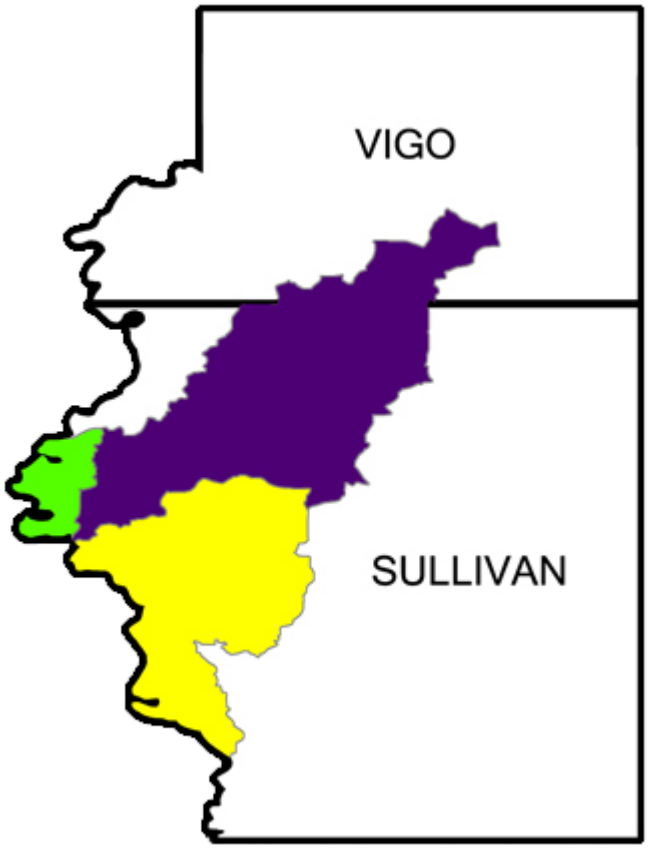
2016-2019

TTK Watershed

319 Implementation Project

Final Report



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Report Completed by:

Laura Demarest, Watershed Coordinator

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INTRODUCTION and OVERVIEW

The TTK (Turman Creek, Turtle Creek, and Kelley Bayou watersheds) 319 Implementation project officially began on April 21st, 2016 and ended on April 20th, 2019. It ran concurrently with the TTK Planning and Implementation grant (A305-6-224) for its first 10 months, allowing for the successful carryover of producers, partners, and practices. The purpose of the TTK 319 Implementation project was to implement a variety of conservation BMPs throughout the area, resulting in significantly improved regional water quality and management changes at the individual farm level, in order to achieve the goals outlined in the Watershed Management Plan.

The original application for funding included several generalized goals, which were adapted into 'Tasks' for the Grant Agreement and can be found summarized in the next section of this report.

The goals from the TTK Watershed Management Plan (WMP pg. 148) are more specific, providing load reduction targets both in short-term and long-term increments, along with a number of biologic and administrative goals. The TTK WMP was approved in January 2016.

Short-Term Goals:

1. Reduce Sediment loads by at least 15% in each subwatershed within the next 5 years (992.07 t/yr)
2. Reduce Nitrogen loads by 15% in each subwatershed within the next 5 years (165,436.25 lbs/yr)
3. Reduce Phosphorus loads by 15% in each subwatershed within the next 5 years (24,192.2 lbs/yr)
4. Reduce E.coli loads by 4% in each subwatershed within the next 5 years (1.1857E+13 cfu/yr)

Long-Term Goals:

5. Reduce TSS loads by 100% in each subwatershed within the next 25 years (6,613.81 t/yr)
6. Reduce Nitrogen loads by 100% in each subwatershed within the next 20 years (1,102,869.4 lbs/yr)
7. Reduce Phosphorus loads by 100% in each subwatershed within the next 25 years (161,278.9 lbs/yr)
8. Reduce E.coli loads 60% in each subwatershed within the next 30 years (1.77808E+14 cfu/year)

Habitat/Biological Goals:

9. Continue to promote programs and conservation practices that establish riparian corridor, wetland habitat, field buffers, and filter strips.
10. Document significant QHEI and macroinvertebrate PTI score improvements on 70% of the 30 monitoring sites within the next 20 years.

Administrative Goals:

11. Continue to pursue advantageous partnerships and additional funding sources in order to make improvements throughout TTK and surrounding watersheds in the future.
12. Continue to promote a variety of Best Management Practices (BMPs) that will help bring about long-term behavioral changes, better land management, and continued conservation throughout the region.

The TTK 319 Implementation grant (A305-6-224) was primarily managed by Watershed Coordinator, Laura Demarest, with the financial oversight of the Sullivan SWCD Board and Coordinator/Educator, Allison McKain.

PROJECT GOALS AND OBJECTIVES

Continuing to work to fulfill the goals of the TTK WMP through implementation was to be accomplished through a variety of efforts that were organized according to "Tasks". Within the scope of each Task were a number of objectives to be completed in order to satisfy the overall goals of the TTK 319 Implementation project. The completion of these tasks will be presented at length in the next section of this report. The requirements of each Task are summarized as follows:

Task A: Develop and Promote a Cost-Share Program to fulfill goals of the TTK WMP

- Evaluate watershed management goals, tasks, and indicators of success twice during the project.
- Meet quarterly with the Advisory Committee to review progress and concerns of the SWCD and landowners.
- Hold one public meeting each year targeting stakeholders.
- Develop and promote cost-share program through meetings with applicants, as well as applicable partners (agronomists, contractors, equipment sales personnel, etc.). Offer technical assistance and project guidance.
- Document all necessary components for implemented BMPs (geolocate, load reductions, match, payments).

