LOWER EEL RIVER WATERSHED 319 GRANT

FINAL REPORT

ARN # A305-6-183

PREPARED BY:

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PREPARED FOR:

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF WATER QUALITY
WATERSHED PLANNING AND RESTORATION SECTION
JANUARY 28, 2019

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Section 1. Introduction

The goals of the Lower Eel River Watershed 319 Grant ARN # A305-6-183 (FFY15 LERW 319) reflect the goals and objectives outlined by the Lower Eel River Watershed Management Plan ARN # A305-5-134 (LERWMP). Most LERWMP objectives, which were set by the steering committee to be met within five years, were changed to reflect more attainable goals in the two years allotted for the FFY15 LERW 319 grant. The goals established by the FFY15 LERW 319 project are (:

> …To implement practices described in the Lower Eel River Watershed Management Plan (LERWMP) in order to achieve the LERWMP goals established by the steering committee. The goals of the LERWMP include: (1) reduce the current level of *E. coli* by 10% within 5 years, (2), reduce nitrates and phosphates by 10% within 5 years, and (3), reduce sediment loads by 10% within 5 years. The goals of the LERW project will align with the LERWMP goals as they will be: (1) a reduction of *E. coli* concentrations by 6% within 3 years, (2) a reduction in nitrates and phosphates by 6% in 3 years, (3), a reduction of sediment by 3% in 3 years, (4), provide a cost-share program to implement best management practices (BMPs), and (5), increase public awareness. These goals will be accomplished by completing three tasks: (1) provide a cost-share program to implement BMPs, (2), education and outreach, and (3) evaluate water monitoring data collected and increase the number of volunteers in the Hoosier Riverwatch (HRW) water monitoring program.

In short, the goals and objectives of the FFY15 LERW 319 project are to implement the LERWMP, but within a two-year timeline. It is important to note that the FFY15 LERW 319 grant application requested three years of funding and received two. Thus, the desired reductions in sediment loads, *E. coli*, phosphorus, and nitrates were squeezed into a two-year timeline rather than three.

To accomplish these goals, a watershed coordinator was hired to manage the cost-share program, perform education and outreach on non-point source pollution, and to oversee the day-to-day operational and administrational aspects of the FFY15 LERW 319 Grant.

The goals of the cost-share program are to target the LERW critical areas with appropriately selected BMPs that positively affect water quality. All BMP implementation, as stipulated by the Executive Grant Agreement, must meet NRCS specs and regulations or other approved specs such as those used by the Indiana State Department of Ag (ISDA). Water quality goals, as stated above, will be monitored and evaluated via the water monitoring program and by utilizing the Region 5 model to estimate pollution reduction loads per completed BMP. LERW critical areas are those listed in the LERWMP. Together, these twelve major tributaries comprise the LERW. The critical areas are:

1. Splunge Creek
2. Birch Creek
3. Birch Creek at Towpath Rd.
4. Connelly Ditch North

5. Connelly Ditch South
6. Turkey Creek
7. Hog Creek
8. Lick Creek
9. Erie Canal
10. White Oak Creek
11. Brush Creek
12. Six Mile Creek

A detailed description of the critical areas can be found in the LERWMP (pgs. 24-35) and in the Quality Assurance Project Plan ARN # A305-6-183 (QAPP).

Finally, the first Coordinator, Tyler Trout, ran the grant until March 9, 2018 when the second Coordinator, Sage Danch, took over on March 12, 2018. By March 12, 2018, 75% of the cost-share had been reimbursed for a variety of BMPs and 100% of the cost-share was allocated. The only remaining tasks to be completed by the new Coordinator was to hold two final steering committee meetings, conduct one final stream monitoring, write the final report, and invoice for the remainder of the cost-share upon completion of the final report.

Section 2. Evaluation of Goal Achievement

The overarching goal of the LERWMP is to improve water quality "in the Lower Eel River Watershed by reducing contaminants to meet or surpass state pollutant benchmarks and standards" (LERWMP, pg. 1). The FFY15 LERW 319 grant was designed to address these concerns.

While all the goals outlined by the Grantee's application to IDEM were tackled, not all were accomplished. The goals outlined by the Grantee were:

- Reduce *E. coli* concentrations by 6% within three years
- Reduce nitrates and phosphates by 6% in three years
- Reduce sediment by 3% in 3 years
- Provide a cost-share program to implement BMPs in the LERW critical areas
- Increase public awareness

These goals were to be accomplished by completing three tasks. The tasks outlined by the Grantee were:

- Provide a cost-share program to implement BMPs
- Provide education and outreach
- Evaluate water monitoring data collected and increase the number of volunteers in the Hoosier Riverwatch (HRW) water monitoring program.

All three of the above stated tasks were completed, but not all the goals outlined by the Grantee's application were accomplished. There is, however, gray area when defining what accomplishment looks like. **Tables 2-4** illustrate that while not all pollutant reduction loads were realized under the 6% reduction goals outlined by the Grantee's IDEM application, the targeted water quality concerns (*E. coli*, nitrates, sediment, and orthophosphates) addressed by FFY15 LERW 319 meet many of Indiana's water quality targets. Furthermore, most of the pollution reduction goals were realized. This is an accomplishment.

