2010-2014

Busseron Watershed
319 Implementation Project
Final Report

ARN: 305 1-2

Project Sponsor: Sullivan Co. SWCD

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Report Completed by:

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INTRODUCTION and OVERVIEW

The Busseron 319 Implementation project officially began on December 18, 2010 and ended on November 23, 2014. It ran concurrently with the Busseron Planning and Implementation grant (A305-7-187) for approximately one year and capitalized on the momentum started during the first grant to achieve success. The purpose of the Busseron 319 Implementation project was to satisfy the original goals listed in the Busseron Creek Watershed Management Plan, which are summarized as follows:

- ***Goal 1***: Revise and promote the Busseron Cost-Share Program.
- ***Goal 2***: Continue implementation of Cost-Share BMPs in critical areas.
- ***Goal 3***: Continue water quality monitoring based on procedures outlined in the Busseron QAPP. Analyze results in order to further refine critical areas, reduce pollutant loads, and quantify pollutant load trends.
- ***Goal 4***: Continue Outreach and Education programs in order to encourage behavioral changes that will lead to reduced nonpoint source pollution in the watershed and further long-term sustainability of the Busseron Creek Watershed Project.

The Busseron 319 grants (A305-7-187 and A305-1-2) were primarily managed by Lisa Holscher from 2008-2012. However a new Watershed Coordinator was hired in January 2013 when Ms. Holscher resigned. Some differences in documentation may be noted due to this change of management, though the requirements of the Busseron 319 Implementation grant were fulfilled by its close in November 2014.

PROJECT GOALS AND OBJECTIVES

Fulfilling the goals of the Busseron Creek WMP 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 Busseron 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: Administration, Development, and Promotion of the Cost-Share Program

- Develop and promote a State-approved cost-share program to implement BMPs.
- Expand the existing cost-share program and revise the *Section 319 Cost-Share Program Development Guidelines* to include new BMPs such as Two-Stage Ditch and Precision Ag technologies. The plan must be approved by the State.

Task B: Cost-Share for BMP 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 Busseron Creek 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. Include abandoned mine sites and probable participants. Follow outlined requirements for this data.

Task C: Water Quality Monitoring and Analysis

- Monitor at the sites sampled for the Busseron Creek WMP and the IDEM TMDL study (47 sites total).
- Sample quarterly for at least four years.
- Parameters shall include: Flow, Temperature, pH, D.O., TDS, TSS, Turbidity, Nitrogen, Phosphorus, and *E.coli*. Sulfates, Metals, and Salinity may be sampled optionally.
- Complete one QHEI assessment on all sites.
- Conduct annual macroinvertebrate sampling on all sites.

- Analyze sampling results to identify zones in which BMP implementation is expected to be most effective for overall water quality and to provide more efficient use of funds for BMP implementation.
- Develop a Quality Assurance Project Plan (QAPP) for the monitoring activities and submit it to the State for approval.

Task D: Demonstration Project

- Implement at least one demonstration project according to the IDEM 319 program requirements.
- Provide a pollutant load reduction estimate of the demonstration BMP.

Task E: Education and Outreach

- Conduct an education and outreach program that includes the following efforts:
    - Update the Busseron Creek Watershed website and include information on reclaimed farmlands, abandoned minelands, septic systems, rain gardens, and agricultural BMPs.
    - Conduct quarterly Steering Committee meetings.
    - Create and distribute a quarterly newsletter.
    - Submit media releases quarterly.
    - Participate in at least three regional SWCD field days, customer appreciation days, or other agriculture-related events each year.
    - Conduct at least one septic workshop.
    - Conduct at least one workshop on rain gardens, lakeside landscaping, or other urban BMP.
    - Conduct a field day showcasing the demonstration project (Task D).
    - Update municipal organizations such as County Council, County Commissioners, and the Conservancy District three times.
    - Conduct at least one workshop for teachers using the "Outdoor Classrooms" program.
    - Create and maintain a database of volunteers, partners, and potential donors.
    - Track the number of attendees at all field days and workshops.
    - Submit two electronic copies of all products to IDEM.

Task F: Reporting

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

EVALUATION OF GOAL ACHIEVEMENT

Overall, the Busseron 319 Implementation project proved to be a great success. This success can largely be validated by assessing the completion of the items listed in each Task. Additionally, favorable trends in producer interest and participation in conservation efforts were noted throughout the duration of the project. Moreover, many helpful lessons were learned during the course of this grant project, which will enable future conservation efforts to benefit considerably.