Task B: Cost-Share Implementation

- Implement the approved cost-share program described in Task A.
- Ensure that all BMPs conform to NRCS specifications or other applicable, approved specifications.
- Implement BMPs only in critical areas as described in the TTK WMP.
- Follow cost-share payment and reporting protocol according to IDEM 319 program requirements.
- Tabulate pollutant load reductions for every BMP funded by 319 or utilized for match.
- Create and maintain a geo-referenced database for all BMPs implemented through the 319 project.

Task C: Water Quality Monitoring and Analysis

- Develop a Quality Assurance Project Plan (QAPP) for monitoring activities: submit to the State for approval.
- Conduct 'trend monitoring' at least 20 selected sites on a quarterly basis.
- Testing for one year will include: NO_2/NO_3, Total Phosphorus, TSS, and E.coli.
- Additional parameters shall include: Flow, Temperature, Dissolved O_2, Salinity, Specific Conductance, Total Dissolved Solids, pH, Turbidity, Color, Odor, and photo documentation.
- Complete one QHEI assessment on all sites.
- Conduct annual macroinvertebrate sampling on all sites.

Task D: Education and Outreach

- Conduct an education and outreach program that includes the following efforts:
  - Update the WCIWA webpage www.watershed-alliance.org at least quarterly.
  - Produce the WCIWA quarterly newsletter and distribute to stakeholders.
  - Host or participate in no fewer than 9 regional water quality related workshops.
  - Conduct one public meeting each year to inform watershed stakeholders about the project.
  - Maintain filterable database of volunteers, groups and partners.
  - Provide no fewer than 3 updates to governing bodies.
  - Maintain a filterable database of volunteers, partners, and other related contacts.
  - Use social media networking to provide monthly updates.
  - Provide no fewer than 6 press releases to local media about the project.
  - Install a minimum of 10 promotional signs throughout the watershed to highlight BMPs.

Task E: Reporting

- Prepare and submit a progress report to the State with each invoice package, at least quarterly.
- Submit two electronic copies of a final report to the State via USB.

EVALUATION OF GOAL ACHIEVEMENT

Overall, the TTK 319 Implementation project proved to be a success, providing an abundance of BMP opportunities for enthusiastic producers. This success can largely be validated by assessing the completion of the items listed in each of the previously outlined Tasks. Additionally, favorable trends in producer interest and participation in conservation efforts were noted throughout the duration of the project. Moreover, many helpful lessons were gleaned during the course of this grant project, which will enable future conservation efforts to benefit considerably.

The TTK Implementation project utilized every cent of the 319 grant funding, exceeded the match goal, and delivered a variety of conservation projects to producers in critical areas. Cover crops and Nutrient Management in the form of precision agriculture technology upgrades gained the most traction during the course of implementation, netting the highest load reductions and interested inquiries.

When considering the specific goals stated in the TTK Watershed Management Plan, it may be premature to gauge overall completion, as the TTK initiative continues in the form of the TTK 319 Implementation II project, for which an additional 319 grant was awarded in 2018. This grant will serve as a Phase III for the TTK initiative, and is slated to begin in early 2020. WMP goals will be discussed and evaluated in this report as applicable.

A series of 'Project Outcomes' and 'Measures of Success' was posited in the TTK 319 Implementation grant application (presented below). Each 'Measure of Success' below will receive a check mark to indicate if it was completed in actuality. Additional discussion may be included, as necessary.

Project Outcomes:

1. Develop, promote, and implement a Cost-Share program in critical areas as defined by the TTK WMP
    - ✓ Completion and approval of Cost-Share program
    - ✓ BMPs implemented on 3,000 acres
    - ✓ Load reductions estimated for each BMP
    - ✓ Achieve load reduction goals: 28,800lbs/yr N, 8,800 lbs/yr P, 6,000 t/yr Sed.
        - ➢ 1% E.Coli reduction - unable to accurately determine due to lack of data and calculation tools

2. Continued expansion of WCIWA Outreach and Education program
    - ✓ Number of newsletters, web updates, presentation/workshops completed
    - ✓ Number of other groups' events in which WCIWA participated
    - ✓ Number of attendees at field days
    - ✓ Number of active stakeholders

3. Continued monitoring and assessment of TTK water quality
    - ✓ QAPP revised and implemented
    - ✓ Ongoing addition of data to IDEM spreadsheet
    - ✓ Reporting of data to general public via website, Adv. Com. meetings
    - ✓ Complete 12 monitoring events total on 20 sites

4. Submit progress and final reports to IDEM.
    - ✓ Administrative: Quarterly Progress Reports and Final Report submitted to IDEM

Watershed Management Plan Goals:

For the most part, the goals outlined in the TTK Watershed Management Plan directly involve load reductions for short-term (5 years) and long-term (20-30 years) benchmarks. After 4 years of targeted BMP implementation it may be too early to make an accurate determination as to whether or not the long or short-term goals have been fully met, especially considering the monitoring data collected during TTK Implementation was 'trend' monitoring only. At this time, the best methods available for evaluating load reduction goal achievement consist of modeling tools such as Region 5, StepL, and estimations based on information from local agronomists. The table below represents short-term load reduction goals outlined in the WMP alongside recorded load reductions as a result of installed BMPs during the TTK Implementation project (phases I and II). In the future, it would be best to 'ground-truth' the collected load reduction data with accurate stream monitoring data. To make this possible, it would be best to have adequate funding for the collection of high-quality water samples to be sent for lab analysis on a more frequent basis.