Sediment in LERW streams was not directly measured during the water monitoring portion of this grant, but was given context by measuring turbidity and transparency. For a complete calculation of total sediment load reductions per BMP implemented, **see Section 4, Table 6**. The LERWMP utilized a sediment load calculator from Pennsylvania State to estimate annual sediment loading in the LERW. This model calculated that 700.2 tons of sediment enter LERW waterways annually. Although the data presented in the LERWMP is now over a decade old, it is the data that guided and formed the goals of the FFY15 LERW 319 grant and therefore is the data that must be used to evaluate how well the goals of this grant were achieved. Based on the data detailed in the LERWMP, 123,180 lbs of nitrogen, 11,380 lbs of phosphorus, and 700.52 tons of sediment enter LERW waterways each year.

The LERWMP steering committee agreed that a 10% reduction (70.2 tons) in sediment loading was possible in five years. The FFY15 LERW 319 aimed to reduce sedimentation by 3% (20 tons per year) in three years. During the two years that the grant operated it reduced sedimentation by an estimated 16,206.4 tons, approximately 10 tons of which occurred during the latter half of 2017.

Table 1. Primary pollutants addressed by FFY15 LERW 319 and the Lower Eel River Watershed Management

Pollutants	FFY15 LERW 319 Goals	FFY15 LERW 319 Two-Year Results
Nitrogen (lbs per year)	$123{,}180\ lbs\frac{p}{yr}x\ .06\ x\ 2\ yrs = \mathbf{14{,}781.6\ lbs}$	**43,277.8 lbs**
Phosphorus (lbs per year)	$11{,}380\ lbs\frac{p}{yr}x\ .06\ x\ 2\ yrs = \mathbf{1{,}365.6\ lbs}$	**16,525.5 lbs**
Sediment (tons per year)	$700.52\ tons\frac{p}{yr}x\ .03\ x\ 2\ yrs = \mathbf{42.03\ \ tons}$	**16,206.2 tons**
E. coli CFU/100mL	2006-2007 LERW Average: 984.58 CFU/100mL. **Reduce by 6% in three years**	221.16 CFU/100mL

Table 2. 2006-2007 and 2016-2018 *E. coli* averages. Red denotes where the FFY15 LERW 319 6% reduction goal was not met. Green denotes a successful pollutant reduction. Red does not mean that Indiana water quality standards have not been met. You will notice than most Indiana water quality standards and benchmarks have been met or surpassed which is a primary goal established under the Lower Eel River Watershed Management Plan.

Monitoring Site	IDEM Site Number	2006-2007 *E. coli* Average	6% Reduction goal	2016-2018 Averages	IDEM TMDL Target
Splunge Creek	WWE-08-0005	765	719.1	80.81	235 CFU/100 mL
White Oak Creek	WWE-08-0008	570	535.8	131.7	235 CFU/100 mL
Erie Canal	WWE-08-0009	1235	1160.9	322.06	235 CFU/100 mL
Lick Creek	WWE-08-0010	700	658	357.1	235 CFU/100 mL
Six Mile Creek	WWE-07-0009	475	446.5	599.99	235 CFU/100 mL
Turkey Creek	WWE-07-0010	1720	1616.8	175.92	235 CFU/100 mL
Brush Creek	WWE-06-0004	1370	1287.8	122.19	235 CFU/100 mL
Connelly Ditch South	WWE-08-0007	800	752	78.57	235 CFU/100 mL
Connelly Ditch North	WWE-08-0006	280	263.2	138.08	235 CFU/100 mL
Birch Creek North	WWE-06-0003	400	376	223.81	235 CFU/100 mL
Birch Creek South	WWE-06-0005	375	352.5	228.56	235 CFU/100 mL
Hog Creek	WWE-07-0008	3125	2937.5	195.22	235 CFU/100 mL

Table 3. 2006-2007 and 2016-2018 nitrogen averages. Red denotes where the FFY15 LERW 319 6% reduction goal was not met. Green denotes a successful pollutant reduction. Red does not mean that Indiana water quality standards have not been met. You will notice than most Indiana water quality standards and benchmarks have been met or surpassed which is a primary goal established under the Lower Eel River Watershed Management Plan.

Monitoring Site	IDEM Site Number	2006-2007 Nitrate Average	6% Reduction goal	2016-2018 Averages	IDEM TMDL Target
Splunge Creek	WWE-08-0005	2	1.88	4.4	10 mg/L
White Oak Creek	WWE-08-0008	1	0.94	5.34	10 mg/L
Erie Canal	WWE-08-0009	1	0.94	8.06	10 mg/L
Lick Creek	WWE-08-0010	0.5	0.47	1.26	10 mg/L
Six Mile Creek	WWE-07-0009	0.7	0.66	2.51	10 mg/L
Turkey Creek	WWE-07-0010	4.9	4.61	7.22	10 mg/L
Brush Creek	WWE-06-0004	4.2	3.95	8.06	10 mg/L
Connelly Ditch South	WWE-08-0007	3.6	3.38	8.17	10 mg/L
Connelly Ditch North	WWE-08-0006	5	4.7	5.66	10 mg/L
Birch Creek North	WWE-06-0003	1.4	1.32	3.77	10 mg/L
Birch Creek South	WWE-06-0005	1	0.94	3.77	10 mg/L
Hog Creek	WWE-07-0008	2.3	2.16	1.89	10 mg/L

Table 4. 2006-2007 and 2016-2018 orthophosphate averages. Red denotes where the FFY15 LERW 319 6% reduction goal was not met. Green denotes a successful pollutant reduction. Red does not mean that Indiana water quality standards have not been met. You will notice than most Indiana water quality standards and benchmarks have been met or surpassed which is a primary goal established under the Lower Eel River Watershed Management Plan.

