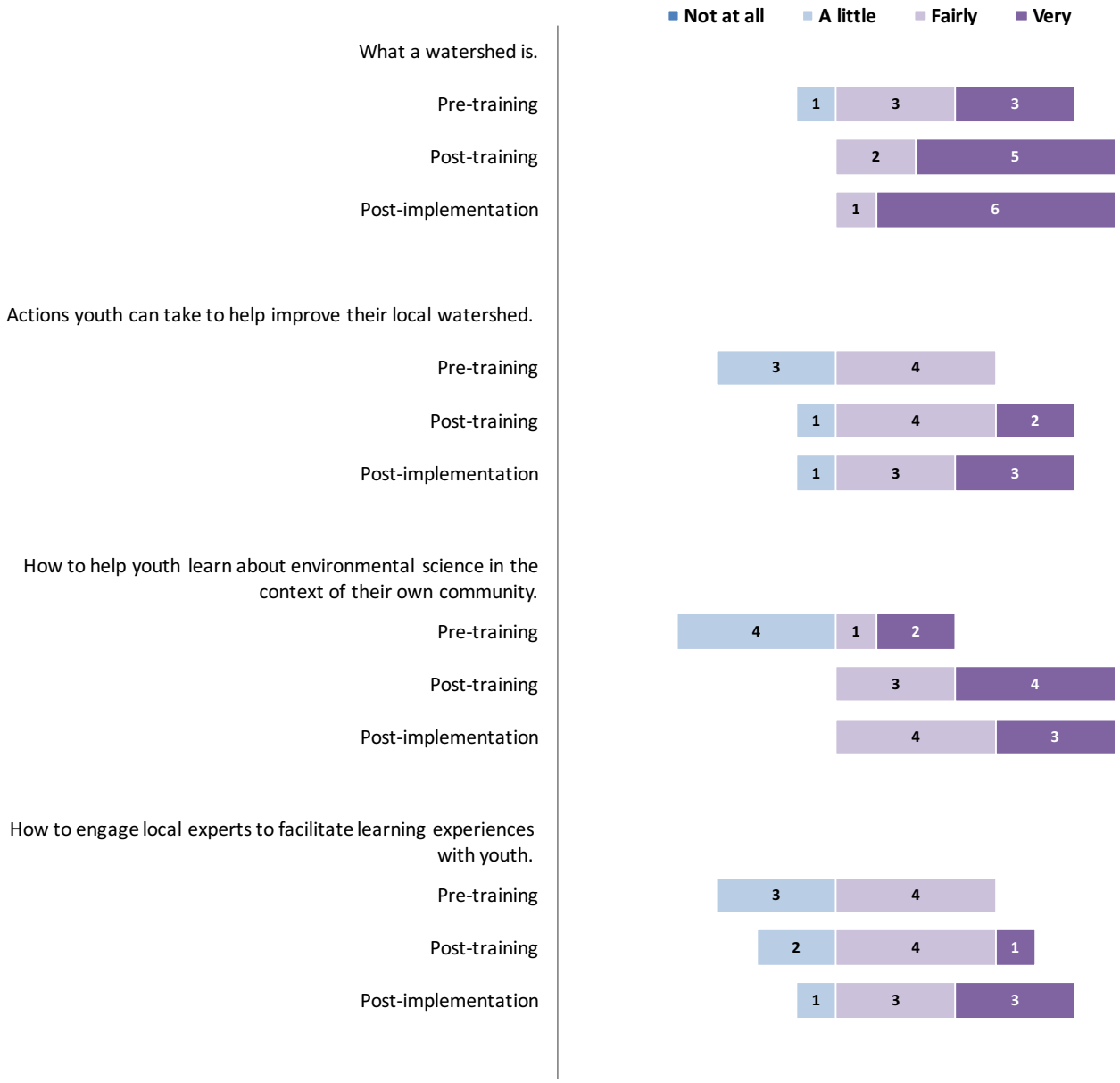
Some educators increased their knowledge of "actions youth can take to help improve their local watershed." At the beginning of the project, three felt a little knowledgeable and four felt fairly knowledgeable. By the end of the project, only three felt very knowledgeable, three felt fairly knowledgeable, and one only felt a little knowledgeable.

Educators self-reported gains in knowledge about "how to help youth learn about environmental science in the context of their own communities." Before the training, four of the educators wrote that they were only a little knowledgeable about how to do this. By the end of the project, knowledge had shifted. Four educators felt fairly knowledgeable and three educators felt very knowledge about how to implement this place-based education strategy.

Some educators increased their knowledge of "how to engage local experts to facilitate learning experiences with youth." At the beginning of the project, three educators felt a little knowledgeable of how to engage experts and four felt fairly knowledgeable. By the end of the project, there was a slight shift and three individuals felt very knowledgeable and three felt fairly knowledgeable. However, there was still one person that only felt a little knowledgeable of how to engage local experts.

Across the five items, it is important to note that for the three statements that had one individual feeling only a little knowledgeable on the post-implementation survey, it is a different educator in each instance. The same educator did not rate her/himself low across three items.

Chart 3. Educators' ratings of Splash Screen-related content and pedagogical knowledge. (n=7)



All educators could define a watershed by the end of the project

The Splash Screen team used the Project WET Curriculum and Activity Guide's definition of watersheds when training educators. In the Guide, a watershed is defined as, "The land area from which surface runoff drains into a stream channel, lake, reservoir or other body of water; also called a drainage basin" (Project WET Foundation, 2011, p. 591). All Splash Screen educators received a copy of the guide as part of their project materials.

We wanted to get a sense of educators' understanding of watersheds over the course of the project so we asked them how they would describe a watershed to a 4-H group. Their responses are matched in Table 11 to demonstrate how definitions changed from before the training to after the training to after implementation. Their responses were categorized in relation to how well their definition aligned with the Project WET definition.

- Completely in line: Talked about the relationship of water and land in their definition in a way that reflected the Project WET definition.
- Align somewhat: Talked about watersheds in very general terms.
- Does not align: Responded, but talked about something else (like water conservation).
- Unsure: Responded that they were unsure how to describe a watershed.

There was one case where someone misinterpreted the question and talked about how he/she would facilitate the youth experience but didn't provide a definition of a watershed. This individual's response is not included in Table 11.

By the end of the project, all six educators described watersheds in a way that aligned with the Project WET definition. Of these six individuals, half of them came to the initial training with a definition that completely aligned with the Project WET definition and continued to describe watersheds in this way on their post-training and post-implementation surveys. Two educators came into the training with definitions that somewhat aligned, but afterwards their definition expanded to fully align with the Project WET definition. Both before and after the training, one educator talked about watersheds as water flowing together (aligning somewhat with the definition). However, by the end of the summer, after implementing the program, this educator was able to provide a definition that described a watershed as water draining to a similar area, which more fully aligned with the Project WET definition.

Table 11. "If youth asked you what a watershed is, how would you describe it to them?" (n=6)

Pre → Post → Post Codes	Pre-Training	Post-Training	Post-Implementation
Completely in line → Completely in line → Completely in line	A watershed is the area of land that surrounds a body of water. Any rain that falls on that land will eventually make its way to that body of water. Sometimes that water picks up stuff along the way and brings it to that body of water.	An area of land surrounding a body of water, where any water that falls on that land eventually drains into that body of water. It is determined by elevation.	A watershed is the land that surrounds a body of water. If a rain drop falls on that land, and it would eventually drain to that body of water, then that land is a watershed for that body of water.
	A large region in which all of the bodies of water (lakes, streams, creaks…) are connected because of running/contributing to a river or mass movement of water which enters and exits many thousands of miles of land and could eventually reach an ocean.	The bodies of water, local and regional, that we use in our water cycle which travels downstream, absorbs into permeable surfaces and hosts many ecosystems.	Imagine you and all your friends. You all are waking up in the morning and it's a school day. You all live in different parts of St. Paul. But you all are heading toward the school. You all take different routes, maybe on different buses, maybe some of you share the same bus after a few stops. Eventually, you all get to school. Imagine that water is like you and your friends! Water is flowing from many homes around cities and states, but is generally flowing towards a basin. Many different streams, rivers, lakes, storm drains, and wetlands are on different routes, but flowing together as a great watershed. Some kids on the bus might be sick and some buses might break down on the way to school. That means that sick kids spread their germs to other kids once they get to school. And a broken down bus means that there's less kids learning in school and contributing their ideas. Sometimes water gets "sick" too. If water that travels in this big watershed gets contaminated, it contaminates the water that it's flowing into, all the way into the basin. Some wetlands or rivers are blocked from flowing properly, sort of like a broken down bus, which creates an imbalance in the water sources that are supposed to be helping by contributing to freshwaters. Humans are often the reason that water is contaminated or re-routed away from watersheds, but kids and communities can help to solve those problems.