When it comes to Nitrogen and Phosphorus, it seems that implementation strategies were on track for meeting load reduction goals within the 5 year time period. Sediment loads, however, reflect a 1,654.2% load reduction – a calculation that hardly seems feasible if using 'common-sense' reckoning. Indeed, this conundrum, stemming from inconsistencies in load reduction calculation tools (L-THIA, StepL, and Region5 all offered variable results, especially

when compared with monitoring data collected during the WMP Planning phase), could be filed under 'Lessons Learned' for this project. Much scrutiny was paid to the load reduction calculation tools used during Watershed Management Planning and it now seems obvious that the goal for reducing sediment was likely much too low. In any case, theoretical load reduction calculation tools have their limitations and funding for future water monitoring would help verify that the conservation practices installed have, in fact, had drastically positive effects on water quality.

	TTK WMP Reduction Goal (5 yrs)	TTK Implementation I Reduction 2016	TTK Implementation II Reduction 2016-2019	Total Load Reduction (2016-2019)	Goal Completion Percentage
Nitrogen	165,436.25 lbs/yr	72,447.85 lbs/yr	95,762.02 lbs/yr	168,209.87 lbs/yr	101.6%
Phosphorus	24,192.2 lbs/yr	8,922.7 lbs/yr	18,565.50 lbs/yr	27,488.20 lbs/yr	113.6%
Sediment	992.07 tons/yr	6,523.5 tons/yr	9,886.9 tons/yr	16,410.40 tons/yr	1,654.2%
E.coli	1.857E+13 cfu/yr	Cannot be determined	Cannot be determined	n/a	n/a

It is also worth noting that at the time of this report no adequate load reduction tool for E.coli has been definitively approved for use in 319 projects. Most BMPs implemented in this project do not have any measureable effect on E.coli load reduction, though ongoing public awareness education continues.

Habitat/Biological Goals:

- Continue to promote programs and conservation practices that establish riparian corridor, wetland habitat, field buffers, and filter strips.
  - ✓ During this time period, additional grants such as Clean Water Indiana, TNC, and LARE were utilized in and around the TTK watershed in an effort to cross-promote various BMPs and enable opportunities for match/in-kind in non-critical watershed areas. As always, programs such as CREP, Healthy Rivers Initiative, WRP, CRP, EQIP, and other offerings through The Nature Conservancy are made known to TTK stakeholders where applicable.

- Document significant QHEI and macroinvertebrate PTI score improvements on 70% of the 30 monitoring sites within the next 20 years.
  - After only 4 years of implementation, it is much too early to determine if significant improvements have been made, though monitoring will continue as funding permits.

Administrative Goals:

- Continue to pursue advantageous partnerships and additional funding sources in order to make improvements throughout TTK and surrounding watersheds in the future.
  - ✓ Many beneficial partnerships have been solidified through this grant and continue to offer support through match-funding, Advisory Committee participation, consultation, and promotion. During the time of the TTK Implementation grant, several grant sources s for additional funding were utilized:
    - TTK 319 Implementation grant application (overlap 1 year)
    - TNC Funding for cover crops, soil testing
    - Clean Water Indiana in partnership with Clay County SWCD
    - DNR LARE Watershed Land Treatment grant for Turtle Creek

- Continue to promote a variety of Best Management Practices (BMPs) that will help bring about long-term behavioral changes, better land management, and continued conservation throughout the region.
  - ✓ Many of the same programs previously highlighted in the Habitat/Biological goals apply to this parameter as well. In addition, programs such as INField Advantage (formerly On Farm Network) promote consideration and good management of Nitrogen, while innovative new practices such as saturated buffers, blind inlets, and modified or mountable cover crop seeders are being explored and encouraged.

COMPLETION OF TASKS

One straightforward way to quantify the success of the TTK Implementation grant project is to review the completion of the objectives outlined in each Task. More complex topics will be further discussed and analyzed as necessary. Supporting documentation can be found in the TTK Final Report USB Appendices.

Task A: Develop and Promote a Cost-Share Program to fulfill goals of the TTK WMP

☑ Evaluate watershed management plan goals, tasks, and indicators of success twice during the project

Watershed Management Plan goals, etc. were evaluated twice; once at the closing of the first TTK Planning and Implementation grant and a second time at the conclusion of the TTK Implementation grant. The compilation of Final Reports provided an opportunity for a thorough evaluation of the goals; results were shared with the Advisory Committee and Sullivan SWCD.

☑ Meet quarterly with the Advisory Committee to review progress and concerns of the SWCD and landowners

The TTK Advisory Committee continued with many of the same stakeholders who regularly participated through the first TTK Planning and Implementation grant. The TTK Advisory Committee was required to meet at least quarterly (a minimum of 12 times) during the time of the TTK 319 Implementation grant. Meetings were sometimes more or less frequent than quarterly, depending on the group's needs. Supporting documentation for all meetings can be found in **Appendix E** on the TTK A305-6-224 Final Report USB.