Several unique aspects were introduced to the Busseron 319 Implementation program, including a tiered cost-share system which offered a percentage of funding based on the producer's current conservation practices. For example, a checklist of various conservation practices was presented to each producer enrolling in the cost-share program. The list included various practices such as: Variable Rate application of P, K, and lime, Buffers (at least 20 feet wide) on 75% of streams, 100% No-Till commodity crops, proof of septic maintenance within the past three years, 10% of total operation utilizing cover crops, etc. In the case of a precision agriculture tool, a producer who checked between 1-3 boxes on the application checklist would receive 40% cost-share (up to $3,000). If they checked between 4-6 boxes, they were entitled to 50% cost-share (up to $5,000), and more than 7 boxes checked would achieve a cost-share level of 75% (up to $10,000). Full descriptions and documentation of this program can be found in **Appendix A** of the Busseron Final Report CD.

Through this program, an impressive number of BMPs were implemented and a number of new producers continue to attend field days and inquire about cost-share opportunities. Cover crops, in particular, were noticeably popular, especially during 2013 when many producers were interested in using them on acres that were not planted due to flooding. Several producers who received cost-share from the Busseron 319 Implementation program for cover crops had never participated in any sort of government cost-share program before. The program assisted a varying customer base – some producers planted hundreds of acres of cover crops while others implemented as few as 7 acres total.

In terms of water monitoring, a large amount of data was collected in the Busseron watershed from 2011-2014. During this time, 47 sites were monitored for E.coli, NO_2, NO_3, Total Phosphorus, Total Suspended Solids, pH, Dissolved Oxygen, Total Dissolved Solids, Temperature, Turbidity, Flow, and several other parameters. In total, over 400 samples were collected and recorded for each parameter during this time. Further discussion of the water monitoring program can be found on page 20 of this report. All related documents can be found in **Appendix C** of the Busseron Final Report CD, as well.

The goal of encouraging behavioral changes in the region is certainly evident through the heightened interest in new practices such as cover crops and precision agriculture. Producers seem to be ready to make changes to their farming operations in significant ways and are looking for information and cost-share opportunities. Many field days and events experienced a high attendance rate, with new producers and individuals eager to learn more. Perhaps the strongest evidence of the success of the Busseron 319 Implementation program is the fact that every cent of the cost-share funding was utilized, with more producers still on the waiting list.

COMPLETION OF TASKS

One straightforward way to quantify the success of the Busseron 319 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 on the Busseron Final Report CD (Appendix).

Task A: Administration, Development, and Promotion of Cost-Share Program

☑ Develop and promote a State-approved cost-share program to implement BMPs.

> See **Appendix A** on the Busseron Final Report CD. Per a 'Change of Scope' in 2013, some aspects of the tiered cost-share application system were simplified in order to implement BMPs more efficiently before the closure of the grant.

☑ Expand the existing cost-share program and revise the *Section 319 Cost-Share Program Development Guidelines* to include new BMPs such as Two-Stage Ditch and Precision Ag technologies. The plan must be approved by the State.

> See **Appendix A** on the Busseron Final Report CD. Per a 'Change of Scope' in 2013, Heavy Use Area Protection (HUAP) was added to the list of eligible BMPs for the Busseron 319 Implementation project.

Task B: Cost-Share for BMP 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 Busseron Creek WMP.

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

By the close of the Busseron 319 Implementation grant, all of the cost-share funds had been completely utilized and more producers were still asking to apply. All BMPs were installed according to NRCS (or other approved) specifications and in accordance with IDEM 319 program guidelines. See **Appendix B** on the Busseron Final Report CD for a complete list of producers, BMPs (match and funded by 319 cost-share).

In summary, the Busseron 319 Implementation grant worked with *43 unique producers* to install an impressive quantity of BMPs in critical areas, including:

- 6,344.92 acres of Cover Crops
- 36 WASCOB structures
- 3 Grassed Waterways
- 1 Diversion
- 1 Heavy Use Area Protection pad
- 2 Grade Stabilization structures
- 3,914.97 new acres utilizing Precision Agriculture tools
- 822.9 new acres utilizing improved Nutrient Management/No-Till methods

Success: Many 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 Busseron watershed region. The allocated cost-share funds in Task B were completely spent by the end of the grant. The balance for Task B is $0.00, which is a success!