Pre → Post → Post Codes	Pre-Training	Post-Training	Post-Implementation
Completely in line → Completely in line → Completely in line	A watershed is the large collection basin for a community where the water of the community flows into.	A watershed is a local area where water is collected naturally before it flows to the oceans. This area is size dependent based on the topographic (geography) of the area. I.E. on a mountain range, water can flow in separate directions.	A watershed is that part of the ecosystem where water collects in a basin, river or stream. Water will flow from the highest to the lowest points. In Minnesota, water flows to the Gulf of Mexico; the Great Lakes to the Atlantic Ocean and to Hudson Bay. Additionally, the watershed encompasses all living and non-living parts of area; and above, below and on the ground. Local watersheds can be part of a larger watershed. For example, the Mississippi River Watershed flows through or by 10 states and affects thirty-one states.
Align somewhat → Completely in line → Completely in line	A watershed is a network of all the water used in your community - up and down stream. From rivers to lakes to rain to sewers to even your kitchen sink.	The network of rivers, streams, pipes, and land that drains water in an area. It is both a large scale and sub areas that all ultimately drain to the seas - how water connects each of us to all water in the world.	A watershed is all the land where water is drained to the same place.
	A watershed is a specific area of water in which all above & underground tributaries are connected.	An area of land & its water bodies that are not only interconnected but also drain/flow to a common source, before flowing into a larger scale area.	A watershed is the area of land which "sheds" the water and collects and drains into the same place.
Align somewhat → Align somewhat → Completely in line	A watershed is a grouping of lakes, rivers, ponds, other sources of water that all flows together. This is where a community can have access to water resources.	A region where all water is connected + flows together. Big watersheds have multiple mini watersheds.	A watershed is an area of land were all the water in that area of land eventually will flow to the same area. Watershed have rivers, lakes, streams, rain, people, animals, communities. We all live in a watershed.

Educators increased their knowledge of sources of watershed pollution

One outcome of the Splash Screen program was that educators would be knowledgeable of sources of urban watershed pollution, since it is a topic they would have to discuss with youth. Educators were asked before the training, after the training, and after program implementation, "What are some sources of urban watershed pollution? Try and list as many as you can." Seven educators responded to the question on both the pre-training, post-training, and post-implementation surveys. Responses were coded into three categories of watershed pollution that were defined by the Splash Screen program team.

- Chemical (fertilizers, road salt, herbicides, industrial waste, oil, pharmaceuticals)
- Man-made (litter, wrappers, cigarette butts, trash)
- Organic (dog poop, leaves, grass clippings, sediment, yard waste)

Before the training, educators were most knowledgeable of chemical sources of watershed pollution (see Table 12). By the end of the training, all seven educators were knowledgeable of all three types of watershed pollution. This knowledge remained after post-implementation.

Table 12. Educators' knowledge of different types of watershed pollution before the training, after the training, and after program implementation. (n=7)

	Pre-Training	Post-Training	Post-Implementation
Chemical	7	7	7
Man-made	5	7	7
Organic	5	7	7

Educators had varying levels of knowledge of watershed pollution before the training. As illustrated in Table 13, only four out of the seven educators mentioned pollution sources from all three categories. By the end of the training and again after implementation, all educators mentioned all three categories. Educators' matched responses across the three surveys are provided in Table 14.

Table 13. Number of watershed pollution categories mentioned by educators before the training, after the training, and after program implementation. (n=7)

	Pre-Training	Post-Training	Post-Implementation
Listed 3 categories	4	7	7
Listed 2 categories	2	0	0
Listed 1 category	1	0	0
Listed 0 categories	0	0	0

Table 14. "What are some sources of urban watershed pollution? (Try and list as many as you can.)" (n=7)

# of Categories Pre → Post → Post	Pre-Training	Post-Training	Post-Implementation
1 → 3 → 3	Lawn chemicals, ex: Roundup, storm runoff, industrial waste, geologic contamination --> metals in bedrock seep into water table.	Agriculture, industrial waste, litter, runoff, sedimentation, erosion.	Litter, oil, heavy metals, lawn chemicals/fertilizers, sewage like dog waste, grass clippings, road salts.
2 → 3 → 3	Chemical run off, gasoline pollution, trash in lakes + rivers, using more water than needed.	Chemical run off, salt, trash, plastic, scat, gasoline.	Trash/litter, fertilizer, gas, emissions, animal waste, sediment, chemical runoff, oil runoff, storm water runoff.
	Factories, boating, pollution, fecal matter, fertilizers (runoff), air pollution, car fluids leaking (runoff).	Garbage, sediment, oil from cars/trains/planes/boats, garbage from streets getting into the storm drains, pollution, fecal matter from animals or leaking septic systems, upstream from factories/chlorine/chemicals/breweries/etc.	Feces, oil from cars, factory pollution, litter, farming chemicals.
3 → 3 → 3	Fertilizers, oil, and other liquids from vehicles, grass clipping and other yard waste, triclosan from soap, sediments from eroded soils (and sand from the roads), salt from the winter, trash etc.	From runoff sedimentation, trash, oil and other liquids from cars, fertilizers, etc.	Runoff from streets and yards (things like oil, fertilizers, trash, etc.). Sediments collected from soils along the way. Sand and salt picked up from winter roads.
	Car leaks, trash falling into and running along the storm drain systems, industrial waste, increase water speed on paved surfaces - creates faster currents, carries more trash, and creates more erosion, capitalism, unraked leaves - eutrophication.	Farm fertilizers, oil, car pollution - fuel/oil, leaks, air exhaust, fecal matter, industrial waste, trash.	Vehicle oils, exhaust, and parts pollution. Storm drains carrying leaves and litter. Amplified erosion due to vast impermeable surfaces such as parking lots, streets, park paths, stripped shorelines. Contamination due to industrial/civilian waste outputs into the river. Imbalanced ecosystems due to over-crowded human population and less wildlife and vegetation.

# of Categories Pre → Post → Post	Pre-Training	Post-Training	Post-Implementation
3 → 3 → 3	Organic matter & leaves, branches etc., pollution: oil/gas runoff from cars, airplane fuel condensates; chemical soil additives (herbicides and pesticides), trash, industrial waste in hot water from power plants, nuclear waste, etc., pharmaceutical & personal care product disposal.	Pharmaceuticals; personal care products; organic debris; industrial waste; farm waste; household waste; trash: plastic bottles, cigarette butts, bags, wrappers, etc.; oil based products from cans, planes, boats, etc.	Storm water run-off; pollution from cars, planes, etc.; agricultural sources, such as herbicides, pesticides, and fertilizers; pet waste; litter including trash, paper, plastics, etc.; industrial waste caused by manufacturing processes; mining waste; fracking, nuclear plant; and utility company discharges; home owners not repairing leaky cars, improper disposal of lawn and garden waste, and excessive use of chemical additives; and household cleaning products; pharmaceuticals and medicines, and food waste being put down drains.
3 → 3 → 3	Medications, fertilizers, street salt/chemicals, litter, dissolved dirty air/particles, leaf litter, used liquids (e.g. improperly disposed of), invasive species, runoff.	Oil, salt, cigarettes, fertilizers, medications, human/animal waste, silt, dissolved pesticide, litter, organic matter.	Litter, cigarette butts, salt/chemicals on roads, fertilizers/chemicals on lawns, animal excrement, sand/soil runoff, oil/gas/liquid runoff.

All of the educators knew more than three best management practices for urban watersheds

One of the outcomes for the Splash Screen project was for educators to be able to list three common Best Management Practices (BMPs) for urban watersheds. These might include rain barrels, rain gardens, yard care, storm drain maintenance, or other practices that help retain water on a property. During the training, Project WET activities also highlighted the importance of maintaining cleaner watersheds through city planning and a variety of personal actions.

In the post-implementation survey, we asked educators to list things that they could do to protect their local watersheds and compared these with their responses to the pre-training and post-training surveys. We coded these comments by the number of correct examples educators listed (see Table 15). We did not count listed items that might not be considered to be protecting urban watersheds (like 'being aware of where water flows'). Also, we counted items that were grouped together by the respondent as one example (like, "make sure garbage and waste are picked up"). Any items not included in our coding counts (because they were an incorrect or questionable response) are italicized.

Before the training, educators listed from one to seven BMPs for urban watershed, with an an average of five practices cited across the seven educators. By the end of program implementation, all seven educators were able to list at least three BMPs, with some educators listing as many as 10. On the post-implementation survey, educators were able to cite an average of seven BMPs; more than double the project's goal.

