

**SECTION 319
NONPOINT SOURCE POLLUTION
CONTROL PROGRAM**

INFORMATION/EDUCATION/TRAINING/DEMONSTRATION PROJECT

FINAL REPORT

319 Information and Education Project Segment 5

By

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This project was conducted in cooperation with the State of South Dakota and the United States Environmental Protection Agency, Region 8.

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Executive Summary	4
1.0 Introduction	5
2.0 Project Goals, Objectives, and Activities	5
2.1 Planned and Actual Milestones, Products, and Completion Dates.	7
Explanation for Milestones Not Achieved	7
2.2 Evaluation of Goal Achievement and Relationship to the State NPS Management Plan	9
Goal achievement	9
Relationship to the State NPS Management Plan	9
2.3 Supplemental Information	9
Information	10
PRODUCT 1: Urban Watershed Planning	10
PRODUCT 2: Volunteer Monitoring	10
PRODUCT 3: Conference Support	10
PRODUCT 4: Mini-grants	10
Education	14
PRODUCT 5: Water Festivals	14
PRODUCT 6: Educator Professional Development	14
PRODUCT 7: Watershed Education Mentoring	14
PRODUCT 8: Youth And Student	15
PRODUCT 9: Envirothon	15
3.0 Long Term Results in Terms of Behavior Modification, Stream/Lake Groundwater, and/or Watershed Protection Changes	15
3.1 Water Quality Data	18
4.0 Best Management Practices Developed and/or Revised (For Demonstration Projects)	19
5.0 Monitoring Results for Demonstration Projects	19
6.0 Public Involvement and Coordination	19
6.1 State Agencies	19
6.2 Federal Agencies	19
6.3 Local Governments, Industry, Environmental, and Other Groups; Public at Large	20
6.4 Other Sources of Funds	21
7.0 Aspects of the Project That Did Not Work Well	22
Volunteer Monitoring	22
Conference Support	22

8.0 Future Activity Recommendations	22
Appendix A: Product Evaluation Summary	24
Appendix B: Education Evaluation	27
5.0 Water Festival	27
6.0 Professional Development	27
Table 1: Summary of Activities, Milestones, Dollars and Outcomes	8
Table 2: Mini-grants	12
Table 3: Logic model Connecting Outcomes.....	17
Table 4: Other Sources of Funds by Product	21

Executive Summary

Project Title: 319 Information and Education Project Segment 5

Project Start Date: June 1, 2017

Project Completion Date: August 31, 2020

FUNDING

Total Budget

Total EPA Grant	\$229,000.00
Total Expenditure of EPA Funds	\$190,610.67
Total Section 319 Match Accrued	\$228,749.95
Budget Revisions	\$0.00

Total Expenditures **\$419,360.62**

SUMMARY ACCOMPLISHMENTS

The 319 Information and Education Project successfully promoted and facilitated public understanding of watersheds and related issues through the continued implementation of a comprehensive, coordinated statewide effort. The Project achieved 132% of its milestones. In doing so, the project approved 10 projects through mini-grants, continued support of the volunteer monitoring program, supported 22 water festivals, and reached almost 300 educators.

The 319 Information and Education Project continues to be a valuable part of the strategy to protect watersheds. The partnership of federal, state, and non-profit organizations leverages the strength of each to deliver a project that is effective and useful for the citizens of South Dakota.

1.0 Introduction

The South Dakota 319 Information and Education Project (I&E Project) began in 2004. Prior to the project, watershed protection outreach and education were coordinated by the South Dakota Department of Environment and Natural Resources Water Resources Assistance Program. Staff changes within the department in 2003 required a new method of delivering outreach and education. The South Dakota Department of Environment and Natural Resources partnered with the South Dakota Discovery Center and outsourced much of the day to day delivery and oversight of outreach and education except for some watershed project coordinator training and web activities. This partnership is described more in depth in the draft *South Dakota Nonpoint Source Management Plan, 2019*.

The information and education project that resulted from this partnership has had four previous segments, 2004-2007, 2007-2010, 2010-2014, 2014-2017 reaching South Dakotans statewide with the message about watershed protection and preventing nonpoint source pollution. These topics are particularly important in South Dakota as nonpoint source pollution is a primary contributor to water pollution with sedimentation, algae and bacteria being the pollutants of concern. (South Dakota Department of Environment and Natural Resources, *2018 South Dakota Integrated Report*).

The first four segments of the I&E Project met or exceeded almost all their milestones and objectives. This fifth segment was on track to meet the milestones and objectives per the 2019 Grant Reporting Tracking System report of October 2019 until COVID 19 disrupted outreach and operation of the South Dakota Discovery Center. This will be discussed more in depth in [Section 2.1](#) in Milestones Not Achieved.

As with previous projects, the fifth segment was statewide in scope. The broad geographic focus was to ensure that all South Dakotans were being reached with the important message of watershed protection. Under the current structuring of 319 projects, South Dakotans who live in impaired watersheds where there is an active improvement project are reached with watershed specific information and education. That leaves a vast number of unreached and formerly reached citizens who are not receiving any information about watershed protection. Since watershed protection requires continual and repeated practices by a wide array of stakeholders, a statewide project was deemed necessary to support current, past, and future watershed improvement projects.