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

Included below is a complete list of participating producers, BMPs, and calculated load reductions, which can also be found in **Appendix B** on the Busseron Final Report CD. The pollutant load reduction estimates of the BMPs installed as a direct result of the Busseron 319 Implementation project (Cost-Share and Match projects) are summarized as follows:

- Total Nitrogen Load Reduction = 128,245.60 pounds/year
- Total Phosphorus Load Reduction = 34,975.50 pounds/year
- Total B.O.D. (Biological Oxygen Demand) Load Reduction = 123,138.40 pounds/year
- Total Sediment Load Reduction = 31,460.70 tons/year

Busseron 319 Implementation Project – Funded BMPs

Producer	Project/Description	Units	Year	Nitrogen	Phosphorus	B.O.D.	Sediment
Mark Holscher	Cover Crops	507.43 acres	2011	2,994.30	831.60	3,578.50	559.10
Gertrude Lisman	Diversion	1040' linear ft.	2011	9.20	3.50	18.40	5.00
Roger Lovelady	Cover Crops	301.6 acres	2011	1,701.10	520.40	2,392.90	373.90
Brad Page	Cover Crops	147.6 acres	2011	2,412.00	787.40	3,764.40	588.20
Travis Page	Cover Crops	259 acres	2011	3,187.20	979.20	4,514.90	705.40
Carter Farms	Precision AG (every other year)	136.7 acres	2011	541.70			
Brad Ferree	Cover Crops	30.8 acres	2011	297.20	94.90	448.10	373.70
Irene Christy	WASCOB	(7) WASCOB	2012	743.30	295.60	1,374.60	214.80
Charlie Kirschner	WASCOB, Waterway	380' Waterway, (3) WASCOB	2012	876.40	310.80	1,457.80	227.80
Forrest Payne	Waterway	365 linear ft.	2012	187.90	64.40	301.80	47.20
Pat McCammon	WASCOB	(4) WASCOB	2012	444.70	178.90	797.80	124.70
Lois McCammon	WASCOB	(3) WASCOB	2012	2,303.10	917.30	4,241.40	659.70
Rex Dalton	WASCOB	(1) WASCOB	2012	351.90	139.60	654.40	102.30
Janice Miliken-Carmichael	Waterway	4.7 acres	2012	998.10	323.20	1,430.30	223.50
Don Wells	Cover Crops	240 acres	2012	2,984.50	919.40	4,245.90	663.40
Jason Danko	Cover Crops	7.9 acres	2012	86.90	28.40	136.20	21.30
John Gill	Cover Crops	17.5 acres	2012	336.90	117.60	583.10	91.10
Jack Hamilton	Cover Crops	168.2 acres	2012	1,271.50	414.30	1,979.00	309.20
Mike Bell	Cover Crops	195.8 acres	2012	861.40	264.70	1,220.60	190.70
Tim Butler	Cover Crops	50.09 acres	2012	497.60	165.40	798.70	124.80
Clint Followell	Cover Crops	101.62 acres	2012	315.00	94.80	1,147.20	49.00
Curtis Horton	Cover Crops	20 acres	2012	3.60	1.20	5.80	0.90
Mike McKinley	Cover Crops	90 acres	2012	14.00	4.60	21.70	3.40
Cullen Page	Cover Crops	206.7 acres	2012	2,621.10	811.30	3,758.30	587.20
Travis Page	Cover Crops	150.6 acres	2012	675.30	208.70	966.00	150.90
Jim Hiatt	Cover Crops	20.46 acres	2012	407.00	137.40	668.60	104.50
Mark Holscher	Cover Crops	479.23 acres	2012	5,444.30	1,637.50	7,448.10	1,163.80
Pat McCammon	Cover Crops	282.65 acres	2012	3,440.40	1,054.10	4,851.50	758.10
Jim Hiatt	No-Till Planter Upgrades	822.9 acres	2013	8,106.40	2,428.30	10,797.20	1,687.10
Curtis Horton	WASCOB	(3) WASCOB	2013	379.30	189.70		189.70
Chuck Abrams	Cover Crops	311.35 acres	2013	819.90	3,741.10	1,142.50	5,247.50
George Hale	WASCOB, Flared Inlet Structure	(3) WASCOBs, (1) Structure	2013	379.30	189.70		189.70
Travis McKinney	Precision AG (every other year)	40.1 acres	2013	240.60			
Cliff Orr	Precision AG (every other year)	114 acres	2013	684.00			
Cullen Page	Precision AG (every other year)	2871.95 acres	2013	34,463.40			
Bill Hagemeier	Cover Crops	65.3 acres	2013	1,141.30	377.90	1,820.90	284.50
Rich Cole	Cover Crops/No-Till Planter Upgrades	56 acres	2013	1,007.80	334.40	1,613.50	352.10
Alan Drake	Cover Crops	41 acres	2013	761.30	253.90	1,228.30	191.90
BE N AG	Cover Crops	192.19 acres	2013	741.60	3,063.20	995.40	4,746.50
Drew Brand	Cover Crops	917.64 acres	2013	9,578.70	2,809.70	12,569.30	1,964.00
Carter Farms, Inc.	Cover Crops	232.2 acres	2013	2,900.00	894.30	4,132.90	645.80
Jerry Charley	Cover Crops	64.13 acres	2013	1,138.60	377.00	1,816.70	283.90
Jason Danko	Cover Crops	13.9 acres	2013	288.20	97.70	476.70	74.50
Hoke Family Farms	Cover Crops	45 acres	2013	827.80	275.60	1,332.50	208.20
Alan Huff	Cover Crops	103.44 acres	2013	1,751.50	575.30	2,760.30	431.30
David Lofton	Cover Crops	16 acres	2013	327.00	110.60	539.20	84.20
Roger Lovelady	Cover Crops	131.74 acres	2013	2,178.30	712.60	3,410.80	532.90
Michael McKinley	Cover Crops	50 acres	2013	910.10	302.50	1,461.20	228.30
Brad Ferree	Cover Crops	17.3 acres	2013	350.80	118.50	577.30	90.20
Mark Holscher	Cover Crops	288.72 acres	2013	3,504.50	1,073.00	4,936.20	771.30
Curtis Horton	Cover Crops	52 acres	2013	942.80	313.20	1,512.20	236.30
Jeff Mann	Precision AG (every other year)	686.92 acres	2014	3,434.60			
Ray McCammon	Cover Crops	25 acres	2013	488.10	164.00	796.70	124.50
Travis McKinney	Cover Crops	362 acres	2013	4,266.00	1,296.00	5,933.00	927.00
Cullen Page	Cover Crops	28 acres	2013	540.40	181.30	1,584.00	247.50
Dale Phegley	Cover Crops	54.83 acres	2013	988.80	328.20	1,584.00	247.50
Valley View Farms	Precision AG (every other year)	65.3 acres	2014	391.80			
Jason Danko	HUAP	4270 square ft.	2014	40.00	20.00		20.00
Jim Gill	WASCOB	(2) WASCOB	2014	475.20	237.60		237.60
JT Gill	WASCOB	(3) WASCOB	2014	304.80	152.40		152.40
Barbara Davis	WASCOB, Flared Inlet Structure	(3) WASCOB, (1) Structure	2014	66.90	33.50		33.50
Chuck Templeton	WASCOB	(4) WASCOB	2014	318.80	159.40		159.40
			TOTAL	**120,746.20**	**32,116.80**	**115,826.80**	**29,012.90**