Table 15. "What are some things that we can do to protect urban watersheds? (Try and list as many as you can.)" (n=7)

# Correct Pre → Post → Post	Pre-Training	Post-Training	Post-Implementation
5 → 6 → 3	Water clean-up programs, conserve water when brushing teeth/showering, support water treatment facilities, make sure cars & boats are in good condition, hybrids! Make sure garbage and waste are picked up, pick up dog poop, use more natural means of pesticides/herbicides.	River clean up, plant indigenous plants, keep rivers & lakes in their natural state, hybrid cars or bike, prairie/river restoration programs, minimize water use & ecological footprint.	Clean up trash, use environmentally friendly chemicals, *hybrid or electric cars*, pick up dog poop, *use water treatment facilities*.
1 → 3 → 4	Facilitate an understanding that polluting the river (or any body of water) doesn't come from just people visiting the river and dropping their trash there. It comes from everywhere. And what we do in our homes, yards, schools, neighborhoods, communities, etc. have an impact. Also learning that all pollutants are not so obvious as a candy wrapper and can have much larger impacts.	Learn more about them, learn about how they work, learn about how actions we take have an impact on water (even if that action is not directly related to the river).	Decrease impermeable surfaces (put in things like permeable pavers) Increase vegetation to decrease erosion, especially in a buffer around the body of water. Restore/build/take care of wetlands.
5 → 6 → 4	Clean up storm drains, pressure lawmakers to regulate pollution/industry more, encourage people to wash their cars on grass, plant trees, raise gardens (watch out for fertilizer), buy used clothing (global water issue) - takes 3,000 gallons of water to make new jeans.	Increase public awareness of: storm drains, water treatment practices, importance of shoreline native vegetation, roads salting practices, landscaping/urban planting, impermeable surfaces.	Keep streets clean of litter and eutrophicating plant materials. Re-establish shorelines and green spaces with strong root systems instead of clean lawns, pavement, gravel, etc. Apply public pressure to local leaders in government and business to tighten regulations for waste management for industries and citizens: such as carwashes, factories, oil disposal, etc. Designate more space to become wildlife refuges, especially near bodies of water like the Mississippi River.

# Correct Pre → Post → Post	Pre-Training	Post-Training	Post-Implementation
6 → 4 → 7	Put trash and items in recycling, reduce amount of consumed goods, re-use items, walk/bike instead of drive, use less water, educate others.	Conserve water, throw away trash; advocate to others, *do little things*; walk/bike places.	Don't litter. Pick up after animal waste. Create rain gardens. Reduce driving. Create deep root grass buffers around lakes, rivers, etc. Conserve water. Educate others.
7 → 5 → 8	Conserve at home, increase [permeable] surfaces for enter back into water table, don't litter, pick up trash, recycle - especially electronics - stop leaching into water table, support local protection agencies, be knowledgeable in local issues.	Pick-up litter, dispose of waste properly, especially industrial, conserve, buffer zones, increase [permeable] surface area.	Find appropriate trash/recycling receptacle. Sweep grass clippings after mowing. Pick up dog waste. Pick up litter. Limit use of salts in winter. Conserve water usage (showers, dishes, laundry). Contact local officials. Educate family and friends.
3 → 6 → 10	Avoid dumping in waters & sewers, *don't try to save your goldfish by 'freeing' in a lake*, plant deep-rooted gardens (rain gardens), avoid clearing vegetation at lake/river sides.	Rain gardens, native gardens, clear storm sewers, advocate permeable pavers, avoid litter, stop dumping, don't use water (faucet, home, shower…)	Retain water in a rain garden; use permeable materials where applicable (e.g. permeable pavers); avoid inappropriate or over salting pavement; install rain barrels; keep storm sewers clear; don't feed ducks/geese; don't litter; pick-up waste; don't dump bait/fish in waters; clean off equipment to avoid invasive species transfer.
7 → 2 → 10	Limit pesticide and herbicide use, take public transportation, reduced water usage, do not place medicine and OTC drugs into the water system, pick-up trash, yard waste to compostables, no paint, oil, etc., dumped into water system or yard.	*Be aware of how water is used, in what quantities, where it flows,* and be diligent in picking up recycling materials & trash. All water is connected and must therefore be used, but not abused.	Dispose of all materials listed above in the proper manner; recycle; reduce, and reuse; plant grasses, flowers, and trees are your property; wash cars on your lawn; keep trash, litter, etc. out of storm drains near you; pick-up litter, trash, and recyclable material left by others and dispose of properly; reduce water use by taking "Navy" showers; water lawns at night; write your government representatives to inform them of your concerns about the above items; inform others of good practices; help establish a community rain-garden.

Almost all of the educators included place-based education practices

Place-based education was a core pedagogical approach of the Splash Screen curriculum. This approach was taught and modeled to educators throughout the Splash Screen training during discussions about how to connect the content to local water bodies, bringing in local experts, and talking about bringing youth to local water-based sites. At the training, place-based education was defined as:

> "Place-based education is the process of using local community and environment to teach concepts of language arts, mathematics, social studies, science, and other subjects across the curriculum. Emphasizing hands-on, real-world learning experiences, this approach to education increases academic achievement, helps students develop stronger ties to their community, enhances students' appreciation for the natural world, and creates a heightened commitment to serving as active, contributing citizens. Community vitality and environmental quality are improved through the active engagement of local citizens, community organizations, and environmental resources in the life of the school" (Sobel, 2004).

On the post-implementation survey, we asked educators to share ways they made their Splash Screen programming more place-based. Six of the seven educators shared place-based practices they had incorporated. Most of these educators talked about tying the learning to local sites; whether it be to visit local water bodies, see first-hand the implementation of best management practices in the community, or understand the American Indian history and significance of the local area. One of the seven educators had a response that did not align with place-based practices. He/she simply talked about taking youth outside to take pictures while on a walk, which doesn't automatically make an activity place-based. His/her response to this question and lack of description related to how the outdoor activity might be place-based suggests that he/she may lack understanding of what it means to make a program place-based.

"Think about the way that you changed the Splash Screen curriculum for different program locations. In what ways did you make it place-based? Please give as many examples as you can." (n=7)

- Field trips to local Minnehaha Creek watershed sites; focus on BMPs that are present in local parks; estimate the total runoff for the park sites; neighborhood walks to local rain gardens.
- Went to a lake and performed multiple water quality tests on it, including looking for water bugs, taking the oxygen level of the lake, using a Secchi disk to test clarity of water. Tour a conservation district office to see what BMPs they had in place such as a permeable paver parking lot, rain gardens. Tour rain gardens in local community.
- We were lucky and able to teach on the Mississippi River. So for just about every major idea discussed in the Splash Screen curriculum, we were able to go out and see that process, or effect happening on or around the river. We also made sure to take time to just explore the river and the watershed directly surrounding it, so that our students were able to just observe what was happening without us telling them.
- We used local sites for our day in the field. We invited local water experts to discuss what is going on in their local watershed.
- Seeing Your Watershed: I used a white plastic table cloth and placed over the ground of where we were at, and then first sprayed the cloth with clear water. Next we added food coloring to the water and sprayed the cloth again. This led to discussion like Blue River, Seeing Your Watershed; and pollution and runoff issues. These topics were then discussed by observing the part of the Mississippi River where we were at. Runoff, Best Practices and pollution were topics that we discussed through-out the course. Site runoff was discussed during our numerous

outdoor activities. I used the activities in the Ecolab booklet on storm water and we discussed these as a group. Likewise, we [did] runoff calculations outside and visually estimated the percentage as compared to doing the math. Incredible Journey: for my last group, we did this activity outside near locations which approximated the particular activity site. IE: the "river" block was placed near the MS River, and the "plant" block near vegetation and flowers.

- Our program ran at a local park in East St. Paul, where youth live and could walk to program if need be. Place-based learning happened by exploring the area, learning American Indian history and significance of that area, and then offering our healing prayers and tobacco ties to honor that place in a significant, creative, and communal way.
- We took [the tablet] on a walk with us to take and annotate pictures.

Almost all of the educators engaged with watershed experts

Bringing in local experts was one way educators were encouraged to make their program more place-based. In the post-implementation survey, we asked educators to list the the local experts that met with their 4-H groups (see Table 16). Five of the seven educators reported that experts had visited their programs. One educator commented that they were unable to meet with a local expert and another educator listed an expert that she had consulted with who was unable to attend the program.

Table 16. Educators collaborated with experts with an array of backgrounds to augment programming at different locations.