Advisory Committee Meeting Dates:

- June 28th, 2016
- July 19th, 2016
- September 20th, 2016
- February 7th, 2017
- July 18th, 2017
- September 12th, 2017
- December 12th, 2017
- May 1st, 2018
- July 31st, 2018
- December 11th, 2018
- February 7th, 2019
- April 4th, 2019

Lessons Learned: Overlapping grants have the potential to make meeting Task requirements difficult. For instance, with concurrent TTK grants, the Advisory Committee meetings were doubled during the overlap period so that meetings could be 'counted' separately for each grant. These meetings sometimes felt compulsory, especially during implementation. In the future, it is worth considering that fewer meetings be required during the implementation phase as there may not be as strong of a need for frequent feedback from the Advisory Committee through the entire project (as opposed to Planning). A group can always meet more often than the Task requirement states, if necessary.

☑ Hold one public meeting each year targeting stakeholders.

The Sullivan SWCD Annual Meetings were used as an ideal venue for providing information and relevant updates to a wide variety of watershed stakeholders, partners, and local leaders. Each year an Annual Report for the WCIWA was released for publication in the Sullivan Daily Times along with an award of recognition for 'Friend of the Watershed'. Each SWCD Annual Meeting had attendance in the range of 90-110 people, depending on weather. Annual Reports and other supporting documentation can be found in **Appendix D.**

2017 Sullivan SWCD Annual Meeting (Friend of the Watershed – CCK Grain)
2018 Sullivan SWCD Annual Meeting (Friend of the Watershed – Barney Burton)
2019 Sullivan SWCD Annual Meeting (Friend of the Watershed – Brad Smith, The Nature Conservancy)

☑ Develop and promote cost-share program through meetings with applicants, as well as applicable partners (agronomists, contractors, equipment sales personnel, etc.). Offer technical assistance and project guidance.

The TTK Cost-Share Program was carried over from the first round of implantation with few changes in order to reduce confusion and capitalize on the momentum started during the first grant. Some clarifying language was added to certain BMPs (precision ag., planter upgrades), but it was not greatly changed as the format has proven to be very successful. All supporting documentation can be found in **Appendix A**.

☑ Document all necessary components for implemented BMPs (geolocate, load reductions, match, payments).

All documentation relating to individual projects/producer payments, bills, maps, etc. can be found in **Appendices B and F**. Additionally, a summary of all cost-share projects with corresponding load reductions, etc. can be found in the Quarterly Progress Reports in **Appendix E**.

During the cost-share program, a shapefile was created for each type of BMP installed within the TTK watershed (Cover Crops, Nutrient Management, WASCOBs, etc), either with 319, CWI, or LARE funding. This geodata was provided to IDEM in the Final Report USB – **Appendix B**). In addition, the latitude/longitude for each installed BMP was provided to IDEM on the 319A form, submitted for cost-share reimbursement or match.

Task B: Cost-Share for BMP Implementation

☑ Implement the approved cost-share program described in Task A

The TTK Implementation Cost-Share Program was approved by IDEM on 1/10/17. It was based on the successful Cost-Share Program that had started in the same TTK watershed during the initial Planning and Implementation grant. The TTK Cost-Share Guidelines offered the same tiered cost-share approach for certain practices (structural, precision ag. and planter upgrades), but was streamlined for administrative ease. Documentation regarding the Cost-Share Program can be found in **Appendix A.**

By the close of the TTK 319 Implementation grant, all of the cost-share funding had been completely utilized and more producers were still asking to apply. Additional implementation funds were requested in the form of

another 319 Implementation grant, which was selected for funding and is slated to start in early 2020. All BMPs were installed according to NRCS (or other approved) specifications and in accordance with IDEM 319 program guidelines. See below for a summary of BMP Implementation projects and **Appendix B** on the TTK Final Report USB for a complete list of BMP documentation (match and funded by 319 cost-share).

In summary, the TTK 319 Implementation grant was very successful, resulting in the installation of an impressive number BMPs on critical area acreage. Several of these producers were first-time participants and young farmers who showed keen interest especially when it came to cover crops and precision agriculture. This is a promising observation for future conservation sustainability in the TTK watershed region.

Total BMPs implemented in TTK critical areas (2016-2019):

- *Cover Crops = 1,821.1 acres*
- *Cover Crops (Seeders/Equipment) = 1,512.69 acres*
- *Diversions = 680' linear ft.*
- *No-Till Planter Upgrades = 832.57*
- *Prescribed Grazing = 86 acres (10,125' fence)*
- *Nutrient Management (Precision Ag. Tech upgrades) = 3,286.43 acres*
- *WASCOBs = 30 structures (11,292.13 linear ft gully erosion repaired)*
- *Animals Trails and Walkways = 285 linear ft.*

Total BMPs implemented in TTK non-critical areas:

- *Cover crops = 1,259.03 acres*
- *Cover Crops (Seeders/Equipment) = 252.73 acres*
- *Nutrient Management (Precision Ag. Upgrades) = 817.98 acres*

The total pollutant load reduction estimates of the BMPs installed as a direct result of the TTK 319 Implementation project (Cost-Share and Match projects) are summarized as follows:

- *Nitrogen: 95,762.02 lbs/year*
- *Phosphorus: 18,565.50 lbs/year*
- *Sediment: 9,886.9 tons/year*

Lessons Learned: Garnering enough interest for cost-share funding has not been a problem in this region, though with the last two rounds of implementation, there has been a rush to spend a sizeable amount of funding in the final months of the project due to engineering projects not getting constructed in a timely fashion. Some of the delays have been weather-related or, in a few cases, a producer signing up for a too-ambitious project load. In the future, it may be prudent to assign an earlier 'deadline' for engineering projects to be completed or to consider limiting the number of projects for a first-time applicant. Fortunately for the TTK Implementation project, there are always a number of projects on the WAIT LIST, many of which have relatively quick turn-over, such as Precision Ag. Technology and No-Till Planter upgrades.