Monitoring Site	IDEM Site Number	2006-2007 Orthophosphate Average	6% Reduction goal	2016-2018 Averages	Indiana Water Quality Targets
Splunge Creek	WWE-08-0005	0.9	0.85	0.21	.005 mg/L
White Oak Creek	WWE-08-0008	0.11	0.1	0.16	.005 mg/L
Erie Canal	WWE-08-0009	0.3	0.28	0.13	.005 mg/L
Lick Creek	WWE-08-0010	0.23	0.22	0.06	.005 mg/L
Six Mile Creek	WWE-07-0009	0.16	0.15	0.1	.005 mg/L
Turkey Creek	WWE-07-0010	0.27	0.25	0.23	.005 mg/L
Brush Creek	WWE-06-0004	0.2	0.19	0.16	.005 mg/L
Connelly Ditch South	WWE-08-0007	0.48	0.45	0.31	.005 mg/L
Connelly Ditch North	WWE-08-0006	0.23	0.22	0.23	.005 mg/L
Birch Creek North	WWE-06-0003	1.3	1.22	0.37	.005 mg/L
Birch Creek South	WWE-06-0005	0.53	0.5	1.27	.005 mg/L
Hog Creek	WWE-07-0008	0.35	0.33	0.27	.005 mg/L

Section 3. Completion of Tasks

3.1 Tasks A and B

The first Watershed Coordinator (Coordinator) was hired during the first quarter. Soon after, the steering committee was assembled and began providing guidance on how the cost-share program and ranking sheet should be developed. The steering committee provided insight on how the cost-share should be executed upon approval from the Indiana Department of Environmental Management (IDEM). IDEM approved the cost-share guidelines in May of 2016 and the cost-share implementation began soon after. To publicize the cost-share program, a brochure was created and distributed throughout the Lower Eel River Watershed (LERW) and initial advertisements were placed in local newspapers, the Clay County Soil and Water Conservation District's (CCSWCD) website and Facebook page.

Once the QAPP was approved by IDEM on May 17, 2016, all CCSWCD staff and the Coordinator were trained in Hoosier Riverwatch (HRW) data collection methods. The Coordinator received all HRW monitoring equipment on May 17, 2016. On June 13, 2018, all CCSWCD staff and the Coordinator attended the HRW advanced *E. coli* training. With the cost-share program approved, the QAPP approved, and the appropriate staff trained in HRW methods, the 319 Grant was ready to begin fulfilling the tasks outlined by the Executive Summary Grant Agreement.

There are currently forty-three applications that are either complete, awaiting completion, or waitlisted. Engineering designs were completed for the projects that required them including a WASCOB, a grade stabilization structure, and a grassed waterway. The first project to receive cost-share was an air seeder modification that allowed the producer to more effectively plant cover crops. Currently thirty-five applications have been reimbursed for a variety of projects including a WASCOB, grade stabilization structure, cover crops, and cover crop equipment modifications, and precision ag modifications. All cost-share funding is currently waitlisted for approved applications.

Waitlisted applications are in the process of being transferred to the next round of 319 funding which was executed in July of 2018. The Coordinator will continue to assist applicants in their conservation efforts. Due to a large waitlist of approved applications, the Coordinator requested IDEM to transfer the remaining funds from Task C and D into Task B to be spent on cost-share for the waitlisted applicants. The transfer request was completed on December 12, 2018. The current balance for Task B (cost-share) is $23,270.77 which will be invoiced for cost-share reimbursement upon approval of the final report.

3.2 Task C

Below is a comprehensive list of what and when each Task C requirement was completed.

- The QAPP was approved on May 17, 2016.
- The Coordinator and CCSWCD staff were trained in HRW methods on May 17, 2016.
- The CCSWCD staff and Coordinator were trained in advanced *E. coli* monitoring techniques on June 13, 2016.
- The first sampling even took place between June 29, 2016 and July 1, 2016. All sites were sampled. All data was submitted to the HRW online database. The Coordinator failed to perform a field blank which was noted in the record.
- The second sampling event took place between September 27, 2016 and September 30, 2016. The Coordinator failed to take a duplicate sample and this was recorded in the record. All data was submitted to the HRW online database.
- The third sampling event took place between December 27, 2016 and December 30, 2016. All sites were sampled and the data submitted to the HRW online database.
- The fourth sampling event took place between March 27, 2017 and March 28, 2016. All sites were samples and the data submitted to the HRW online database.
- A basic HRW training, as mandated by Task B, was held on June 17, 2017 at the Izaak Walton League Chapter 200 grounds in Clay County. All nine attendees were certified to conduct HRW volunteer monitoring.
- The fifth sampling event took place between June 26, 2017 and June 28, 2016. All sites were sampled and the data submitted to the HRW online database.
- The sixth sampling event took place between September 28, 2017 and September 29, 2017. All sites but Brush Creek were sampled and the data submitted to the HRW online database. Brush Creek was dry due to drought. Flow could not be measured at multiple sites due to no flow from drought conditions.
- The seventh sampling event took place between December 27, 2017 and December 28, 2017. All sites were sampled and the data submitted to the HRW online database.
- The final sampling event was completed on September 2, 2018. Multiple sites were not sampled due to dangerously high flows and murky water. The data was submitted to the HRW online database in January, 2019.