Role	Locations Visited
Master Water Stewards	MLK, Pershing, Pearl, Harriett Tubman Center
Water Resources Specialist for the Minneapolis Park Board	Pearl, Pershing, Packer Pad
Canoe/Aquatic Invasive Species Specialist for Minneapolis Parks	MLK, Pershing
Director of Environmental Projects at Metro Blooms	MLK
Water Resources Management for Three Rivers Park District	Coon Rapids Dam
Washington Conservation District Representatives	Washington County
Mississippi Watershed Management Organization Representatives	Heritage Park
Lakota Language and Culture Specialist	AIMS*
Basset Creek History Project Representative	Heritage Park
National Park Services Volunteers	Harriett Tubman
Civil Engineer at St. Anthony Falls Laboratory	Harriett Tubman

*This expert was unable to attend the AIMS program, but consulted with the educator.

Educators demonstrated a range of knowledge about the benefits and drawbacks of using technology in environmental education

In addition to place-based education practices, educators were taught about incorporating technology into outdoor environmental education experiences. Educators were asked to list the pros and cons of using technology in environmental education settings in the post-training survey and again in the post-implementation survey. While some individual responses varied, most of the educators identified similar benefits and drawbacks after-training and after engaging with the technology during Splash Screen programming. Their reflections, shared in Table 17, suggest that educators recognize situations in which technology can be useful and when it can be a distraction. They value the technology for supporting creative final project design, providing opportunities for introverted youth to participate, giving curious youth a way to explore topics in more depth right away, and providing access to visuals that show local sites during different seasons and through time. Educators thought that drawbacks of using technology tools might be increased distraction in youth, youth not taking advantage of the opportunity to "unplug" from screen-based technology, and creating a potentially uncomfortable experience for youth who are not experienced tech users if not enough time is devoted to skill building.

Table 17. "What do you feel might be the benefits of using these tools during outdoor environmental education experiences?" (n=7) and "What do you feel might be the drawbacks of using these tools during outdoor environmental experiences?" (n=7)

Post-Training		Post-Implementation	
Benefits	**Drawbacks**	**Benefits**	**Drawbacks**
Location services. Access to maps and geography.	Distraction. Makes answers too readily available--Google effect of every answer at fingertips rather than needing to be thought through. Blogging is not necessarily different than reflection essays.	Worked well as a "carrot" for the end of the day to keep youth engaged. Allowed creativity in final presentations. Provided opportunity for introvert youth to express their ideas/opinions outside public speaking or game playing.	Too easy a distraction. Too easy to Google an answer rather than think through a hypothesis of what MIGHT be true first. Inconsistent Internet access. Some lessons seemed to be built more to capitalize on the technology than the lesson itself: e.g. seeing a watershed works as well without Google My Maps.
If a young person wants to learn more about what they are experiencing outdoors they can pull out the tablet and do some research or apply what they are learning directly in apps and contribute to an online learning community. I feel like the technology can help young people go deeper into their learning right when it is sparked in the outdoors.	My concerns with being outdoors and using technology is that young people will not experience fully what nature has to offer. They might miss a bird flying right past them because they are looking up a flower. There is a calming and relaxing experience that comes out of nature and I am afraid that young people won't be fully engaged in that experience when there is technology. It is just helping them understand a balance of using the technology to further learn but also experience the outdoors.	Learners can get answers to questions right away and continue to learn about the topic more in depth.	Sometimes technology doesn't work or youth are not skilled and that could disappoint youth which then could shut them off to the learning topics.

Post-Training		Post-Implementation	
Benefits	**Drawbacks**	**Benefits**	**Drawbacks**
It's a good tool to direct focus, and it's a great way to bring a lot of different ideas together.	Sometimes, in utilizing this technology, we are feeding into our culture's obsession with technology. Sometimes you need to just unplug and be in the moment you're in, to look up and see what's around you.	Technology allows students to be interactive in a different way. It's also very much become a part of how we think and how we communicate, using technology. So it makes sense that we would teach using technology.	A lot of times it's difficult to use technology in outdoor ed. Things like internet can be very unreliable. If one person's tech isn't working properly it slows everyone else down. Also, and honestly more importantly, I think it's really important for people to unplug. Spend time away from our screens and to look up and look around. Environmental education is all about being fully immersive. It's not possible to do that when you have a screen in front of your face.
Students are more engaged; they can see pictures of things in their environment that aren't present when they are looking- whether it is the wrong season or wrong time of day. They can take pictures of what they think is interesting and find relevance in what they are learning. I really liked the idea of students creating a learning blog and to communicate their ideas with each other.	The potential for the technology to be faulty or a distraction instead of a tool. The potential for students to bully each other.	Kids are engaged with technology. They can look up answers to their questions right away. They can see other areas of the world and compare them to their homes.	Off task behavior. Too engaged in the screen that they don't look up.

Post-Training		Post-Implementation	
Benefits	**Drawbacks**	**Benefits**	**Drawbacks**
Students witness and learn how technology can be used in many different capacities combine 21st century realities of a tech-centered society to find new ways to connect to their outdoor place.	Teacher may have to compete more for attention of students to give directions students in this program may not have opportunities to "disconnect" from technology, while outdoors, but perhaps may be more enabled/attached to their devices in future while outdoors possible/probable damage to technology	The majority of tablet use including reflection and final project creation took place indoors. I will address this question in both locations: Indoors: Students enjoyed the independence of researching their final project topics. They also loved to troubleshoot the new apps, creating new animations and videos in practice for their final projects. Outdoors: The tablets were certainly a major draw in enrolling in these camps, and were very exciting to hand out on the first day. During outdoor, environmental education experiences, students used tablets to take photos and videos, which they were very engaged in, and enjoyed. For example, one group of students was very fearful of poison ivy on our hike (there was no poison ivy anywhere). But instead of telling them that, I encouraged students to look up what poison ivy looks like and where it grows. This particular instance, I found was a great benefit for students to use tablets for answers and interpretation.	Similar to number 6, the majority of tablet use was indoors. I will address this question in both locations: Indoors: Specifically, I believe this particular model of tablet had major drawbacks as a facilitator. Many buildings we were based out of had limited in-house wifi or had stucco walls, which made it challenging for students to connect to the internet. Kidblog also had several bugs that were challenging for students to engage in the technology. I believe that these challenges were extremely limiting to really capture student learning and progress. For example, if wifi worked for only 1-2 minutes, students would quickly type a reflection statement. With their resources and time, as well as increasing frustration, I think our students' reflections may not truly capture the true learning and reflection that took place, simply because they couldn't type it without encountering an internet connection problem. Outdoors: In general, the drawbacks of using technology tools during OEE (and any other subject/setting) is if the technology piece is being used as their lens to the outdoors, instead of their own eyes and hands. I felt in these camps, students were more distracted in their learning than having their learning enhanced by the technology.

Post-Training		Post-Implementation	
Benefits	**Drawbacks**	**Benefits**	**Drawbacks**
These tools are essential to outside inquiry. Students will experience the wonder of being outside and be able to explore the inter-relations of nature based systems. Additionally, they will be able to experience and/or first-hand the effects humans have on these systems.	The largest drawback is the weather and the time it takes to set-up these programs. However, both of these factors can be overcome. In the case of weather, students will learn that scientists must do their field work under all types of weather conditions.	The benefits would include learning and using new applications to assist in understanding the various processes and variables that affect water flow, location, pollution, etc. Students can quickly investigate local, regional, and global water impacts. students can use the technology to locate where they are physically at and what water bodies are nearby. They can then use this technology to expand their search to include a wider area. In many respects, the information technology is a convenient, quick, and accurate means to gain requested information.	Technological drawbacks would include protection of the equipment from adverse elements; signal disruption where the electronics do not work, and reliance solely on the electronics. Additionally, people can become too focused on the technology rather than using their own senses to explore their environment.
[No pre]	[No pre]	Tablets and internet access give students more options for learning methods.	Students who are underprepared due to limited access to technology tools struggle to take advantage of using them.

Educators gained skills that increased their comfort facilitating technology experiences

On the post-implementation survey, educators were asked what, if any, skills they may have gained around using technology with youth in environmental education. Educators tended to discuss a variety of skills they gained. Three educators (their comments are first in the list below) wrote about skills related to particular apps or use of technology. Six educators discussed skills around facilitating technology experiences with youth.