☑ Ensure that all BMPs conform to NRCS specifications or other applicable, approved specifications.

☑ Implement BMPs only in critical areas as described in the TTK WMP.

☑ Follow cost-share payment and reporting protocol according to IDEM 319 program requirements.

☑ Tabulate pollutant load reductions for every BMP funded by 319 or utilized for match.

Pollutant load reduction totals corresponding to each individual project are reported in the Quarterly Progress Reports submitted to IDEM with each Invoice Package. See **Appendix E** for further details.

Task C: Water Quality Monitoring and Analysis

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☑ Develop a Quality Assurance Project Plan (QAPP) for the monitoring activities and submit it to the State for approval.

The QAPP for trend monitoring during TTK Implementation was approved 8/1/17.

For the TTK 319 Implementation grant, it was stipulated that a minimum of 20 sites would undergo 'trend monitoring' quarterly (a total of 12 sampling events) during the course of the project. A total of 30 sites had been regularly monitoring during the TTK Planning and Implementation phase, including the nine Hoosier Energy-funded Turtle Creek watershed sites and TNC-funded Kelley Bayou oxbow site (Kelley 3). For the purposes of the QAPP and continued data collection, these additional 10 sites were included in the trend monitoring, as well. Alli McKain, the Sullivan SWCD Coordinator/Educator assisted with sample collection.

Lessons Learned: The QAPP was not submitted for approval until over 1 year into the TTK Implementation grant, which necessitated more frequent monitoring in the final two years to meet the requirement of 12 total monitoring sessions. Implementation of BMPs through the development and promotion of the Cost-Share Program was the #1 priority for this grant, which meant most of the attention and effort was diverted towards handling customer requests for projects, conducting on-site planning, submitting engineering requests, compiling planning documents, verifying project completion, and processing payments. The QAPP and other monitoring-related tasks were often (unfortunately) relegated to the 'back burner' in order to ensure that implementation efforts and customers were handled first and foremost.

Additionally, when applying for a 319 Implementation grant for the TTK watershed, it was specifically stipulated that monitoring would not be funded during implementation. Therefore, a modest schedule for trend monitoring was outlined in the application, chiefly involving Hoosier Riverwatch methods and the usage of an in-house YSI probe. However, after the application was selected for IDEM approval, it was requested that it be edited to include a mandatory testing of Nitrates/Nitrites, Total Phosphorus, Total Suspended Solids, and E.coli – all parameters for which data was collected during the Planning phase. In the previous TTK Planning and Implementation grant, these parameters were funded for lab testing, which provided precise data used during the development of the WMP. Searching for methods that offered the same (or comparable) precision and detection limits WITHOUT funding proved to be quite difficult and frustrating. Hoosier Riverwatch methods offer some tools for collecting some of this data (E.coli), but many of the methods (Turbidity tube, Orthophosphate ampoules, Nitrate/Nitrite test strips) were not comparable with the detection limits/tools/methods used to collect this data during the Planning phase, making trend monitoring of questionable value for this implementation project, especially when the WMP Water Quality Targets for Total Phosphorus and Nitrates/Nitrites were at the lower end of the detection limits offered by H. Riverwatch tools.

In an effort to acquire more comparable data, equipment that could be used for accurate readings of Total N and Total P was purchased, though components necessary for its regular usage were unfortunately very cost-prohibitive. E.coli samples were plated and read at a 'home' lab set-up, which proved to work well. No

adequate tool/method for Total Suspended Solids was found that did not involve expensive costs, so TDS (YSI probe) in combination with Turbidity Tube methods were utilized for this project. Additionally, maintaining the YSI probe with proper calibration solutions and replacement parts is also a costly endeavor.

Overall, strong efforts and attempts were made to uphold the required monitoring standards, but in the future, a group should give heavy consideration to the importance of continued monitoring during implementation if there will not be adequate funding for the collection of data that is useful to the project in terms of WMP load reduction comparisons and accurate evaluation of progress towards short and long-term goals.

☑ Conduct 'trend monitoring' at least 20 selected sites on a quarterly basis. Testing for one year will include: NO_2/NO_3, Total Phosphorus, TSS, and E.coli. Additional parameters shall include: Flow, Temperature, Dissolved O_2, Salinity, Specific Conductance, Total Dissolved Solids, pH, Turbidity, Color, Odor, and photo documentation.

All data collected was entered into the specified IDEM Spreadsheet, which can be found in **Appendix C** on the TTK Final Report USB. Sampling was generally conducted with the assistance of Sullivan SWCD Coordinator/Educator, Allison McKain.