3.3 Task D

Below is a comprehensive list of when each Task D requirement was completed. All supporting documentation and products produced with grant funds can be found in **Appendix A**.

Stakeholder meetings

- The first stakeholder meeting was held on April 6, 2016.
- The second stakeholder meeting was held on September 25, 2017.

Steering committee meetings

- The first meeting was held on May 5, 2016.
- The second meeting was held on July 7, 2016.
- The third meeting was held on October 6, 2016.

- The fourth meeting was held on January 5, 2017.
- The fifth meeting was held on April 3, 2017.
- The sixth meeting was held on June 29, 2017.
- The seventh meeting was held on October 4, 2017.
- The eight meeting was held on January 11, 2017.
- The ninth meeting was held on May 22, 2018.
- The tenth and final steering committee was held on December 4, 2018.

Brochure

- The LERW cost-share brochure was created in May of 2016. It was then distributed to neighboring SWCDs, the local Co-ops, and Crop Production Services.

Develop at a minimum one newsletter and one news release to local media to promote the cost-share program, field days, and workshops

- During the first quarter, the first news release was distributed by the CCSWCD to The Brazil Times.
- During the first quarter, the Coordinator submitted news releases to The Brazil Times, The Clay City News, The Spencer Evening World, and the Greene County Daily World.
- In May of 2016 a newsletter was made available through the CCSWCD office, on the CCSWCD website, and emailed to the 319 listserv.
- An educational display was presented during the 2016 Clay County 4-H Fair from July 16 to July 24. Volunteers attending the booth spoke about the 319 program and distributed brochures and newsletters.
- The 319 involvement in the September 10, 2016 Purdue Extension Nature Day was advertised in the Brazil Times, on the Purdue Extension and CCSWCD websites, the CCSWCD Facebook page, and by distributing flyers.
- The September 25, 2017 Stakeholder Meeting was advertised via The Brazil Times, The Clay City News, CCSWCD Facebook and website, and email.

Septic: one 'how-to' postcard and one workshops or two workshops in lieu of a postcard

- On March 14, 2017, the Coordinator and the CCSWCD held a septic workshop in conjunction with the Indiana Onsite Wastewater Professionals Association (IOWPA) at the Fellowship Hall of the First United Methodist Church in Clay City. 30 people attended.
- A septic informational post card was made and distributed in 2017.

Hold two annual field days or workshops

- On September 12, 2016, the Coordinator held a cover crop workshop with partners Ceres Solutions LLP and Purdue Extension. The workshop took place at the Brazil North Branch of Ceres Solutions. There were 45 attendees. Topics included the 319 Grant, the science of cover crops, available mixes and methods of seeding, and how to adopt and manage cover crops for success. This event was advertised through the Brazil Times, The

Clay City News, the Green County Daily World, the Clay County SWCD website and Facebook.

- On February 24, 2017, the CCSWCD and the Coordinator held an ag technology and nutrient management workshop in partnership with Ceres Solutions LLP at the Ceres Solutions North Branch. 36 people attended. The workshop topics included fertilizer application equipment modifications, web-based planning tools, pesticide application safety, and precision ag and conservation.
- A cover crop Q&A/demo plot was held on September 7, 2017 to showcase the variety of available cover crops and cover cropping strategies in the area. The FFY15 LERW 319 cost-share was presented to those who attended.
- On March 6, 2018, the Coordinator presented to local contractors at the annual CCSWCD Contractors Breakfast. Contractors were educated on the ways that they would likely be involved with the FFY15 LERW 319 via contracted BMP installations for farmers and private land owners.
- On March 9, 2018, the Coordinator presented the FFY15 LERW 319 during the Ceres Solutions Nutrient Management and Technology Workshop.

Hold at least one field day or workshop to educate people on the Cost-share program

- SWCD staff presented the 319 Grant during the 2016 Farm Tour in cooperation with a water quality monitoring presentation put on by Grace College.
- On March 7, 2017, the Coordinator presented at the annual CCSWCD Contractors Breakfast to educate local contractors about how they might encounter the 319 grant with regards to BMP installation and what meeting NRCS specs entails. Contractors were also educated on what the grant provides for the communities within the boundaries of the LERW.
- From July 17, 2017 to July 21, 2017, the Coordinator, CCSWCD staff, and the supervisors staffed the FFY15 LERW 319 display. Brochure, flyers, and a newsletter were distributed. Large LERW maps were displayed to help orient people to the watershed. Septic and cost-share information were also advertised. Finally, the large screen monitor was used to educate viewers on the purpose of a 319 grant and how they could get involved.
- On March 8, 2018, the Coordinator presented at the Ceres Solutions Beef Dinner. The goal of this presentation was to make LERW residents aware that there are a significant amount of available BMPs designed to assist ranchers and the cattle industry.