The I&E Project used a variety of practices to reach different audiences. The adult audience was reached through a targeted outreach on low impact development and outreach conducted at the local or regional level by groups availing themselves of mini-grant funds provided by the I&E Project. The youth audience was reached by training educators in various watershed education curricula, water festivals, and youth and student outreach events including Envirothon.

2.0 Project Goals, Objectives, and Activities

The goal of the South Dakota 319 Information and Education Project is to **use information and education to foster citizen support for and participation in activities which maintain and restore water quality and watersheds.**

Information refers to outreach that is fact based and is targeted towards adults and the wider community. The delivery methods can be broad-- media, publications--or focused, as in a workshop. Education projects are also fact based but include the development of critical thinking skills. Education project are targeted towards students (pre-kindergarten through college) and youth. The delivery

methods can be direct to students (Water Festivals), or indirect through trained teachers or youth program leaders.

The goal of the Information and Education project is big and audacious. Like all big goals, it needs smaller steps in order to be achieved. The project staff identified these smaller steps as intermediary outcomes, objectives, tasks, and products that, if attained, would lead to goal achievement. For the purposes of this project, we define the above terms thusly:

Outcomes - the desired result that occurred because of the work of the project.

Objectives - the means to achieve the outcomes.

Tasks - a description of work to be done.

Products - the outputs from the work done in the tasks.

The I&E Project identified four outcomes or results that would lead to goal achievement. All work conducted under the auspices of the I&E Project was to result in one of the following.

Outcome 1. Increased awareness and/or knowledge of watershed ecology.

Outcome 2. Increased awareness of nonpoint source pollution causes, effects, and remedies.

Outcome 3. Increased awareness of and participation in nonpoint source best management practices.

Outcome 4. Increased capacity to deliver nonpoint source information and education.

The two main objectives that will achieve these outcomes are:

Objective 1: Facilitate understanding and action to protect watersheds.

Objective 2: Educate students and educators about watershed and nonpoint source issues.

The tasks and products for Objective 1, summarized as Information, are:

- Task 1: Develop and coordinate outreach.
 - Product 1: Planning for urban watershed protection project
 - Product 2: Volunteer Monitoring Program with 10 sites monitored
 - Product 3: Two conferences supported
- Task 2: Provide support for local, regional, and statewide projects through a competitive mini-grant program.
 - Product 4: Twelve (12) projects sponsored by local or regional groups which inform or educate South Dakotans or that provide I & E opportunities to a high-priority segment of the population (example: communities with identified water quality concerns).

The task and products for Objective 2 (Education) are:

- Task 3: Support water education and water educator professional development activities that align with state educational initiatives and standards.

- Product 5: Twenty-two (22) water festivals which are hands-on learning events for 4th-6th graders conducted in a field day format with multiple stations, events and activities.
- Product 6: Twenty-seven (27) professional development opportunities
- Product 7: A watershed education mentor project piloted with seven (7) mentors trained
- Product 8: Twenty-one (21) programs for family, youth, and students outside of the Water Festivals.
- Product 9: Three (3) Envirothon events serving a total of 36 teams.

[Table 1](#) summarizes the objectives, tasks and products completed during the Information and Education Project.

2.1 Planned and Actual Milestones, Products, and Completion Dates.

The I&E Project had a target of 138 products or milestones to achieve. The total number of milestones achieved was 187 or an achievement rate of 132%. The over achievement of milestones can be explained by the large number of Youth and Student activities being offered virtually during March – May of 2020 due to the pandemic. Virtual events are easy to deploy and during the spring phase of the pandemic were the only outreach method available on such a quick pivot. When you remove Youth and Student milestone achievement from the totals, the I&E Project had 117 milestones with 95 completed for a 78% completion rate. The low number of completed milestones is explained mostly by the impact of COVID. This will be discussed below.

A summary of planned and completed milestones for each objective, task and product can be found in [Table 1](#).

Explanation for Milestones Not Achieved

While the total number of milestones exceeded the target, not all tasks achieved their targeted milestones.

Most of the incomplete milestones are explained by the disruption of COVID 19 pandemic. Water Festivals (Product 5), Professional Development (Product 6) and Envirothon (Product 9) all failed to complete their milestones due to canceled events. Their milestone completion rates were 90%, 85% and 61% respectively. The Envirothon (61%) anticipated a large number of teams (20) to participate in the Spring 2020 event. Since that milestone was based on the number of teams, canceling the Envirothon reduced their milestone achievement substantially and this in turn affected the total number.

The mini-grants milestone (Product 4) also was not achieved. We anticipated disbursing twelve mini-grants and ten projects were funded by the mini-grant product for an 83% completion. Thirteen project applications were accepted by the mini-grant review subcommittee but three were funded out of different products and objectives (urban watershed planning, citizen science, and education).