Samples were collected for the following months:

- November 2017 (Macroinvertebrates)
- January 2018
- March 2018
- May 2018
- July 2018
- September 2018
- November 2018 – early
- November 2018 – late (Macroinvertebrates)
- January 2019 (attempt – frozen)
- February 2019 (attempt – frozen)
- March 2019
- April 2019 (Macroinvertebrates + QHEI)

At times, some of these sites were not able to be sampled due to weather-related hazards (flooded or icy roads) or dangerous access due to heavy traffic, hunting, mining activities, other people using the site, or swift water currents. Some sites were unsafe to sample or conduct macroinvertebrate collection during times of high flow or hunting season restrictions. In many cases, streams dried up or became disconnected pools during times of drought. A note to indicate the reason that sampling was not performed was included in the field books, housed at the Sullivan SWCD office. An entry of 'NS' (Not Sampled) is reflected on the IDEM spreadsheet. An overview of the sampling sites can be found in the QAPP in **Appendix C** on the TTK Final Report USB. All compiled data from the TTK water monitoring program can be found in **Appendix C,** as well. Further discussion regarding the collected data can be found of page 14 of this report.

☑ Complete one QHEI assessment on all sites.

QHEI assessments were attempted on all sites and recorded for those that were accessible and without hazards.

☑ Conduct annual macroinvertebrate sampling on all sites.

Macroinvertebrate sampling was conducted three times during the course of the project, though severe weather thwarted efforts during ideal time windows. Permission was obtained from the IDEM Project Manager to conduct sampling outside of normal collection windows. Assessments were attempted on all sites and recorded for those that were accessible and without hazards.

Task D: Education and Outreach

Conduct an education and outreach program that includes the following efforts:

☑ Update the WCIWA webpage www.watershed-alliance.org at least quarterly.

☑ Produce the WCIWA quarterly newsletter and distribute to stakeholders

The TTK 319 Implementation project was to be promoted through the distribution of a quarterly newsletter (12 total). The newsletters were circulated regularly to the TTK email list and placed on the wwww.watershed-alliance.org website. Sullivan SWCD Coordinator/Educator, Alli McKain, was responsible for compiling these newsletters. Copies of all TTK Newsletters can be found in **Appendix D** on the TTK Final Report USB and are still housed on the website.

Newsletters were created for the following months: June 2017, August 2017, October 2017, February 2018, March 2018, May 2018, July 2018, October 2018, January 2019, February 2019, March 2019, April 2019

☑ Host or actively participate in a minimum of **three (3) field days**, workshops, and other conservation focused public events **per year,** for a **total of nine (9),** to educate about water quality and to promote BMPs. Field days, workshops and events must be available to TTK producers. Topics may include, but are not limited to, maximizing precision agriculture tools, saturated buffers, soil nitrogen analysis, livestock management, septic maintenance, and cover crops. Track number of attendees at each event.

The TTK watershed project generated many opportunities to partner with other agencies for local and regional events that promoted conservation practices. The WCIWA facilitated and participated in a wide variety of events, seminars, workshops, and field days. Attendees were tracked at events, as represented below. Further discussion regarding each individual event can be found within the Quarterly Progress Reports, which have been compiled in **Appendix E** on the TTK Final Report USB.

- ✓ 2/7/17 - Purdue Extension Breakfast Ag Chat – Presenter (Nutrient Management topic) ~20 attendees
- ✓ 2/9/17 – Pigg Planter Clinic – Presenter (Precision Ag. cost-share opportunities) ~100 attendees
- ✓ 7/26/17 – Clay Co. Agriculture Bus Tour – Presenter (overview of TTK project, BMPs) ~35 attendees
- ✓ 9/6/17 – Cover Crop Workshop (Sullivan Fairgrounds) – Presenter (Cost-share program) ~50 attendees
- ✓ 2/8/18 – Pigg Planter Clinic – Provide updates on grant opportunities ~100 attendees
- ✓ 10/1/18 – SHS Cover Crop Demo Plot Demo + BMP sign installation/discuss benefits of cover crops ~25 attendees
- ✓ 11/8/18 – Soil Sampling workshop w/ TNC ~50 attendees
- ✓ 2/7/19 – Pigg Planter Clinic – Provide updates on cost-share opportunities ~110 attendees

Additional meetings, workshops, trainings, fairs, and other related events were attended by WCIWA; complete details on all event involvement can be found summarized in the Quarterly Progress Reports in **Appendix E.**

☑ Provide a combined total of 3 updates to governing bodies (County Council, County Commissioners, Drainage Boards, partner SWCDs, etc.).

Each summer, representatives from the Sullivan SWCD provide the Sullivan County Council with updates regarding grant initiatives (including 319), education/outreach, and other projects in an effort to make local government leadership aware of the dollars being leveraged into this area by the Sullivan SWCD.

The Sullivan County Council was briefed as follows: 8/16, 8/17, 8/18

☑ Maintain filterable database of volunteers, groups, and partners.

The free software Plaxo (www.plaxo.com) was initially used for this purpose, though unfortunately was discontinued, causing inconvenient disruption in communication efficiency. Existing contacts were transferred to a free Google Drive account and updated as time allowed. This Google account (watershed.alliance.wci@gmail.com) requires login information which has been shared with the Sullivan SWCD Coordinator/Educator and the free email can be used (if necessary) in the future during lapses between grant funding. New contacts can be easily added to the Google Contacts list, sorted into groups, and edited quickly. Group emails can be sent with this software and access is shared with the Sullivan SWCD Coordinator/Educator.