Hold one field day or workshop to educate students on non-point source pollution and stream monitoring in the LERW

- The Coordinator presented to over 200 students at the Rockville Lake Conservation Day on May 16, 2016. Topics included defining watersheds, non-point source pollution, and how benthic macroinvertebrates service as indicators of water cleanliness.
- The Coordinator presented and put up a display during the Purdue Extension Nature Day on September 10, 2016. He discussed water quality in the LERW, stream monitoring, and the cost-share program with kindergarten through fifth grade students and their parents.

- During September 13, 2016 and September 15, 2016, the Coordinator and the SWCD staff presented to 1,250 students from Vigo County on non-point source pollution using a rainfall simulator.
- On September 21, 2016, the Coordinator presented to all 350 seventh grade students on non-point source pollution in the LERW.
- In November of 2016 the Coordinator provided hands-on experience with water quality monitoring for a Brazil high school science class.
- On March 2, 2017, the Coordinator presented to the Northview High School envirothon team about aquatic ecology, non-point source pollution, and other water issues related to the LERW.
- On March 16, 2017, the Coordinator presented to the Northview High School Technical Communications Class on what a 319 grant is, the role of a watershed coordinator, and the type of writing and communication skills required to fulfill the watershed coordinator position.
- On September 12, 2017, the Coordinator presented to Vigo County 5th graders on wetlands, watersheds, and non-point source pollution. 375 students were in attendance.
- On September 20, 2017, the Coordinator presented to Clay County 7th graders during the Nature Bowl. 230 students were in attendance.
- On September 23, 2017, the Coordinator attended and presented the 319 grant, what non-point source pollution is, and how macroinvertebrates are studied to indicate levels of water quality.
- On September 26, 2017, the Coordinator presented to the Putnam County 7th graders. Topics included what a watershed is, non-point source pollution, and stream sampling. All 250 students were able to take macroinvertebrate samples from the Big Walnut which is a main tributary to the Eel River.
- On Friday March 23, 2018, the Coordinator and the SWCD staff presented to 300 students during Purdue Ag Day on cover crops, protecting top soil, erosion, and high residue crops.

Conduct surveys before and after each event to evaluate success of the program

- A survey was provided to the 36 attendees after the Ag Technology and Nutrient Management Workshop on February 24, 2017.
- A survey was provided to the 30 attendees of the septic workshop on March 14, 2017.

Use large screen monitor at no less than two educational events annually to promote available BMPs via the cost-share program, septic care and maintenance, BMP installation or non-point source pollution awareness.

- During the first stakeholder meeting on April 6, 2016, the large screen monitor was used to display a power-point presentation.
- The large screen monitor was used at the CCSWCD Annual Meeting on March 15, 2018. The display included information on available BMPs, completed projects, the basics of the 319 Grant, and information on non-point source pollution.

- The large screen monitor was used to display a power point presentation during the first steering committee meeting on May 5, 2016.
- The large screen monitor was used at the Clay County 4-H Fair from July 17, 2017 through July 21, 2017 to continuously play information about the grant, BMPs, maps of the LERW, conservation information, and upcoming events. Brochures and a newsletter were also handed out.
- The large screen monitor was used on September 9, 2017 to present the FFY15 LERW 319 on the Purdue Extension Nature Day.
- The large screen monitor was used during the March 15, 2018 CCSWCD Annual Meeting to promote the 319 grant and septic care information.

Present to local officials on the grant and the LERW

- On March 6, 2017, the Coordinator spoke to the Clay County Commissioners and the Clay County Water Board about the 319 Grant and the upcoming septic workshop to be held in Clay City.
- On March 5, 2018, the Coordinator presented to the Clay County Commissioners the accomplishments of the previous two years of 319 grant activity. The Coordinator also made the Commissioners aware that a new round of 319 funding would begin during the summer of 2018.

Place educational signs at no less than one installed BMP

- Four BMP showcase signs were placed at four different cover cropped fields. The signs were strategically placed along thoroughfares: SR 59, SR 48, SR 246, and CR 200 E (Harmony Rd.).

Additional press for the FFY15 LERW 319 Grant

- During the first quarter the Coordinator presented the 319 grant and what it provides for the community at the CCSWCD Annual Meeting.
- On March 9, 2016, the Coordinator presented the 319 grant, the purpose of the grant, the cost-share program, what had been accomplished during the first year of the grant, and what goals were being set for the upcoming and final year of the grant during the CCSWCD Annual Meeting.

3.4 Task E

Below is a summation of each electronic invoice sent to IDEM. The stipulations of the grant required that no less than nine (9) invoices be submitted over the course of the FFY15 grant.