TABLE 1: SUMMARY OF ACTIVITIES, MILESTONES, DOLLARS AND OUTCOMES

Goal/Objective/Task/Product	Milestones	EPA Dollars	Match	Total Dollars
Objective 1: Facilitate understanding and action to protect watersheds.				
Task 1: Develop and coordinate outreach.				
Product 1: Urban Watershed Infrastructure	1 planned 1 completed	\$37,500.00*	\$25,000.00*	\$62,500
Product 2: Volunteer Monitoring	10 planned 10 completed	\$7,726.61	\$1,405.58*	\$9,132.19
Product 3: Conference support	2 planned 2 completed	\$3,100.00	\$11,083.00	\$14,183.00
Task 2: Competitive Mini-grants				
Product 4: Mini-grants	12 planned 10 completed	\$28,778.04*	\$27,844.63*	\$56,622.67
Objective 2: Educate youth and students about watersheds and non-point source pollution				
Task 3: Coordinate and support water education				
Product 5: Water Festivals	22 planned 20 completed	\$13,300.83	\$124,759.97	\$138,060.80
Product 6: Professional Development	27 planned 23 completed	\$18,609.44	\$29,943.92	\$48,553.36
Product 7: WE Mentor	7 planned 7 completed	\$3,668.52		\$3,668.52
Product 8: Family, Youth and Student	21 planned 187 completed	\$3,468.32	\$5,053.53	\$8,521.85
Product 9: Envirothon	36 planned 22 completed	\$50,000.00	\$30,123.07	\$80,123.07

* Earmarked dollars that have not been vouchered yet

2.2 Evaluation of Goal Achievement and Relationship to the State NPS Management Plan

Goal achievement

Goal achievement can be measured both quantitatively and qualitatively. Quantitatively, the goal achievement is measured in the number of milestones successfully completed which is discussed above in [Section 2.1](#).

The qualitative measurement is determined by evaluation of outcomes achieved and will be discussed more in depth in [Section 3](#). A summary of qualitative evaluation is provided in Appendices A and B.

Relationship to the State NPS Management Plan

The mission of the South Dakota Nonpoint Source Program is:

Protect or restore the chemical, physical, and biological integrity of the waters of the state by promoting locally sponsored projects where waters are threatened or impaired due to nonpoint sources of pollution.

To achieve this mission, the South Dakota Nonpoint Source Program has its goal:

Maintain a balanced program focused on the restoration and maintenance of the beneficial uses of the State's water resources impaired by nonpoint source pollution by developing and implementing workplans to attain the TMDLs for listed waterbodies.

To achieve this goal and fulfill the mission, objectives were identified for six program areas, one of which was information and education (I&E). Objective Three (3) in the Nonpoint Source Management Plan is

Provide for an outreach program that conveys information and participation opportunities to targeted segments of the state's urban and rural populations.

The South Dakota Department of Environment and Natural Resources (DENR) selected the South Dakota Discovery Center to facilitate aspects of that outreach. The Department of Environment and Natural Resources retained some elements of outreach such as training watershed coordinators and web outreach as well as requiring that each project to develop Total Maximum Daily Loads (TMDLs) have an information and education component.

The 319 Information and Education Project coordinates with the State Nonpoint Source Management Plan by conducting outreach to targeted audiences that are not reached by DENR or TMDL project outreach.

Furthermore, this project has aligned its project goals with the information and education goals of the Non-Point Source Management Plan, namely to increase awareness of water quality issues, nonpoint source pollution, and ways to improve water quality issues. This Information and Education project also has goals that scaffold or support the Management Plans goals.

2.3 Supplemental Information

Below is a summary of activity conducted as part of the 319 Information and Education Project Segment 5

Information

A total of \$142,437.86 in Federal and local funds will be spent on information projects which included a urban watershed planning, conferences, volunteer monitoring, and mini-grants to local and regional groups. The US EPA Region 8 funds totaled \$77,104.65 with a match of \$65,333.21

PRODUCT 1: URBAN WATERSHED PLANNING

EPA: \$37,500 Match: \$25,000 Total: \$62,500

Workshops and design charettes about low impact design, green infrastructure. Target audience: planning professionals, stakeholders, local government staff and officials, general public.

Outcome: Increased awareness of and participation in NPS best management practices.

PRODUCT 2: VOLUNTEER MONITORING

EPA: \$7,726.61 Match: \$1,405.58 Total: \$7,726.61

In the original project implementation plan, the volunteer monitoring project was facilitated by another agency that stepped back from the work shortly after the segment began. A citizen science project with the South Dakota Game, Fish and Park was piloted that did not achieve sufficient staff support to continue. In the extension of this project implementation plan, the volunteer monitoring product was revised to support a partnership with education. Volunteers collected water transparency data using GLOBE protocols to provide data for students to analyze that would help them understand land use and geology of the state. This product will be discussed in section 3.1.

Outcome: Increased awareness and/or knowledge of watersheds.

PRODUCT 3: CONFERENCE SUPPORT

EPA: \$3,100 Match: \$11,083.00 Total: \$14,183.00

This product provided support for the conference on the Big Sioux River through the City of Sioux Falls.

Outcome: Increased awareness of NPS pollution prevention, causes, effects and remedies.

PRODUCT 4: MINI-GRANTS

EPA: \$28,778.04 Match: \$27,844.63 Total: \$56,622.67

Mini-grants are a mechanism to support local or regional outreach efforts to communities or producers (as opposed to students or youth). All mini-grants were required to support one of the priority topics:

- Watershed, Wetlands, and Ground Water ecology
- Healthy watershed protection
- Climate and watersheds
- Nonpoint source prevention and mitigation

Mini-grants also had to support one of the outcomes of the Information and Education Project.

- Outcome 1. Increased awareness and/or knowledge of watersheds.
- Outcome 2. Increased awareness of NPS pollution prevention, causes, effects and remedies.

- Outcome 3. Increased awareness of and participation in NPS best management practices.
- Outcome 4. Increased capacity to deliver NPS I&E.