"What, if any, skills do you think you may have gained around using technology with youth in environmental education?" (n=7)

- Using different forms of processing tools/apps. Communication skills using online forums. Responsibility for devices. Typing skills.
- I have learned a lot about the use of technology for doing presentations not only faster, but also by a number of different venues.
- Patience- re-teaching in many ways to allow students to independently navigate next time without teacher assistance Priority- when is learning being compromised by troubleshooting. Navigating new apps.
- Remain flexible with technology: it does not always work the way you think. But kids are understanding: be honest with where issues arise and have them help find solutions. Some kids are drawn to technology while others pull back. Good to find a balance. Always think through what the purpose of the lesson is first: if technology issues are creating hang-ups for the intended take-a-away, put the tech away and try something new.
- Trying to have one one one technology to learner ratios. Set boundaries around when to put the technology away if it is not working. Provide youth with coping skills if the technology is not working or the learner is having difficulties.
- I have definitely learned how to better set boundaries and how to plan for the time it takes to do use new technologies with kids.
- Leading youth in research, exploring their neighborhoods with maps creation, and sharing their ideas in an online community (which can be lower stakes and easily shareable).

Educators had a variety of recommendations for future training and use of the Splash Screen curriculum

To help inform future implementation and scale up of the Splash Screen project, we asked educators what they felt were the most important improvements the Splash Screen team (TPT – Twin Cities Pubic Television) could make to the project going forward. Six educators offered their recommendations. Four educators had comments around the use of technology including more support around learning to use the technology and thoughts about the use of KidBlog. Two educators suggested more training and support around program planning. Two educators recommended adding more recreational activities to the curriculum, one mentioning the importance of asking youth for input into what those activities might be.

"Now that you've completed your work with the Splash Screen project, what do you feel are the most important improvements that TPT could make to the project going forward?" (n=6)

- Having an expert come in to set students' accounts up with them would have been helpful. We lost a lot of time in just learning how to use the devices correctly.

- Condensing the amount of technology use. I know that it's an important part, but it felt like we spent the majority of time in our classroom figuring out new technologies, and not going out to look around. I think things could be simplified and have a few programs that function for several different curriculum points.
- Add lessons where youth can get their hands dirty. Days for the summer camps appear to have been made for PARENTS rather than YOUTH: without recreation activities, play, and breaks it would be too much. As an after-school program, would be slick. For KidBlog, perhaps an "online diary" format would be more successful over a longer period of time. That is, each youth receives a page to comment on their own impressions and thoughts. Thus, everything they have to say is in one place. The technology was ESSENTIAL for final projects. Keep youth engaged and creative. However, should not be a limiting factor. Those who desire to make dioramas or posters were encouraged to do so!
- First, I felt the lesson plans were outstanding! I made minor adaptations based on the student dynamics and to incorporate it into place-based learning. Going forward, the only thing I would improve would be to increase the speed of KidsBlog. A site survey should be done beforehand to work out any software/electrical connectivity issues for the particular site. The Hot Spots worked well.
- Definitely make sure to continue the program! Families and youth were very happy with the program and took away lots of great learning around watersheds. I would have preferred to have the training sooner than when it was in March. Program planning felt a little rushed between the training and the start of programs. I didn't really get anything out of the evening support calls because my program was one full week and then done. I may have felt different if my program was weekly and I could have time to make changes.
- More training and straightforward planning time with the group leaders. We did not complete some of the lessons because we did not plan enough. Perhaps give the splash screen leaders a rough idea of how much time they need to dedicate to planning the lessons. There were a lot of factors leading up to our club making little curricular progress, (besides anything in the power of TPT), and so we would try a pilot curriculum again, but knowing we need to be planning and meeting as leaders at least once a week. None of our schedules allowed for enough meeting time. But our youth had strong Social-Emotional Learning outcomes of gained empathy, relationship skills, teamwork, social awareness, etc. For the youth, they did learn a lot about watersheds, but in a way that we all could manage, at a snail's pace with more activities like canoeing, walking, photography, funny games, drawing movies about water, etc. I would give room in the curriculum for each youth worker to have youth plan what extra fun activities they would like to do in the summer. Youth voice is so important for buy-in. So we brought that into the pilot as much as possible.

Educator Demographics

The Splash Screen educators that responded to the post-implementation survey ranged in age and were college educated. As illustrated in Table 18, over half are in their 20s. All of the educators had a college degree, three with a bachelor's degree and four with a graduate degree.

Table 18. "How old are you?" (n=7)

Age Range	Number of Educators
19	0
20-29	4
30-39	2
40-49	0
50-59	0
60-69	1

Summary of Findings

Summative evaluation of the Splash Screen program was guided by four overarching evaluation questions that are aligned with project outcomes for educators and youth.

1. To what extent does the project increase educator awareness and knowledge of issues around watershed health and environmental stewardship?
2. To what extent do educators integrate place-based education strategies into their use of the Splash Screen program?
3. To what extent does the project increase educator knowledge and skills around the integration of technology into environmental education?
4. To what extent do youth increase their awareness and knowledge about watersheds, issues and decisions that affect watershed health, and actions they can take to be stewards of watersheds in their community?

Summative evaluation findings are presented by each evaluation question. We also provided a summary of what we learned about Splash Screen program implementation and attendance. Overall, the Splash Screen project was more successful in addressing educator outcomes than youth outcomes.

Evaluation Question 1: Educator knowledge of watershed health and stewardship

The first evaluation question, "To what extent does the project increase educator awareness and knowledge of issues around watershed health and environmental stewardship?," was answered by measuring educators' awareness and knowledge of what a watershed is, sources of watershed pollution, and best management practices. All three of these topic areas were related to Splash Screen educator outcomes. The Splash Screen project successfully met these three outcomes for all seven educators.

All educators could define a watershed

By the end of the project, all educators described watersheds in a way that aligned with the Project WET definition. Of these individuals, half of them came to the initial training with a definition that completely aligned with the Project WET definition and continued to describe watersheds in this way on their post-training and post-implementation surveys. This increase is also reflected in educators' self-assessed knowledge, where only three individuals felt very knowledgeable about the definition of a watershed at

at the beginning of the training, but six out of the seven educators felt very knowledge by the end of the project.

Educators were knowledgeable of all three types of watershed pollution
Educators had varying levels of knowledge of watershed pollution sources before the training. Only four out of the seven educators mentioned pollution sources from all three categories of watershed pollution. All educators started the project knowing chemical sources, but four educators failed to mention organic or man-made sources. By the end of the training, all seven educators were knowledgeable of all three types of watershed pollution. This knowledge remained after post-implementation.

All of the educators were able to list more than three best management practices for urban watersheds
One of the project outcomes was that educators would leave the project knowledgeable of at least three best management practices for urban watersheds. Before the training, educators listed from one to seven best management practices for urban watersheds, with an an average of five practices cited across the seven educators. By the end of program implementation, all seven educators were able to list at least three best management practices, with some educators listing as many as 10. On the post-implementation survey, educators were able to cite an average of seven BMPs; more than double the project's goal.

Even though educators were able to identify a wide range of best management practices both at the beginning and end of the project, they tended to not rate themselves high in that knowledge. At the beginning of the project, three felt a little knowledgeable and four felt fairly knowledgeable of actions that youth can take to help improve their local watershed. By the end of the project, only three felt very knowledgeable, three felt fairly knowledgeable, and one only felt a little knowledgeable.

Evaluation Question 2. Educators' use of place-based education strategies

The second evaluation question, "To what extent do educators integrate place-based education strategies into their use of the Splash Screen program?," was answered by understanding educator knowledge and implementation of place-based strategies, including bringing in local experts. The question aligns with one of the project outcomes stating that educators would increase their understanding of place-based education and how to implement it within an environmental education setting. The program was slightly more successful in increasing educator knowledge of how to engage youth in environmental science in their own community, than how to engage local experts to facilitate learning experiences with youth. Almost all the educators successfully described strategies to integrate place-based education practices into their programming, including the use of watershed experts.

There were large gains in knowledge of place-based education
Educators had gains in knowledge about how to help youth learn about environmental science in the context of their own communities. Before the training, four educators had only a little knowledge of this practice. By the end of the project, knowledge had shifted. Four educators felt fairly knowledgeable and three educators felt very knowledge about how to implement this place-based education strategy.

Some educators increased their knowledge of how to engage local experts
Even though most educators engaged with local experts, only some of the educators left the project feeling very knowledgeable of how to do this. At the beginning of the project, three educators felt a

little knowledgeable of how to engage experts and four felt fairly knowledgeable. By the end of the project, there was a slight shift and three individuals felt very knowledgeable and three felt fairly knowledgeable. However, there was still one person that only felt a little knowledgeable of how to engage local experts.

Almost all of the educators included place-based education practices in their Splash Screen programming

Six of the seven educators incorporated place-based practices into their programming. Most of these educators talked about tying the learning to local sites; whether it be to visit local water bodies, see first-hand the implementation of best management practices in the community, or understand the American Indian history and significance of the local area. One of the seven educators seemed to lack an understanding of what it means to make a program place-based. When describing place-based practices he/she integrated into programming, the educator simply talked about bringing youth outside to take pictures while on a walk, which doesn't automatically make an activity place-based.