- The first progress report and invoice were prepared and submitted on April 12, 2016.
- The second progress report and invoice were prepared and submitted on May 20, 2016.
- The third progress report and invoice were prepared and submitted on June 17, 2016.
- The fourth progress report and invoice were prepared and submitted on July 28, 2016.
- The fifth invoice were submitted on August 19, 2016. The progress reported was mistakenly ommitted.
- The sixth progress report and invoice were submitted on September 23, 2016 .

- The seventh progress report and invoice were submitted on October 28, 2016.
- The eight progress report and Invoice were submitted on December 13, 2016.
- The ninth progress report and invoice were submitted on January 20, 2017.
- The tenth progress report and invoice were submitted on February 24, 2017.
- The eleventh progress report and invoice were submitted on March 24, 2017.
- The twelfth progress report and invoice were submitted on April 24, 2017.
- The thirteenth progress report and invoice were submitted on May 24, 2017.
- The fourteenth progress report and invoice were submitted on June 24, 2017.
- The fifteenth progress report and invoice were submitted on July 24,2017.
- The sixteenth progress report and invoice were submitted on August 24, 2017.
- The seventeenth progress report and invoice were submitted on October 2, 2017.
- The eighteenth progress report were submitted on November 2 ,2017.
- The nineteenth progress report and invoice were submitted on December 1, 2017.
- The twentieth progress report and invoices were submitted on January 26, 2018.
- The twenty-first progress report and invoice were submitted on March 12, 2018.
- The twenty-second progress report and invoice were submitted on June 1, 2018.
- The twenty-third progress report and invoice were submitted on December 18, 2018.

Section 4. Best Management Practices and Load Reductions

No producers made the conversion from conventional till to no-till during this grant. This was a key challenge throughout the duration of the grant. Nearly all producers who sought out the 319 cost-share were already no-till or were using some form of vertical tillage tool. There was not much of a conversation to be had with our conventional till producers.

The bulk of BMPs implemented over the lifetime of the grant were cover crops, followed by grassed waterways, equipment modifications for cover crops and precision ag, a WASCOB, a forage and biomass planting, and a grade stabilization structure. See **Table 5** for descriptions of the BMPs implemented and **Table 6** for an estimate of the pollutant load reductions achieved by the implemented BMPs.

Table 5. Type and quantities of implemented BMPs

BMP	Quantity
Cover Crops	3,534.67 acres
Forage and Biomass Planting	6 acres
Grassed Waterways	Three grassed waterways
Cover Crop Equipment Modification (seeders)	Four seeders
Precision Ag Equipment Modification	Three precision ag modifications
WASCOB	One WASCOB
Grade Stabilization Structure	One structure

Table 6. Pollutant load reduction estimates by BMP

BMP	Nitrogen (lbs/year)	Phosphorus (lbs/year)	Sediment (tons/year)
Cover Crops	34,040.70	13,110.7	12,495.7

Forage and Biomass	79	39	37
Grassed Waterways	81.2	40.6	40.6
Cover Crop Seeders (based on acres to be planted)	7,119.9	2,363.3	2423.2
Precision Ag Modifications	1,899	943	1,181
WASCOB	22.7	11.3	11.3
Grade Stabilization Structure	35.3	17.6	17.6
TOTAL	**43,277.8**	**16,525.5**	**16,206.4**

Section 5. Monitoring Results

All data produced by the FFY15 LERW 319 stream monitoring was conducted and reported by the Coordinator. This approach proved to be effective in that it ensured consistently accurate, unbiased, and precise monitoring methods from quarter to quarter. Because there were not multiple people or a team of volunteers collecting stream data for the Coordinator, there were no quality assurance concerns. Monitoring methods remained consistent throughout the grant.

For a complete detailing of every parameter tested for under the FFY15 LERW 319 QAPP guidelines see **Appendix B**. **Table 7** provides averages for each parameter tested for under the LERWMP in 2006-2007 and **Table 8** details the averages for each parameter tested for under the FFY15 LERW 319.

The monitoring strategy for the FFY15 LERW 319 was successful. Furthermore, the time spent analyzing and characterizing the major waterways in the LERW by physically walking in them provided the Coordinator with a better understanding of the Watershed itself. To understand land use and natural resource concerns, one must spend a certain amount of time physically engaging with the land, the people who work it, and the wildlife that may be affected by such activity. For a complete detailing of which FFY15 LERW 319 monitoring goals were met, not met, and which Indiana water quality benchmarks were met, surpassed, or not met, see **Tables 2-4, Section 2**.

Table 7. 2006-2007 averages for each parameter monitored under the LERWMP.