A list of mini-grant projects is provided in [Table 2](#).

TABLE 2: MINI-GRANTS

Mini-grant Name	Sponsor	Description	Topic	Outcome
Adopt a Lake Trailer	South Dakota Game Fish and Park	Trailer purchase to facilitate riparian trash pick ups.	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.
Leopold Conservation Award 2017	Sand County Foundation	Administer project to recognize outstanding land manager for conservation outcomes.	Healthy watershed protection	Increased awareness of and participation in NPS best management practices.
Leopold Conservation Award 2018	Sand County Foundation	Administer project to recognize outstanding land manager for conservation outcomes.	Healthy watershed protection	Increased awareness of and participation in NPS best management practices.
Rain Garden Demonstration Project	Dakota Rural Action	Coordinated community outreach for rain garden installation. Recruited homeowner, facilitated public demonstrations	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.
Rain Garden Demonstration Project	South Dakota State University	Installed a rain garden demonstration project for continued monitoring.	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.
French Creek	Custer Conservation District	Healthy Streams Workshop	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.
BMP Audits Part 1	Department of Agriculture	Preparation for audit of Forestry BMP practices	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.

Mini-grant Name	Sponsor	Description	Topic	Outcome
BMP Audits Part 2	Department of Agriculture	Audit for Forestry BMP practices	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.
Wall Lake Signage	Minnehaha Conservation District	Install informational signage about the watershed and watershed health along a walking trail near Wall Lake.	Watersheds, wetlands, and groundwater ecology	Increased awareness and/or knowledge of watershed ecology.
Rainwater Harvesting	South Dakota State University	Rainwater harvesting demonstration project at a community site with rain barrel outreach to that community.	Nonpoint source prevention and mitigation	Increased awareness of and participation in NPS best management practices.

Education

A total of \$278,927.60 of Federal and local dollars were spent on education activities including educator trainings, Envirothon, Water Festivals and youth and student outreach activities. The US EPA Region 8 funds totaled \$89,047.11 with a local match of \$189,880.49. This section discusses achievements in these areas.

PRODUCT 5: WATER FESTIVALS

EPA: \$13,300.83 Match: \$124,759.97 Total: \$138,060.80

Water Festivals, usually for 4th and 5th graders, feature a half or full day of hands-on presentations or stations about water. The following locations have established Water Festivals: Sioux Falls, Brookings, Yankton (Gr 7-12), Vermillion, Pierre, Aberdeen and starting in September of 2019 Huron. These events pull in students from that locale as well as surrounding counties. Approximately 4500 students and 240 teachers are served each year through these Water Festivals.

The I&E Project supports Water Festivals by providing funding for student or teacher resources and a presenter, either the I&E project coordinator or a contractor. Sufficient presenters are an on-going challenge for Water Festivals so having a reliable, quality presenter is an important means of support. Agency and organization outreach staff enjoy working at Water Festivals. An estimated 140 state, local and organizational volunteers support the local water festivals by staffing a station.

Outcome: Increased awareness and/or knowledge of watersheds.

PRODUCT 6: EDUCATOR PROFESSIONAL DEVELOPMENT

EPA: \$18,609.44 Match: \$29,943.92 Total: \$48,553.36

Equipping educators with the skills, knowledge, and resources necessary to implement high quality instruction about watersheds is a critical part of the information and education project. Educators include classroom teachers but also include agency staff and non-formal educators that work in settings other than a school, such as 4H or camp. More than 375 educators were reached through 30 opportunities.

This segment of the project used GLOBE (Global Learning and Observations to Benefit the Environment) in most of the educator trainings. GLOBE is an international, school based, citizen science project sponsored by NASA and the National Science Foundation with support from NOAA and the US Department of State. Other resources included National Geographic, Project WET, and Journey North, a citizen science based education project. This segment of the project also included the Limnology workshop, a popular hands-on workshop held in a residential camp. Previously, the Limnology workshop was funded through a mini-grant.

Outcome: Increased capacity to deliver NPS I&E.

PRODUCT 7: WATERSHED EDUCATION MENTORING

EPA: \$3668.52 Match: Total: \$3,668.52

If watershed education is to become a widely disseminated practice, there is a need for more watershed educators to serve as water festival presenters, provide experiences for families and children in their

communities and for agency staff, to be able to communicate effectively. This product piloted a training for interested citizens and agency staff to build their capacity to deliver effective watershed education.

Outcome: Increased capacity to deliver NPS I&E.

PRODUCT 8: YOUTH AND STUDENT

EPA: \$3468.32 Match: \$5053.53 Total: \$8521.85

Youth and Student outreach targets youth and students outside of the water festival format. The youth and student milestones were over achieved by the South Dakota Discovery Center offering daily live streams for families and children from March 16 to May 16, due to COVID. In addition to the livestreams, other youth and student activities include supporting water quality monitoring at camps and 4H programs, special programs utilizing Elementary GLOBE and citizen science opportunities for GLOBE and Marine Debris tracker. Youth and student funding is provided to other water education organizations. Because these organizations are often small the match requirement is reduced or eliminated.

Outcome: Increased awareness and/or knowledge of watersheds.