Almost all educators engaged with watershed experts as part of their Splash Screen programming

Bringing in local experts was one way educators were encouraged to make their program more place-based. Five of the seven educators reported that they had engaged local experts to come to one or more of their program sessions, and an additional educator consulted with an expert who was unable to attend the program. Local experts that became involved in Splash Screen programming were from a wide variety of professional roles.

Evaluation Question 3: Educators' knowledge and skills around technology integration in environmental education

The third evaluation question, "To what extent does the project increase educator knowledge and skills around the integration of technology into environmental education?," was answered by asking educators about their knowledge of the benefits and drawbacks of using technology in environmental education, as well as the skills they gained around using technology with youth in environmental education. Educators were knowledgeable of a wide range of benefits and drawbacks to integrating technology into environmental education programming. The Splash Screen project was successful in increasing educators' skills around the use of technology in environmental education and facilitating technology experiences with youth.

Educators demonstrated a range of knowledge around the benefits and drawbacks of using technology in environmental education

While some individual responses varied, most of the educators identified similar benefits and drawbacks after-training and after engaging with the technology during Splash Screen programming. Their reflections suggest that educators recognize situations in which technology can be useful and when it can be a distraction. They value the technology for supporting creative final project design, providing opportunities for introverted youth to participate, giving curious youth a way to explore topics in more depth right away, and providing access to visuals that show local sites during different seasons and through time. Educators thought that drawbacks of using technology tools might be increased distraction in youth, youth not taking advantage of the opportunity to "unplug" from screen-based technology, and creating a potentially uncomfortable experience for youth who are not experienced tech users if not enough time is devoted to skill building.

Educators reported gaining skills that increased their comfort using technology and facilitating technology experiences

Educators gained a variety of skills around using technology with youth in environmental education. Gaining skills around facilitating technology experiences with youth was discussed by six educators, while skills related to particular apps or use of technology were mentioned by three educators.

Evaluation Question 4: Youth awareness and knowledge of watersheds, watershed health, and stewardship

The fourth evaluation question, "To what extent do youth increase their awareness and knowledge about watersheds, issues and decisions that affect watershed health, and actions they can take to be stewards of watersheds in their community?," was answered by asking questions to measure Splash Screen's youth outcomes around knowledge of the definition a watershed, understanding of actions that hurt and help a watershed, and awareness of storm water runoff and what people can do to prevent it. There were some areas where the program was successful in increasing youth's awareness and knowledge, and other areas where the program wasn't as successful in doing so. The program was successful in increasing youth's understanding of a variety of actions that could help or harm a watershed. Two-thirds of youth were able to suggest best management practices to reduce runoff at local sites, but a third were unable to. The program was successful in increasing Twin Cities youth's understanding of their local watershed, but less so in increasing Duluth youth's knowledge of their local watershed. A majority of youth understood that storm drains lead straight to nearby waterways, but a quarter of youth still had misconceptions that storm drains lead to water treatment plants. The program was unsuccessful in helping youth obtain an accurate definition of a watershed at an early stage in the program, with less than a tenth of youth being able to describe a watershed after Lesson 2 of the curriculum.

Youth showed gains in being able to correctly identify the name of their local watershed, with the Twin Cities youth showing higher gains than Duluth

Part of understanding what a watershed is, is being able to identify your own local watershed. Before the program, about one quarter of youth in the Twin Cities and Duluth were able to correctly identify the name of their local watershed. After the program, most of the Twin Cities youth (81%) correctly identified their local watershed as the "Mississippi River watershed," but only half of the Duluth youth correctly identified their local watershed as the "Lake Superior watershed."

Less than a tenth of youth could correctly describe a watershed after Lesson 2

Lesson 2 of Splash Screen guided youth to construct their own definition of a watershed early in the program. After Lesson 2, only 8% of youth were able to provide a definition of watersheds that described the land and its relation to water flowing to a particular water body. It is possible that youth developed a stronger understanding of the major features of a watershed during the rest of the programming, but most did not walk away from this lesson with a working definition.

Youth had a better understanding of actions that could harm or support watershed health

Youth came into the program with some familiarity of actions they could take to help a watershed, and left with an increased understanding of helpful behaviors. At the beginning of the program, almost all youth knew that picking up litter off the street helps watersheds and three-quarters understood that picking up dog waste helps. Planting native plants near the side of the road and using a rain barrel to collect water were least familiar to youth. At the end of the program, a majority of youth were able to correctly identify the five actions in the list that help watersheds. Almost all the youth identified planting

a rain garden and picking up dog waste as helpful actions. There were large gains in the number of youth understanding that planting native plants near the side of the road, creating a rain garden in someone's yard, and collecting water in a rain barrel would help a watershed.

Over half the youth entered the program unfamiliar with some of the actions that can hurt a watershed, however there were gains in the number of youth being able to identify harmful actions by the end of the program. Most youth entered the program understanding that pouring oil down a storm drain is harmful and by the end of the program almost all the youth could identify this as a harmful action. Close to half the youth entered the program aware that washing a car with soap in the driveway and using salt to melt sidewalk ice were harmful actions, at the end of the program this increased to close to three-quarters of youth for both of these actions. Youth were least familiar with the effects of paving over a gravel lot to make a basketball court at the beginning of the program and only half the youth knew this was harmful by the end.

A majority of youth understood that storm drains lead straight to nearby waterways, but some youth still had misconceptions

A little more than half the youth came into the program correctly identifying where water goes after entering a storm drain, but two-fifths had the misconception that water goes to a water treatment plant after entering the storm sewer. Correct understandings of storm water runoff increased to 70% at the end of the program. However, a quarter of youth still left the program with a misconception that water is treated after entering a storm drain.

Two-thirds of youth were able to suggest best management practices to reduce runoff at local sites

After completing Lesson 8 of the Splash Screen program, two-thirds of the youth were able to describe best management practices to reduce runoff at local sites. Of the 29 youth who correctly described best management practices, over half (55%) offered hardscaping examples of non-plant features, such as rain barrels, roof design and permeable paving. About three-quarters (76%) of the youth best management responses included changes to landscaping to incorporate more plantings, rain gardens or holding ponds where water could be slowed down.

Program delivery and attendance

The program reached 107 youth participants from 13 programs and was delivered in either four-day intensive or multi-week sessions. Nine of the programs were delivered over four intensive days that drew almost exclusively from the Splash Screen program and Project WET curricula. The other four programs were delivered over the course of several weeks and were augmented by additional content and experiences.

Educators adapted how they implemented the order of the Splash Screen lessons. While all of the programs began by implementing Lessons 1 and 2 and concluded with the final presentation share-out in Lesson 13, there was a lot of variability in the order of delivery for the rest of the lessons in the program guide. During webinars, educators shared that this flexibility of program design helped them to implement Splash Screen in the context of the ever-changing weather, the availability of local experts, and their access to other programming resources.

Finally, there was variation in daily youth attendance and overall attendance based on the program type. Daily attendance was higher for four-day programs than multiweek programs. Overall attendance was also higher for four day programs (70% of youth attended all four days) compared to multiweek programming (22% of youth attended all days of multiweek programming).

References

Project WET Foundation. (2011). *Project WET curriculum and activity guide 2.0.* Bozeman, MT: Author.

Sobel, D. (2004). Place-based education: Connecting classroom and community. *Nature and Listening, 4*, 1-7.

Appendix A: Splash Screen Logic Model

Activities	Audience	Outcomes

TPT staff activities for 4-H leaders:
• 2-day training for 4-H educators
  ○ Place-based education
  ○ Technology overview
  ○ Project WET curriculum
  ○ Connections to community watershed experts
• Splash Screen Curriculum
• SciGirls educators' website
  ○ Online technology tutorials
  ○ Videos to model inquiry process
  ○ Science inquiry overview
• Webinars
• Poster session event
	4-H programs	**Outcomes for Educators:**
		• Increased awareness and knowledge of issues of watershed health and environmental stewardship
		  ○ Understand what a watershed is.
		  ○ Understanding of issues related to urban watershed pollution including storm drain issues caused by runoff from yard waste, roadways and litter.
		  ○ Can list three common Best Management Practices for urban watersheds (i.e. steps that home-owners can take to mitigate storm drain issues, like using rain gardens, rain barrels, yard care, storm drain maintenance).
		• Increased knowledge and skills around the integration of technology into environmental education
		  ○ Understanding of pros and cons of using technology in environmental education and when it's appropriate to use it. Pros: Tech is flexible; it can help engage older youth since they may already be familiar with it. Cons: Youth may more focus on tech than natural landscapes.
		  ○ Increased comfort facilitating media products with 4-H groups.
		• Increased understanding of place based education and how to implement it within an environmental education setting
		  ○ Understand the importance of taking kids outside
		  ○ Integrate community experts into the program (program tells educators when to bring in experts, but not who – that is up to each program). Experts will help educators make larger connections (different ways of knowing).
		  ○ Understand the big ideas/reasons for place based education
		• Increased understanding of inquiry-based science
		  ○ Understand what inquiry looks like when implemented

4-H leader activities for youth: • Provide programming for youth based on the Splash Screen curriculum (25 hours of hands-on learning per child). • Collaborate with watershed experts. • Youth develop project and share at poster session.	Middle school youth	**Outcomes for Youth:** • Be able to define a watershed. • Understand that everyone makes decisions about water resources and be able to connect actions that people might take with hurting or helping watersheds. • Become aware of storm water runoff and what people can do to prevent it .