☑ Use social networking media or other appropriate media as dictated by changing technology such as Twitter to provide meeting notices/reminder and informational updates on a monthly basis

The Sullivan SWCD Facebook page (managed primarily by Alli McKain, Sullivan SWCD Coordinator/Educator) was also used frequently to provide updates about events, workshops, and photo sharing.

☑ Provide no fewer than 6 releases to local newspapers, radio stations, and/or TV stations about the project.

News regarding the TTK watershed project was often featured in the Sullivan Daily Times (SDT) newspaper. Since the watershed is situated primarily in Sullivan County it was not often necessary to interface with the media of neighboring counties as frequently, though partner SWCDs and other organizations informally circulated news of events/workshops via their own email lists/social media. Copies of press releases can be found in **Appendix D** on the TTK Final Report USB.

Articles and Advertisements:

Hoosier Energy Energylines – Sept 2017, SDT 9/6/17, SDT 3/8/17, SDT 2/21/18, SDT 2/20/19, SDT 3/4/19

SDT ad 8/29/17, Merom Chautauqua Ads (June 2016, June 2017, June 2018)

☑ Install a minimum of ten (10) promotional signs throughout the watershed to raise public awareness about the TTK project and to highlight BMPs. At least two (2) out of the ten (10) signs must correspond to a publicly-visible BMP.

During the winter of 2018, eight large, outdoor, heavy-duty corrugated plastic signs were designed with the slogan "Don't Farm Naked – Plant Cover Crops!" and distributed to a number of farmers who had planted 319 cover crops the previous fall. Seven signs were placed in fields throughout the TTK Watershed alongside cover crops and one sign was reserved for office usage/fair booths, etc. Surprisingly, one of the signs was 'reappropriated' by another local landowner and humorously shared on social media. In any case, it was nice to see that the sign grabbed some attention!

In the fall of 2018, a cover crop demonstration plot was installed at the FFA/Natural Resources lab behind the Sullivan High School (publicly visible from road) and a series of BMP signs (5 total) were installed to highlight various seed mixes as well as the benefits offered by cover crops. A small field day was held in early October 2018 and in early May 2019 (beyond the deadline for this grant), a crimping demonstration was held for the public to show a method for terminating cover crops. See **Appendix D** for photos, etc.

Task E: Reporting

☑ Prepare and submit a progress report to the State with each invoice package at least quarterly.

A total of 11 Quarterly Progress Reports were submitted during the course of the TTK 319 Implementation project, meeting the Task E requirement. Copies of all Progress Reports can be found in **Appendix E** on the TTK Final Report USB.

☑ Submit two electronic copies of a final report to the State.

The TTK 319 Implementation project Final Report and all supporting documentation was submitted to the State on two USBs and provided to the Watershed Specialist on a dedicated USB. All hard copy information will be retained at the Sullivan SWCD Office.

Discussion of Monitoring Results

All collected data was tabulated on the IDEM Spreadsheet provided at the time the QAPP was approved. This document can be found in **Appendix C** on the TTK Final Report USB. QHEI scores were collected for each site and 3 macroinvertebrate assays were conducted. During the TTK Implementation 319 project, samples were collected on 12 different occasions, though in many cases not all sites were sampled due to reasons described at length on pg. 10 "Lessons Learned". No results were obtained for Nitrogen and Phosphorus samples (see pg. 10 "Lessons Learned") and numerous other challenges were apparent, mainly due to issues stemming from the implementation of a monitoring regime that was an unfunded amalgamation of trend methods and futile attempts to collect quality data that exceeded the limits available equipment and in-house resources.

At this time, and with data that is not wholly comparable to the standards and precision of the lab data collected during the Planning phase for the TTK WMP, it does not seem prudent to make a full-fledged analytical assessment as to whether or not the trend monitoring data can definitively provide accurate information regarding improvements in overall water quality. It would be preferable to conduct monitoring in the future when adequate funding is available or to continue to collect Hoosier Riverwatch 'trend' monitoring data for a longer period of time. Perhaps more extensive monitoring can be conducted after the next round of Implementation (2020-2023), though until sufficient funding is available, it is best to reserve judgment/analysis at this stage.

However, based on general observation of the data results, there did not appear to be any significant deviations from the sampling information/data typically collected at these 30 sites. Of the 170 total E.coli samples collected, 97 were below 235 cfu/100mL while 73 exceeded the Water Quality Target, sometimes by the thousands. The Little Turtle HUC12 watershed still shows signs of some of the highest E.coli concentrations of any recorded, along with other signs of degradation, mostly due to high sedimentation. Higher E.coli concentrations were typically seen in the early summer months (June), though without consistent (and more frequent) long-term monitoring, it is difficult to determine if the BMPs implemented through 319 funding have yet had an effect on this parameter. Turbidity was elevated at all sites after rain events, as can be expected. Dissolved Oxygen was higher in winter months, with colder temperatures and consistently low at certain sites where water tends to stagnate (Kelley Bayou). The pH levels were normal throughout the 30 sites; TTK has not had previously reported issues with acid mine drainage or other mine-related environmental issues. Streams are still heavily embedded with sediment in many places, impacting macroinvertebrate communities, and trash dumps are still recorded at several sites which locals seems to frequent. There is no doubt that this watershed will greatly benefit from continued implementation and until better methods/tools are available for stream monitoring, the best gauge for improvement and WMP goal achievement is through the usage of pollutant load reduction modeling tools such as StepL and Region 5.