PRODUCT 9: ENVIROTHON

EPA: \$3468.32 Match: \$31,123.07 Total: \$80,123.07

Envirothon is a hands-on competition for teams of five high school students who compete in knowledge and skills pertaining to aquatic ecology, soils, wildlife, forestry, and a current issue. The Envirothon is active in the US and Canada. Two Envirothons were held during the project. A third project was cancelled due to COVID.

Outcome: Increased awareness and/or knowledge of watersheds.

3.0 Long Term Results in Terms of Behavior Modification, Stream/Lake Groundwater, and/or Watershed Protection Changes

The 319 Information and Education project contributed to water quality by developing the knowledge, skills, and abilities of targeted groups of citizens to understand watershed protection and act upon that understanding. Development of these knowledge, skills and abilities is a multi-faceted process with various methods and intensity levels of outreach required.

True long-term results are difficult to determine as the 319 Information and Education Project does not have the scope nor the finances to support a longitudinal follow up of those reached by the project. The project has identified immediate outcomes which are expected to yield eventual intermediate and long-term results. Immediate and intermediate outcomes are more easily measured than long term outcomes which need to be tracked over a period of years.

Outcome 1. Increased awareness and/or knowledge of watershed ecology.

Outcome 2. Increased awareness of NPS pollution causes, effects, and remedies.

Outcome 3. Increased awareness of and participation in NPS best management practices.

Outcome 4. Increased capacity to deliver NPS I&E.

A logic model is useful for seeing how immediate outcomes relate to long term results. Table 3 below is the logic model for the 319 Information and Education project. The model below shows the relationship of output/product to long term outcomes.

TABLE 3: LOGIC MODEL CONNECTING OUTCOMES

Output/ Product	Audience	Outcomes		
		Immediate	Intermediate	Long term
Projects conducted by local/regional stakeholder groups (mini-grants, volunteer monitoring, conferences, urban watershed planning)	Adult, community	-Increased awareness and/or knowledge of watershed ecology. - Increased awareness of NPS pollution causes, effects and remedies. - Increased awareness of and participation in NPS best management practices.	As opportunities present themselves, those adults and community members participate in watershed protection practices. This strengthens the social norming and diffusion of these practices.	Many informed and active citizens positively impact water quality through good watershed management.
Educator workshops and watershed education mentoring	K-16 students	-Increased awareness and/or knowledge of watershed ecology. -Increased awareness of NPS pollution causes, effects, and remedies. -Increased capacity to deliver NPS I&E.	Educators increase their capacity to teach effectively about watersheds utilizing assets (knowledge, skills, abilities, resources) acquired during the workshop in their classrooms.	Youth and Students are educated and positively impact water quality by engaging in lifelong watershed protection.
Water Festivals	Grade 4-6 students	Increased awareness and/or knowledge of watershed ecology.	Students build upon the knowledge acquired at Water Festivals	Youth and Students positively impact water quality by engaging in long term watershed protection.
Youth and Student outreach including Envirothon.	K-16.	- Increased awareness and/or knowledge of watershed ecology. - Increased awareness of NPS pollution causes, effects, and remedies.	Students participate in watershed protection activities such as monitoring as part of the curriculum and youth programs.	Youth and Students positively impact water quality by engaging in long watershed protection.

Even though evaluating the long-term outcomes is beyond the scope of this project, evaluation of outreach is a necessary task for the 319 I&E Project. All aspects of the 319 I&E Project have an evaluation component.

The evaluation is informed by the [four outcomes](#) discussed above in Section 2. Each product, which shapes the day to day work of the project, has at least one outcome it supports.

A few underlying assumptions exist in evaluating the products.

1. Numbers are indicator of outcome. If a product is not being used and has no or low numbers served, then the value and effectiveness of the product should be called into question. This underpins using numbers served as an evaluation tool.
2. Using appropriate methods and executing those methods will yield desired results, though it is difficult to assess the quality of those results. Some methods are so evident and essential (such as signage or media campaigns) that you can assume that the outcome was achieved, if only to a small degree. Completion of project is a proxy measure that the outcome was achieved.
3. Self-reporting is an indicator of whether an outcome was achieved. It does not tell you to what degree the outcome was achieved.

The tools and resources available to the I&E Project allow for a coarse-grained evaluation. In short, the evaluation shows whether the outcomes or results are being achieved but it is not feasible to determine to what degree. A summary of products and their evaluation is provided in [Appendices A](#) and [B](#). All products were found to have achieved the minimum desired outcome.

3.1 Water Quality Data

This project supported volunteer water quality monitoring using the GLOBE project protocols and database. GLOBE is an international science and education project sponsored by NASA and NOAA with the support from the US Department of State. All quality assurance protocols established by GLOBE were followed.

The project specifically supported water clarity readings using a transparency tube. The reasons for this are:

1. Water clarity impairments have multiple causes including sedimentation and algae growth due to nutrient enrichment. These impairments are often caused by non-point source pollution and are a concern for South Dakota water bodies.
2. Water clarity is a good screening tool that yields useful data to watershed managers.
3. The equipment for water transparency is inexpensive, the training is minimal, and the skills are accessible to a wide range people from approximately upper elementary age children through adulthood.
4. There are multiple uses for the data. In addition to screening, water transparency data can be used by educators to teach the geology and land use of South Dakota.

The data collected from the project can be viewed on a map at <https://bit.ly/39Tlkj8>. The entire data set including data from years outside this project can be downloaded from the GLOBE website using the

Advanced Data Access Tool (<https://datasearch.globe.gov/>) by filtering for Water Transparency under Data Filters and South Dakota under Site Filters.