Appendix B: Youth Responses to Journal Prompt About Defining a Watershed

This Appendix includes youths' response to the the journal prompt, "What is a Watershed?" Responses are verbatim except in a few instances. In some cases, we modified youth responses to include punctuation that might be helpful for the reader, as well as to correct spelling where meaning would be lost without the substitution. Words in hard brackets indicate a substantial edit by the evaluators. Numbers in hard brackets following a comment denote the number of times that exact comment was repeated in the responses. The programs that youth attended are indicated in blue italicized font following their comments.

Youth responses were categorized into four categories based on how well they aligned with the project's definition of a watershed. In some cases, subcategories were developed under the larger categories.

- Completely in line: Response included the relationship of water and land in a way that reflected the project's definition of a watershed.
- Align somewhat: Response included partial ideas of what a watershed is and/or used one of the watershed vocabulary terms (without completely describing a watershed).
- Does not align: Response did not align with the definition of a watershed.
- Unsure: Response where youth indicated that they didn't know the answer.

Youth responses to the journal prompt, "What is a watershed?" *(n=71)*

8% (6) Definition completely in line

- A watershed is water that flows from a large area into one river. The rivers are also connected in some way. One area can also be part of multiple watersheds, like a mountain that flows to multiple different different lakes, streams, valleys, etc.… *Coon Rapids Dam, Spring Session*
- Watersheds are the areas around a lake, River, etc. All the water that goes into a watershed will end up in the lake, river, etc., that is in the watershed!!!!!!!! *Washington County*
- A slope [where water is] collected or a valley. *Washington County*
- A watershed is an area in which all the water in the area will go to the same spot. *Washington County*
- The slope on the land that makes water go into the river\lake. *Coon Rapids Dam, Summer Session*
- An area of land that collects water that goes to a body of water. *Coon Rapids Dam, Summer Session*

34% (24) Definition aligns somewhat

Described a watershed as a place where water collects (didn't talk about water flowing down a land area)

- A watershed is an area where water collects. The Mississippi river is a watershed. It has many tributaries. *Coon Rapids Dam, Spring Session*
- Our watershed is Basset Creek. It is part of millions of tributary of water resource that will make the Mississippi. *Heritage Park, Spring Session*
- A watershed is a place where water from another place collects. *Minneapolis Parks & Rec, Martin Luther King Jr.*

- A watershed is an area where all the water drains to one place. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- Where all water goes to become safe. *Coon Rapids Dam, Summer Session*
- A watershed is the area where all the water flows to the same spot! *Coon Rapids Dam, Spring Session*
- I think a watershed is a place that rain water or any type of [water] that falls from the sky goes to. *Minneapolis Parks & Rec, Pearl Park*

Described a watershed as water flowing or connecting together

- I think a Watershed is water that connects always moving. It has headwaters and a mouth. *Heritage Park, Spring Session*
- Connection of water bodies that are called always moving, head water, mouth (Etc.). *Heritage Park, Spring Session*
- A water shed is a water system that starts from a headwater to the mouth. It has many system and goes to a river EX Mississippi river. The end. *Heritage Park, Spring Session*
- Where water flows into a bigger water feature. *Coon Rapids Dam, Spring Session*
- A watershed is a string of water. It flows together. In the winter it is slow, in the spring it goes fast. *Heritage Park, Spring Session*
- Water that connects to more water. [Water drop emoji.] *Coon Rapids Dam, Spring Session*
- A watershed is a place where water connects and goes if it does not get licked up, evaporated, or gets nasty. *Coon Rapids Dam, Spring Session*
- Water that flows. Water that connects to a lake or river or pond or anything. *Coon Rapids Dam, Spring Session*
- I think a watershed are bodies of water that flows into a huge body of water. *Washington County*
- Water flows into one thing. *Coon Rapids Dam, Spring Session*
- Our watershed moves to the Mississippi River. A watershed moves one group of water to another. *Heritage Park, Spring Session*

Described a watershed as an area that divides bodies of water

- A watershed is an area of land that separates water flowing to different rivers. *Washington County*
- A watershed is an area where water is divided to different rivers and stuff. *American Indian Magnet School*
- A watershed is a piece of land or rigid area that separates two bodies. Waters that flow into a basin or sea. *Minneapolis Parks & Rec, Pearl Park*

Described a watershed as water flowing from a high to a low point

- A watershed is a flow of water where there is a high and low point. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- Where water starts at a high point and ends at a low point. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- A lower area where the water goes. *Washington County*

46% (33) Definition does not align

Described a watershed as a place to hold or store water

- Watershed is a huge water storage. *Minneapolis Parks & Rec, Pershing Park*
- Water storage. *Minneapolis Parks & Rec, Pershing Park*
- A place to hold water. *Packer Pad*
- Where water is kept. *Heritage Park, Summer Session*

Described a watershed as a place where water goes

- It is where water goes. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- It is a place where water goes. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- It is where water will go. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- It is where the water goes. *Minneapolis Parks & Rec, Martin Luther King Jr.*
- A Watershed is a place where water goes to different places. *Minneapolis Parks & Rec, Martin Luther King Jr.*

Described a watershed as flowing or moving water

- Flowing water. *Minneapolis Parks & Rec, Pershing Park*
- A watershed is flowing water. *Minneapolis Parks & Rec, Pershing Park*
- A watershed is a place with flowing or exiting water. *Minneapolis Parks & Rec, Pershing Park*
- WATER!!IT IS WHERE WATER!!!!!!!!!!!!!! FLOWS!!! *Minneapolis Parks & Rec, Pershing Park*
- Flowing water. *Minneapolis Parks & Rec, Pershing Park*
- A watershed is water flowing. I am pretty sure of. *Minneapolis Parks & Rec, Pershing Park*
- Watershed is the way water travels from one place to another and what's in-between. *Minneapolis Parks & Rec, Martin Luther King Jr.*

Described a watershed as a shed that holds water

- A silly shed full of water 😑☺😀the alien see's you. *Minneapolis Parks & Rec, Pearl Park*
- A shed full of water. Minneapolis Parks & Rec, Pearl Park
- I think a watershed is a shed with water inside it. *Minneapolis Parks & Rec, Pearl Park*
- I think it is a shed that holds water. *Packer Pad*
- A water shed is probably a shed with water in it or water shaped like a shed I don't know but if you know your smart because I don't know what it is if you know plz tell me PLZ!! *Minneapolis Parks & Rec, Pearl Park*
- My definition of watershed is a water community also called a body of water is affected by landscape which makes a river which is called water migration. Is sent to another water community. But the sun is a bully. The sun make the water turn into clouds which is called evaporation and condensation. A few hours then the clouds will cry which is call preparation and the water goes somewhere else probably on another body of water. And that is a water cycle. And the water goes to a shed making a water shed where water can just hang out. *American Indian Magnet School*

- I think a watershed is either a body of water or a source of water helping a city or a community or maybe it's totally something that's not professional at ALL and is just a shed with water in I don't know anything about it! *Minneapolis Parks & Rec, Pearl Park*