Monitoring Site	IDEM Site Number	DO	pH	Orthophosphate	Nitrate	Turbidity	*E.coli*
Splunge Creek	WWE-08-0005	6.95	8	0.9	2	44	765
White Oak Creek	WWE-08-0008	6.55	8.15	0.11	1	53	570
Erie Canal	WWE-08-0009	5.9	7.8	0.3	1	38	1235
Lick Creek	WWE-08-0010	6.8	8.1	0.23	0.5	51.5	700
Six Mile Creek	WWE-07-0009	7.4	7.9	0.16	0.7	54	475
Turkey Creek	WWE-07-0010	7.05	8.05	0.27	4.9	45.5	1720
Brush Creek	WWE-06-0004	7.65	8.2	0.2	4.2	57.5	1370
Connelly Ditch South	WWE-08-0007	7.95	8.25	0.48	3.6	53.5	800
Connelly Ditch North	WWE-08-0006	7.9	8.15	0.23	5	54	280
Birch Creek North	WWE-06-0003	7.7	8.25	1.3	1.4	57.5	400
Birch Creek South	WWE-06-0005	8.35	8.35	0.53	1	58	375
Hog Creek	WWE-07-0008	7.2	7.9	0.35	2.3	54.5	3125

Table 8. 2016-2018 averages for each parameter tested monitored under the FFY15 LERW 319.

Monitoring Site	IDEM Site Number	Water Temperature	DO	BOD	pH	Orthophosphate	Nitrate	Nitrite	Turbidity	E.coli	Flow
Splunge Creek	WWE-08-0005	15.1	10.1	1.4	6.3	0.21	4.4	0	45	80.81	20.18
White Oak Creek	WWE-08-0008	12.9	9.81	1.81	6.24	0.16	5.34	0.07	49.5	131.7	38.4
Erie Canal	WWE-08-0009	13.61	9.81	2	6.25	0.13	8.06	0.03	46.4	322.06	11.8
Lick Creek	WWE-08-0010	12.58	8.14	1.43	6.16	0.06	1.26	0	43.66	357.1	26.74
Six Mile Creek	WWE-07-0009	13.5	8.86	1.71	6.14	0.1	2.51	0.13	41	599.99	13.4
Turkey Creek	WWE-07-0010	12.71	8.71	1.14	6.5	0.23	7.22	0.14	55.83	175.92	4.36
Brush Creek	WWE-06-0004	14.5	10.83	1.16	6.66	0.16	8.06	0	49.5	122.19	2.76
Connelly Ditch South	WWE-08-0007	15.86	10.29	1.64	6.79	0.31	8.17	0	54.86	78.57	22.96
Connelly Ditch North	WWE-08-0006	14.71	11	1.29	7	0.23	5.66	0	41.79	138.08	7.1
Birch Creek North	WWE-06-0003	13.29	9.29	1	6.43	0.37	3.77	0	56.4	223.81	44.14
Birch Creek South	WWE-06-0005	13.64	10.14	2	6.64	1.27	3.77	0.56	54.66	228.56	28.86
Hog Creek	WWE-07-0008	13.28	9.29	1.14	7.79	0.27	1.89	0.07	58.21	195.22	6.82

Section 6. Public Participation

Public participation was strong throughout the FFY15 LERW 319. All survey results show a wide range of audiences from students, families, farmers, and other invested citizen stakeholders. Public participation remained strong across the following categories:

- Cost-share participation was excellent as reflected by the spending and allocation of all cost-share funds for completed projects/BMPs.
- Education and outreach were particularly good amongst students and during ag workshops as evidenced by high attendance and positive feedback. For a comprehensive analysis and breakdown of education, outreach, and public participation see **Section 3.2 and 3.3**.
- Although attendance for steering committee and stakeholder meetings was generally low, support was consistent throughout the FFY15 LERW 319.
- While volunteer sampling data was not used in stream analyses, turnout for the Hoosier Riverwatch training was well attended by prospective volunteers.

Section 7. Partnerships, Successes, Challenges, and Lessons Learned

7.1 Partnerships

Creating and maintaining strong partnerships was essential to the completion of the FFY15 LERW 319. Notable partners include

- Ceres Solutions
- Purdue Extension
- Local Banks
- Izaak Walton League
- NRCS
- ISDA
- Surrounding SWCDs
- ISDH
- A local soil scientist

Each one of the partners were routinely utilized to collaborate, host, provide technical assistance, answer questions, advertise for and host a variety of workshops and field days. These partnerships are what made the grant successful.

7.2 Successes

Cost-share

- The high interest in the FFY15 LERW 319, the list of completed projects, and the extensive waitlist shows a need and opportunity throughout the LERW to seek out and bring to the table unique cost-share opportunities and conservation enhancements to a wide array of land uses and users.
- The FFY15 LERW 319 displayed a distinctive ability to fill voids where other federal and state programs were limited or maybe too complex for first time conservation program applicants. The non-daunting nature of a 319 application is ideal for recruiting those first-time cost-share applicants. This is a success for putting conservation on the ground in general.
- The increasing interest in the FFY15 LERW 319 cost-share program provided an avenue for discussing conservation ideas and concerns with producers that might not otherwise be available or open to discussion of such topics.
- The FFY15 LERW 319 showed a good use of federal funds, with several permanent structures completed and widespread adoption of new technology and land management strategies.
- Many pollutant load reduction estimates far surpassed the goals set forth by the Grantee, and where applicable, the Lower Eel River Watershed Management Plan.

Education and Outreach

- Good involvement and turnout for a wide range of events.
- Good turnout for all field days and workshops, and indoor/outdoor events.
- An array of different workshops and events targeted audiences from various backgrounds:
    - Farmers
    - Contractors
    - Educators
    - Students
    - Conservation organizations

7.3 Challenges

Getting the word out about what the grant was and was not, the purpose of the grant, and how various and interested parties could participate was an immediate challenge. Once this hurdle was surmounted, public participation, participation from evolving partners, and the cost-share program took off and remained busy for the remainder of the FFY15 LERW 319.