The data are as expected, ranging from very turbid, low clarity water in the Badlands to very clear waters in the Black Hills and on Enemy Swim lake. As more volunteer monitors come online and are trained a larger data set both in terms of history and geographic scope will make the data more useful for watershed management purposes.

4.0 Best Management Practices Developed and/or Revised (For Demonstration Projects)

No Best Management Practices were developed during this project.

5.0 Monitoring Results for Demonstration Projects

One mini-grant was funded that included monitoring for rain gardens. The findings from this projects will be made available to the SD Department of Environment and Natural Resource and the public after review. East Dakota Water Development District is continuing the funding for this monitoring.

6.0 Public Involvement and Coordination

Section 6.0 discusses how the public was involved in this project and how the various partners contributed to the project. With a project of this scope and breadth, it is difficult to identify every source of involvement and coordination. Only the entities that made significant financial, technical, or administrative contributions will be listed.

6.1 State Agencies

The lead state agency that coordinated the project was the South Dakota Department of Environment and Natural Resources (DENR) by providing administrative and grant management assistance. The 319 Information and Education funds were awarded by the DENR to the South Dakota Discovery Center. DENR has provided significant financial support through CWSRF.

South Dakota State University and the South Dakota School of Mines and Technology, both state universities, received mini-grant funding. The South Dakota Department of Game, Fish and Park and South Dakota Department of Agriculture (Forestry) received mini-grants.

State agencies have been strong supporters of the Water Festival throughout the state. The Departments of Environment and Natural Resources, Game Fish and Park, Agriculture and the South Dakota State University provide presenters for the festivals.

6.2 Federal Agencies

Federal agencies are involved directly and indirectly in the educational outreach of the 319 Information and Education Project. NASA and the University Corporation for Atmospheric Research provide support for GLOBE at the national level. Staff from the Natural Resource Conservation Service served on the Envirothon steering committee. The Natural Resource Conservation Service also provided funding for Envirothon. Federal agencies provide support for Water Festivals through staff volunteering for Water

Festivals. Agencies such as the Natural Resource Conservation Service, US Fish and Wildlife, Bureau of Reclamation have provided volunteers over the years. These volunteers are not counted as part of the match provided by water festivals towards the 319 Information and Education Project.

6.3 Local Governments, Industry, Environmental, and Other Groups; Public at Large

The bulk of support for the 319 Information and Education Project comes from local agencies and groups in local cash and local in-kind. Most of these contributions were small and cumulative, a few hundred or at the most one thousand dollars a year over the course of 3 years. These small contributions add up, however.

All mini-grant sponsors (See [Table 2](#)) provided a minimum of 40% match of total project costs. Non state or federal sponsors include Dakota Rural Action, Custer County Conservation District, Minnehaha Conservation District, Miner County Conservation District, and the Sand County Foundation.

The Day County Conservation District supports water education by sponsoring the Limnology workshop training for educators, agency staff, and the public.

Educators provided match in the form of time at and travel to trainings. They also provided cash by paying a deposit for the workshops. Educators are the front-line resource for reaching youth and students. Time is valued only during the training itself at the rate set by Independent Sector, a research organization dedicated to the study of the non-profits and volunteers. The valuations set by Independent Sector are accepted by the Federal Government for determining match.

Water Festivals also generate a lot of cash and in-kind match. Providers of matching funds are municipalities, conservation districts, private businesses, and organizations. Volunteer time is a substantial component of water festival time to streamline accounting, the 319 Information and Education Project values all time, including those who coordinate festivals as part of their paid staff duties, as volunteer time. The valuation of volunteer time is set by Independent Sector for the state of South Dakota. As of this writing that rate is \$22.57 per hour. Only the hours spent at the Water Festival are counted as pre and post hourly contributions are not easily tracked.

6.4 Other Sources of Funds

TABLE 4: OTHER SOURCES OF FUNDS BY PRODUCT

Admin - Salary		
	SD Discovery Center	\$41,219.93
	CWSRF	\$85,700.00
Amin - Non Salary		
	SD Discovery Center	\$28,098.87
	CWSRF	\$1,323.14
Product 1: Urban Watershed Planning		
	South Dakota School of Mines & Technology	\$25,000.00
Product 2: Volunteer Monitoring		
	Volunteers	\$1,405.58
Product 3: Conference Support		
	City of Sioux Falls	\$11,083.00
Product 4: Mini-grants		
	Mini-grant Sponsors	\$21,962.61
	CWSRF	\$5,882.02
Product 5: Water Festival		
	Water Festival Sponsors	\$117,811.06
	CWSRF	\$6,948.91
Product 6: Professional Development		
	Volunteer Trainers	\$24,839.20
	CWSRF	\$4,938.42
	SD Discovery Center	\$166.30
Product 7: Watershed Education Mentor		
		\$0.00
Product 8: Family, Youth, and Student		
	Youth and Student Organizations	\$4,025.43
	CWSRF	\$1,028.10
Product 9: Envirothon		
	Envirothon Agencies	\$22,623.07
	CWSRF	\$7,500.00
CWSRF TOTAL		\$113,320.59
SD DISCOVERY CENTER TOTAL		\$69,485.10
TOTAL ALL OTHER SOURCES		\$228,749.95

7.0 Aspects of the Project That Did Not Work Well

Volunteer Monitoring

In the initial project implementation plan for this project, the volunteer monitoring project was outsourced to a regional agency. That partner, which had administrated the project for 3 years prior, stepped back shortly after the project began due to lack of growth of the volunteer monitoring effort and value to the partner.