Other

- A watershed is the boundary surrounding the area of a river that the water flows into. *Washington County*
- A watershed is a very hilly or valley that has very many drops of water. I have had a very great experience with water. *Coon Rapids Dam, Spring Session*
- I think a watershed is a place where water goes in a community to get cleaned for other purposes. *Minneapolis Parks & Rec, Pearl Park*
- I am assuming that a watershed is like a water transplant. I would like to learn about watersheds more. The reason I would like to learn more about watersheds is because they seems interesting to learn about. *Minneapolis Parks & Rec, Pearl Park*
- Every year new water comes in. To help nature. *Heritage Park, Spring Session*
- What I think a watershed is where water goes down a drain and then cleans the water. The other thing I think it is where water connects where they joins together and get cleaned and always moving. *Heritage Park, Spring Session*
- Water that gets Scott in to the grant. *Coon Rapids Dam, Summer Session*
-  *Coon Rapids Dam, Summer Session*
- Dirty water. *Heritage Park, Summer Session*
- No. A watershed cleans the water. That's all. 😐 I don't know any watersheds. But if I did..... I will poop on it. Make that water dirty. Then I'll clean it with my own watershed. And I would destroy my watershed and make another one. And I would destroy Rebecca's favorite notebook. And make her another one. Anyways, back to the water. Hmmmmmmmm,.....hmmmmmmMmmmmmmm..... I'll make the water dirty REALLY dirty. POLLUTED. I'll make 3 more watersheds and make it really clean. If I had the materials to make a watershed, I will rob a bank and put the rest of the money in the watershed, and make it into money water. You see, money water is really clear, so clear that you see jewels, golden trophies, and people take all that stuff from the water and be rich and everybody will die over stupidity because they're greedy. And that's all so goodbye Minnesota and HELLO CALIFORNIA! 😎 P.S. burgers come from your nose. The water cycle is really clean very very clean. The story the story Into the lake and evaporates into the clouds and then and it rains from the clouds and call and it's called what's it called precipitation goes back into storage in it like drains into a river and turns into a lake. *American Indian Magnet School*

11% (8) Unsure of the definition

- Idk. [2] *Packer Pad*
- I don't know. [3] *Packer Pad*
- I don't know. [3] *Heritage Park, Summer Session*

Appendix C: Youth Responses to Journal Prompt About Best Management Practices

This Appendix includes youths' response to the the journal prompt, "What best management practices (BMPs) could help reduce the amount of runoff at the site (if needed)?" Responses are verbatim except in a few instances. In some cases, we modified youth responses to include punctuation that might be helpful for the reader, as well as to correct spelling where meaning would be lost without the substitution. Words in hard brackets indicate a substantial edit by the evaluators. Numbers in hard brackets following a comment denote the number of times that exact comment was repeated in the responses. The programs that youth attended are indicated in blue italicized font following their comments.

Youth responses were categorized into four categories based on how well they aligned with the project's information about best practices to reduce runoff. In some cases, subcategories were developed under the larger categories.

- Listed best management practices to reduce runoff: Response included changes to either the landscaping or hardscaping of the site to retain water.
- Did not list a best management practice: Response was off topic or included a general watershed stewardship action that would not impact runoff.
- Unsure: Response where youth indicated that they didn't know the answer.

Youth responses to the journal prompt, "What best management practices (BMPs) could help reduce the amount of runoff at the site (if needed)?" *(n=45)*

Note. Several youth provided examples of both landscaping and hardscaping best practices to reduce runoff. Comments that are followed by an asterisk are ones that appear under more than one heading.

64% (29) Listed best management practices

Landscaping: including additional plantings, riparian buffers, holding ponds, rain gardens

- Riparian buffer. *Coon Rapids Dam, Spring Session*
- The best management practice to keep runoff out of certain places is creating a rain garden. Rain gardens take the run off and let it sink into the soil that the storm drain led it to. It also has plants that help with the process. *Washington County*
- LOL. The lesson was good. Water gardens help the water. And also picking up the [garbage] to. *Washington County*
- Nature-scaping. Holding pond. *Minneapolis Parks & Rec, Pearl Park*
- A rain barrel and rain garden could help our yard reduce the [amount of] runoff. *Minneapolis Parks & Rec, Pearl Park*
- A rain garden and a nature scape. *Minneapolis Parks & Rec, Pearl Park*
- A holding pond. *Minneapolis Parks & Rec, Pearl Park*
- A rain garden. *Minneapolis Parks & Rec, Martin Luther King Jr. Park*
- Putting grass on everything you see. *Minneapolis Parks & Rec, Pershing Park*
- Rain garden. *Coon Rapids Dam, Summer Session*
- Making rain gardens, Planting high water intake plants. *Coon Rapids Dam, Summer Session*
- Park. *Heritage Park, Summer Session*
- Plant a lot of plants. *Heritage Park, Summer Session*

- Rain gardens can reduce the amount of runoff and so can permeable pavement to soak in the water and create a useful way for parking. *Washington County**
- Riparian buffer. Porous concrete. *Minneapolis Parks & Rec, Pearl Park**
- Eco or green roof, Wet holding pods, Planters and swales. *Coon Rapids Dam, Spring Session**
- Green roof, wet holding ponds, nature-scaping, planters and swales. *Coon Rapids Dam, Spring Session**
- You can have special pavers called permeable pavers that have cracks in between them to let the water get absorbed. You can also have a permeable pavement parking lot which is a parking lot made out of grass. So that the water doesn't run off. You can also have the storm drains run into a rain garden and the downspouts can also go into it. The one problem is that you have to install some sort of filter to stop the leaves and silt from getting into it. *Washington County**
- Rain barrels. Rain gardens. *Coon Rapids Dam, Summer Session**
- Rain garden and rain barrel. *Minneapolis Parks & Rec, Pershing Park**
- Things you can do to help would be rain barrels, rain gardens, dirt roofs, etc.... *Minneapolis Parks & Rec, Pershing Park**
- I would put in permeable pavement on my drive way. Maybe put in a reason garden. *Minneapolis Parks & Rec, Martin Luther King Jr. Park**

Hardscaping: rain barrels, green/dirt roof, permeable paving

- Rain barrels. *Minneapolis Parks & Rec, Pershing Park*
- Rain barrels. *Coon Rapids Dam, Spring Session*
- Rain barrels and porous concrete. *Coon Rapids Dam, Spring Session*
- Green roof. *Coon Rapids Dam, Spring Session*
- Use pervious pavers to help suck up lots of the water. You can use pieces of steel, plastic, or glass to collect leaves, sand, and other stuff that can go into a storm sewer! *Washington County*

- Practices that you can do at your house is permeable concrete. *Minneapolis Parks & Rec, Martin Luther King Jr. Park*
- Maybe some of the permeable pavement could be added to my house. *Minneapolis Parks & Rec, Martin Luther King Jr. Park*
- Rain gardens can reduce the amount of runoff and so can permeable pavement to soak in the water and create a useful way for parking. *Washington County**
- Riparian buffer. Porous concrete. *Minneapolis Parks & Rec, Pearl Park**
- Eco or green roof, Wet holding pods, Planters and swales. *Coon Rapids Dam, Spring Session**
- Green roof, wet holding ponds, nature-scaping, planters and swales. *Coon Rapids Dam, Spring Session**
- You can have special pavers called permeable pavers that have cracks in between them to let the water get absorbed. You can also have a permeable pavement parking lot which is a parking lot made out of grass. So that the water doesn't run off. You can also have the storm drains run into a rain garden and the downspouts can also go into it. The one problem is that you have to install some sort of filter to stop the leaves and silt from getting into it. *Washington County**
- Rain barrels. Rain gardens. *Coon Rapids Dam, Summer Session**
- Rain garden and rain barrel. *Minneapolis Parks & Rec, Pershing Park**
- Things you can do to help would be rain barrels, rain gardens, dirt roofs, etc.... *Minneapolis Parks & Rec, Pershing Park**
- I would put in permeable pavement on my drive way. Maybe put in a reason garden. *Minneapolis Parks & Rec, Martin Luther King Jr. Park**

29% (12) Did not list a best management practice

- Not use chemicals on my property. *Coon Rapids Dam, Spring Session*
- Some bmps that I can add to my Cafe could be a compost bucket where we can throw away a food that was eaten but wasn't finished. *Minneapolis Parks & Rec, Pearl Park*
- Recycle more. *Minneapolis Parks & Rec, Martin Luther King Jr. Park*
- Recycling. *Minneapolis Parks & Rec, Martin Luther King Jr. Park*
- A net that shot out any pollution that was caught in it. *Packer Pad*
- A net. *Packer Pad*
- Put certain bins for certain things. *Packer Pad*
- Junk that end up in our river: Garbage, Animal Waste, Pinecones, Food Waste/wrappers, Lawn Clippings, Leafs, People Waste. *Lincoln Park Middle School in Duluth, Spring Session*
- We could pick up pet waste and garbage on the ground. *Lincoln Park Middle School in Duluth, Spring Session*
- The main building, by the lake. *Coon Rapids Dam, Summer Session*
- [Surfaces.] *Coon Rapids Dam, Summer Session*
- Littering. *Heritage Park, Summer Session*

9% (4) Unsure

- I don't know. *Coon Rapids Dam, Spring Session*
- I don't know. [2] *Minneapolis Parks & Rec, Pearl Park*
- Idk. *Packer Pad*