- Specific challenges
    - Helping people to understand what the intent/purpose of the grant was.
    - Helping people to understand what was available for cost-share via 319 eligible BMPs and implementation.
    - Building trust and relationships with the members of the community allowed for increased interest, and involvement in the grant and its programs. The power of

word of mouth and communication between community members cannot be overstated. It took insider trust to move the grant forward in a positive and effective direction.

- Moving projects forward from start to finish.
    - There were many cancelled projects that, if completed, would have been big accomplishments for the grant.
    - These were often cancelled due to unforeseen financial circumstances, or due to individuals not fully understanding what was expected of them. Communicating effectively and working harder to understand initially exactly what people wanted and what was expected of them in turn made the difference between completed and cancelled projects.

7.4 Lessons Learned

Communication, or what often feels like overcommunication, is critical for success.

- Knowing and understand your audience.
    - Understanding the needs, interests, and the level of comprehension of those involved or those looking to be involved impacts how well your message comes across.
    - The message needs to be tailored to who you are communicating with, i.e. ag professionals, farmers, students, the general public, etc.)
    - A tailored message includes advertisement strategy and event planning (location and speakers). This can make or break the chance of selling the program or coming up short.
- Communication between those involved with the day-to-day administration of the grant proved to be key.
    - With the grant comes office staff (SWCD, ISDA, NRCS, and FSA), supervisors, the steering committee, dedicated stakeholders, and IDEM. Each one of these entities needed to be kept informed and up-to-date on all events big and small.
    - Understanding the needs of each group and creating efficient lines of communication was important to the success of the FFY15 LERW 319 grant.
- Healthy and strong partnerships are essential.
    - Partnerships for advertisement/promotion/sponsorship (banks, newspapers, SWCDs).
    - Partnerships for technical expertise (NRCS, ag professionals, Purdue Extension, ISDA).
    - Partnerships for event planning (Ag business, SWCDs, Purdue Extension, Izaak Walton League).
- Getting involved with local officials can be beneficial and remains a relatively untapped source of influential stakeholders and potential partners. Local officials include:
    - Commissioners, Drainage Board, County Council, County Surveyor.

- Respected community members that tend to carry clout.
  - These individuals add credibility to the cause of a 319 project.

Section 8. Future Activity

There remains a clear need for more extensive vegetated barriers between agricultural fields and waterways. Well established and biologically diverse barriers (native plants, shrubs, and trees) would aid in filtering out pollutants before entering streams and rivers. Robust barriers would also protect against erosion along waterways and help drain flooded field borders faster. This is not a popular idea amongst most ag producers because it means sacrificing potentially productive ground. What is good for conservation is not always perceived as good from the standpoint of the farmer. This issue remains a difficult topic of conversation between conservationist and farmer. Perhaps placing more of this highly erodible ground (unprotected streambanks) into CRP or conservation easements would provide a greater financial incentive for the producer when considering construction of resilient buffers. The 319 grant, which provides only a one time payment for establishing a buffer, seems to be a less attractive offer. Conversely, this means that there is a great opportunity to expand buffers throughout the LERW. The LERWMP identified an expansion of buffered zones as a primary goal ten years ago.

Cover crops, on the other hand, have been effective and remain popular amongst many LERW farmers. Adding more cover crop acreage is always a good conservation goal and is currently being pursued and completed under the current round of 319 funding, Contract #25438. There is an opportunity to experiment with different kinds of cover crop varietals that do not require chemical termination. Rolling, crimping, mowing, or winter termination not only provides excellent ground cover, but can also be planted directly into no-till operations without relying solely on herbicides. Reducing herbicide use is not only good for conservation and water quality, but saves money for the farmer.

The LERW is fortunate to have many farmers adopting no-till practices. The majority of farmers in the LERW are, however, still practicing some form of conventional tillage and often leaving their fields bare in the winter or other fallow periods. The FFY15 LERW 319 grant was unable to convert any conventional till operations to no-till. This challenge will likely remain an obstacle for increasing the amount of no-till farms for some time. The current FFY17 LERW 319 (Contract #25438) grant hopes to re-engage in this much needed conversation. Moreover, there remains an opportunity to move not only towards more no-till acreage, but a host of unique BMPs that would further reduce and control NPS problems in the LERW. Critical area plantings, forage and biomass plantings, contour farming, riparian forest buffers, heavy use area protection pads (HUAPs), and constructed wetlands are several of many under-utilized BMPs that would reduce NPS in the LERW.

Cattle and range management has been inadequately addressed by the FFY15 LERW 319. Much of the range (small parcels of range compared to their agricultural counterparts) land in the LERW is highly eroded, over grazed/exceeds carrying capacity, and is poorly managed. This

natural resource concern presents itself as a good project and area of focus for current and future LERW 319 grants. The issue of degraded range and highly eroded land in general lends itself to a new sphere of education and outreach for the FFY17 LERW 319 grant.