Efforts were made to complete this product through a pilot project with the SD Game Fish and Park and then as a small pilot volunteer project focused on water transparency. The project with the Game, Fish, and Park stalled mainly because it was not a good fit for the partner staff. The water transparency project did complete its milestones but as a small pilot project the question remains how to scale it.

One of the consistent challenges of a volunteer monitoring project is the low, dispersed population of our state. Historically, a volunteer monitoring project will have between 30 and 40 participants and then stop growing. Volunteer monitoring projects that collect data around an issue important to the stakeholder group tend to fare a little better.

The lessons learned about the volunteer monitoring project will be discussed in section 8.0 Future Activity Recommendations.

Conference Support

This product completed its milestones. Due to the variability of the conferences offered in state about watershed issues funding is difficult to anticipate. Upon review of project staff, the decision was made to include it as line item in the budget. Going forward, the work can be conducted as part of a mini-grant project to allow for more flexibility in funding for Objective 1 tasks and projects.

8.0 Future Activity Recommendations

The 319 Information and Education Project has been funded for a sixth segment of three years per the recommendation of the 319 Nonpoint Source Task Force.

The essential objectives, tasks and products of the project remain sound. In the next iteration, some activities should include adaptations to virtual or remote delivery since the duration of the COVID19 pandemic is uncertain. With these understandings and the lessons from this segment in mind, the following activities are recommended for the next segment.

1. Continue the mini-grant process. Solicit grants from projects that have begun such as the urban watershed planning grant and the rain garden grants. Solicit grants on a rolling basis instead of on a fixed schedule to allow for more flexibility in recruiting and supporting projects.
2. Partner with the South Dakota Game, Fish and Park, and Black Hills Parks Association to support the development of a Master Naturalist program which will include water quality and citizen science monitoring opportunities. Funding will be appropriated, if necessary, through a mini-grant.
3. Maintain support for the Water Festivals. Strategize remote and virtual field sessions for water festival style opportunities.

4. Maintain support for Professional Development. In addition to using GLOBE, expand GIS and geography opportunities for students. Develop more asynchronous and online opportunities and content that supports educators in remote instruction.
5. Continue the Watershed Education Mentoring program, training community members, agency staff and resource professionals in the best practices of watershed education for K-12 and community audiences. This is a scicomm style training with more of a focus on education than watershed content knowledge. Change the name to Watershed Education Fellows. Conduct this under the professional development product.
6. Support the water transparency citizen science project under professional development.
7. Relocate support for the Envirothon to Youth and Student work as a change in leadership makes it uncertain that the program will continue.

Appendix A: Product Evaluation Summary

Product	Evaluation Method	Increased awareness and/or knowledge of watershed ecology.	Increased awareness of NPS pollution causes, effects and remedies.	Increased awareness of and participation in NPS best management practices.	Increased capacity to deliver NPS I&E.	Notes
1.0 Education to Promote Smart Growth	Surveys Numbers served.			X		- Low survey participation numbers - Time & technology barriers to robust survey results - Reached over 700 stakeholders from 11 audience groups
2.0 Volunteer Monitoring	Numbers served	X	X			Ten sites monitored
3.0 Conference	Numbers served Stakeholder feedback	X		X		2 conferences held 2018 125 attendees 2019 130 attendees
4.1 Adopt a Lake Trailer	Numbers served, Stakeholder feedback			X		8 events conducted Trash removal facilitated Exposure of event through signage
4.2 Leopold Conservation Award 2017	Media reach			X		2 million media impressions
4.3 Leopold Conservation Award 2018	Media reach			X		2.8 million media impressions

Appendix A (cont)

Product	Evaluation Method	Increased awareness and/or knowledge of watershed ecology.	Increased awareness of NPS pollution causes, effects and remedies.	Increased awareness of and participation in NPS best management practices.	Increased capacity to deliver NPS I&E.	Notes
4.4 Rain Garden Demonstration Project	Goal achievement (Dakota Rural Action)			X		Rain garden constructed, a public meeting for stakeholders held.
4.5 Rain Water Harvesting Project				X		98 Rain barrels distributed to Brookings residents, 30 participated in webinar.
4.6 French Creek	Goal achievement Numbers served Stakeholder feedback			X		Workshop held 60 participants Participants reported receiving ideas to protect stream health.
4.7 BMP Audits Part 1	Audit results			X		Preparation for the field audits is completed. 6 sites were selected for field audits. A 10 member audit team was assembled from stakeholders and cooperators with broad range of expertise and interest in implementation of BMPs.
4.8 BMP Audits Part 2	Audit results			X		Ratings for BMP effectiveness confirmed adequate or improved protection of soil and water resources on 96 percent of the total rated items.
4.9 Wall Lake Signage	Self reported to survey question	X				One sign included a number to respond via text about self reported learning. n=20 with all reporting learning.
4.10 Riparian Restoration on French Creek	Numbers served Survey			X		

Appendix A (Cont)