Public Participation and Partnerships

The TTK 319 Implementation program celebrated a successful outcome chiefly because of the dedication and commitment of those involved. Led by a motivated Advisory Committee, the project was highly-promoted through widely promoted field days and events. Many beneficial partnerships were formed or reinforced as a result of this project including Hoosier Energy, The Nature Conservancy, Wildlife, Land and Resource Management L.L.C., Pigg Implement, Purdue Extension, Indiana American Water, Merom Town Council, Merom Improvement Association, neighboring SWCDs (Vigo and Crawford County Illinois), and the local FFA group. Additionally, many helpful contacts were made in the form of regional agronomists, seed dealers, contractors, and implement sales personnel. The NRCS CIT and District Conservationist were also instrumental in providing specifications, cost-estimates, and engineering plans for structural practices in the 319 program. Many local officials on the County Council and Commissioners are also directly tied to farming and were happy to learn more and do what they could to help advocate for the 319 program. The success of this project can largely be attributed to the Sullivan SWCD Board for their oversight and management of the 319 project, as well as SWCD Coordinator/Educator, Allison McKain, for her efficient administration skills and careful scrutiny of the finances.

One major credit to the TTK Implementation program is the fact that the Match requirement was not only fulfilled, but exceeded! Indeed, the match requirement was $224,440.00 and the final total reached $280,363.98 exceeding the goal by $55,923.95! This is a true testament to the commitment of local partners, producers, and volunteers. The momentum only continues to gain speed as the project rolls over into the TTK Implementation II project!

Successes, Challenges, and Lessons Learned

In summary, the TTK 319 Implementation project demonstrated many positive efforts, including:

- Exceeded match requirement by $55,923.95
- BMPs installed on thousands of acres
- Large load reductions achieved through Nutrient Management and Cover Crops

- Widespread adoption of precision agriculture techniques and innovative cover cropping methods
- Strong Advisory Committee involvement and overwhelming local interest
- High level of participation from landowners and producers due to strong word-of-mouth promotion
- 319 grant awarded for additional implementation in the TTK watershed (2020-2023)
- Good communication with SWCD Coordinator/Educator regarding finances, event planning, etc.
- Other conservation efforts including:
    - LARE grants for Turtle Creek watershed ($60,000 total available)
    - Clean Water Indiana grant for conservation practices such as cover crops
    - INField Advantage Middle Wabash group
    - Continued cross-promotion of CREP and NRCS/FSA programs
    - Hoosier Energy program promotion, involvement, and match contributions
    - TNC assistance with field days, funding for cover crops, soil testing

However, all roads to success often have a number of 'bumps' along the way. Below are some challenges the TTK 319 Implementation project experienced (and learned from):

- An abundance of engineering projects ran out of time to be completed before the grant deadline, due to weather delays, unforeseen circumstances, and over-ambitiousness on the part of some producers. A large amount of funding had to be utilized (approximately ~$60,000) quickly in the remaining months of the grant, which made for a stressful close-out. It would be best to be wary of this in the future and plan ahead accordingly (earlier construction deadlines, sign-up limits for first-time customers).
- Overlapping implementation grants can make meeting the number of obligatory field days, Advisory Committee meetings, newsletters difficult, as it is not possible to count a single event to meet the requirements of both grant agreements.
- Unfunded trend monitoring did not provide data that was comparable to the caliber of data collected during the planning phase (i.e. funded, lab grade) and was generally lacking in many ways.
- Quickly evolving precision agriculture technology can make it challenging to stay informed.
- Care to recommend good cover crop seeding mixes/practices based on next year's crop and awareness of challenges associated with cover crop termination, pests (slugs), cover crop planting methods (some producers reported that seed drilled during Fall 2018 rotted in the ground due to excessive moisture. In some cases, other methods such as broadcasting can be better suited for local conditions).

Future Activity

The West Central Indiana Watershed Alliance came to fruition in response to the many different conservation efforts that were ongoing in the region, starting with the Busseron watershed. After expanding beyond a single watershed, a more encompassing title for the group was adopted. Currently, the WCIWA has expanded the 319 program into the Turman Creek, Turtle Creek, and Kelley Bayou watersheds, while continuing to seek additional funding in the form of Clean Water Indiana, LARE, and other applicable sources. The WCIWA has assisted neighboring watershed groups with their own 319 grants, acting as a consulting partner at times, while also assisting in the pursuit of funding for Mariah Creek Planning and Implementation initiatives. At the time of this report, the WCIWA is also operating in the nearby Plummer Creek watershed (Greene, Monroe, and Owen counties) as well as Lower Eel Watershed (Clay, Owen, and Greene counties).

When it comes to the TTK watershed efforts, the Sullivan County SWCD continues to act as the backbone of the project, overseeing the completion of required tasks and handling all expenditures. The WCIWA continues to look for opportunities to promote conservation in the region while facilitating ongoing implementation in the TTK watershed.

A new round of TTK 319 Implementation grant funding will be available in early 2020, with the addition of Little Turtle Creek among critical areas eligible for cost-share!