Busseron 319 Implementation Project – Match BMPs

MATCH BMPs							
Producer	**Project/Description**	**Units**	**Year**	**N**	**P**	**B.O.D.**	**Sediment**
Curtis Horton	Cover Crops, CWI	52 acres	2014	942.80	313.20	1,512.20	236.30
Steve McCammon	Cover Crops, CWI	245 acres	2013	3,038.40	935.30	4,317.90	674.70
Cullen Page	Cover Crops, CWI	32.48 acres	2013	617.50	206.60	1,001.80	156.50
Tim Butler	Cover Crops, CWI	14 acres	2013	290.10	98.30	479.70	75.00
INDOT, Roger's Ditch	Two-Stage Ditch	7238 lin.ft. x 2 (per bank)	2013	2,491.60	1,245.80		1,245.80
Improved Ditch Engineering	LARE-funded, spec. approved	400 linear feet	2013	119.00	59.50		59.50
			TOTAL	**7,499.40**	**2,858.70**	**7,311.60**	**2,447.80**

☑ Create and maintain a geo-referenced database for all BMPs implemented through the 319 project. Include abandoned mine sites and probable participants. Follow outlined requirements for this data.

The original intention of maintaining a comprehensive geo-referenced database of probable participants was initiated by the first Watershed Coordinator and was unfortunately far from completion by the time the new Watershed Coordinator assumed responsibility for this task. Much data had been collected (i.e. geo-located photos, potential project sites, conservation planning) though without firsthand knowledge, the accompanying information proved to be insufficient for creating this comprehensive geo-referenced database of probable participants, as it was originally described.