Product	Evaluation Method	Increased awareness and/or knowledge of watershed ecology.	Increased awareness of NPS pollution causes, effects and remedies.	Increased awareness of and participation in NPS best management practices.	Increased capacity to deliver NPS I&E.	Notes
5.0 Water Festivals	Numbers served	X				14,000 students, 633 educators, 468 presenters
6.0 Professional Development	Numbers served Survey				X	297 educators in various formats (online, conference sessions, extended classes) in 23 opportunities
7.0 Watershed Education Mentor	Numbers served Survey Action				X	Seven served, four responded to survey indicating they learned, and five have been active presenters in their community.
8.0 Family, Youth and Student	Numbers served	X				187 events were held for youth and students. The exact numbers served are hard to determine because most of the events were live streams where the number of people watching are unknown.
9.0 Envirothon	Numbers served	X				

Appendix B: Education Evaluation

The South Dakota Discovery Center not only administers the education objective of the 319 Information and Education Project but implements most of it as well, with the support of key partners. This is a summary of the evaluation conducted as part of the education outreach. The education outreach lends itself to a cohesive evaluation treatment since the methods are consistent and the audience similar across tasks and products.

5.0 Water Festival

Water Festivals are field trips that engage students in hands-on learning about water. They have been conducted in the state for over twenty (20) years. Water Festivals have been one of the bedrock field trips offered to 4th-5th graders and have now been extended to the middle and high school level as well. The literature shows that field trips have an important educational impact, (*A Short Review of Field Trips*. DeWitt and Storksdieck. 2008) The research also suggests field trips have an important impact on the development of pro-environmental views. (*An Elementary School Environmental Education Field Trip: Long-Term Effects on Ecological and Environmental Knowledge and Attitude Development*. Farmer, Knapp, and Benton. 2010).

The Water Festivals are evaluated by the numbers served both students and teacher AND volunteers. The students and teacher numbers are indicator that the Festivals are perceived to be valued educationally. The volunteer numbers are indicator that the groups, organizations, and agencies involved perceive that volunteering is a good use of their time.

There are six recurring water festivals in South Dakota: Sioux Falls, Brookings, Vermillion, Yankton, Aberdeen, and Pierre. Huron offered a Water Festival in 2019. Festivals serve approximately 4,750 students annually and an additional 230 educators. These festivals depend on the participation of agency staff from the federal, state, and local sectors; business, academia, and community members at large, with over 200 presenters involved statewide annually. These numbers have remained consistent.

Summary

Participation in Water Festival remains consistent, an indicator of its value. A future goal is to identify additional sponsors to coordinate Festivals in the central and western portions of the state.

6.0 Professional Development

The main outcome of this product is to build capacity to deliver watershed education. Offering professional development for formal (K-12) and informal (4H staff, museums, etc) educators is an important strategy to deliver education. The 319 Information and Education Project has focused most of its professional development opportunities on GLOBE (Global Learning and Observations to Benefit the Environment) which is sponsored by NASA and NOAA. GLOBE is an international school-based citizen science project that explores the interconnections of the Earth Systems. The reasons for anchoring professional development in GLOBE are to provide a holistic understanding of watersheds, provide a pathway for teachers and students for volunteer monitoring, and better address the new educational standards (based on Next Generation Science Standards and Common Core) for South Dakota.

The professional development opportunities range in scope from an hour presentation at a conference to a full day workshop an immersive multi-day opportunity. In 2017 we piloted a real time online workshop conducted for two hours for six months. In the summer of 2020 we leaned heavily on the lessons learned from this pilot as we pivoted to all online professional development. We use recognized best practices of inquiry and experiences recommended by the Lawrence Hall of Science and Beetles Project, both from the University of California Berkeley. The professional development opportunities are evaluated by numbers served and a delayed self-report. The Limnology workshop, delivered by the Northeast Glacial Lakes Project, uses numbers served and a pre and post test.

There were 294 educators served by twenty three (23) professional development opportunities during this project plus an asynchronous GLOBE e-training. An invitation to complete a delayed evaluation was sent out, meaning the evaluation took place anywhere from one week to three years after the workshop. This contrasts with an immediate evaluation which is conducted immediately after the workshop. Delayed evaluations provide more summative insights in the long-term value and usefulness of the content, while immediate evaluations are useful for formative insights. The challenge with delayed evaluations is that the response rate tends to be lower.

The evaluation was sent to 14 educators who engaged in multi day workshops. Seven of them have replied, a response rate of 50%. The educators participated in workshops ranging from July 2017 – May 2020. The low number surveyed is due to a change in managing email registrations.

Respondents reported receiving the following.

- 85% - new or applied content knowledge
- 100% - useful experiences or exemplars to use in their teaching
- 100% - ideas for pedagogy or teaching methods
- 100% - motivation or inspiration
- 71% - professional relationships or connections

Limnology Workshop

The limnology workshop is a multiday workshop facilitated by the Day County Conservation District. A pre/post survey is conducted. Results indicate large gains in knowledge. The 2020 Limnology workshop was canceled due to COVID.

	Macroinvertebrate Pretest Average Score	Macroinvertebrate Posttest Average Score	Limnology Concepts Pretest Average Score	Limnology Concepts Posttest Average Score
2018	34%	95%	66%	94%
2019	39%	89%	59%	98%

Summary

The professional development opportunities are valued with educators reporting high levels of value and learning.