A project location was provided in the form of latitude/longitude coordinates which the IDEM Project Manager used to update an in-house database of all 319-funded BMPs throughout the state. In addition, the Watershed Coordinator frequently used ArcMap 10.1 with a GIS layer featuring abandoned mine sites when planning conservation practices within the watershed.

Furthermore, an 'Interest List' was compiled and maintained using available producer information. It was updated frequently as new producers expressed interest in Busseron cost-share. This list was strictly adhered to in the final stages of the grant when cost-share funds were limited. Eligible producers were assisted in the order in which they first expressed interest in conservation BMPs. Once the Busseron cost-share funds had been entirely obligated, remaining producers were added to a 'Wait List' and would be notified if additional funding became available.

Lesson Learned: Creating and maintaining a complex database for all possible project sites is an ambitious task that requires constant attention to update as well as a great deal of expertise with mapping programs. This type of endeavor also relies heavily on first-hand knowledge of the details involved with planning each BMP, as well as proper landowner relations and knowledge of current project status/schedule. Due to inadequate documentation, these details could not be reconciled for use in a comprehensive manner and were unfortunately discarded in many cases.

However, a producer "Interest List" was maintained on an Excel spreadsheet that contained pertinent details (contact information, critical area location, BMP interest, etc.). It was straight-forward and provided sufficient information to carry out implementation. In the future, it may be best to consider using a simple and efficient method of documentation. This approach will ensure that information is in a format that is able to be used for many years by individuals of varying skill sets and background knowledge specific to the project.

Task C: Water Quality Monitoring and Analysis

☑ Monitor at the sites sampled for the Busseron Creek WMP and the IDEM TMDL study (47 sites total).

In addition to the 22 sites chosen for sampling in the Busseron watershed as a part of the first Busseron 319 Planning and Implementation project, the 25 sites that were monitored for the TMDL study of Busseron were also scheduled for sampling as a part of the Busseron 319 Implementation project. In total, 47 sites within the Busseron watershed were chosen for sampling on a quarterly basis. Additionally, macroinvertebrates would be collected at each site on an annual basis and a QHEI evaluation would be performed at each site.

At times, some of these sites were not able to be sampled due to road construction, high traffic, or dangerous access. Some sites were unsafe to sample or conduct macroinvertebrate collection during times of high flow. A note to indicate the reason that sampling was not performed was included if data was not present. An overview of the sampling sites can be found in **Appendix C** on the Busseron Final Report CD. All compiled data from the Busseron water monitoring program can be found in **Appendix C,** as well. Further discussion regarding the collected data can be found of page 20 of this report.

☑ Sample quarterly for at least four (4) years.

- Parameters shall include: Flow, Temperature, pH, Dissolved Oxygen, Total Dissolved Solids, Total Suspended Solids, Turbidity, Nitrogen, Phosphorus, and *E.coli*. Sulfates, Metals, and Salinity may be sampled optionally.

Sampling was slated to occur quarterly for four years on a total of 47 sites for the parameters listed above (except for sulfates and metals). However, all monitoring had to be discontinued in 2013 due to a lack of funding for lab costs and mileage. This change was communicated in a minor change of scope letter which can be found on the Busseron Final Report CD. Furthermore, it was determined that a sufficient amount of data had been collected during the sampling period to provide a comprehensive snapshot of water quality trends throughout the Busseron watershed. The monitoring program was considered to be successful based on the large amount of data collected.

A summary of sampling occurrences is described below. The sample number varies due to the addition of duplicate samples or the inability to sample a site due to access concerns or unfavorable weather conditions. All data collected was entered into the specified IDEM Spreadsheet, which can be found in **Appendix C** on the Busseron Final Report CD.

- February 2011 (23 sites – BCW only, no TMDL sites)
- May/June 2011 (49 sites)
- August/September 2011 (37 sites)
- December 2011 (48 sites)
- March 2012 (48 sites)
- June 2012 (40 sites)
- *[No sampling in August/September 2012 due to severe drought]*
- November/December 2012 (35 sites)
- March 2013 (41 sites *One sample at possible incorrect location*)
- May 2013 (42 sites)
- August/September 2013 (36 sites)
- ***[All further sampling ceased due to lack of funding for lab costs, mileage]***
- *[October/November 2014 (34 sites) – modified sampling (YSI probe and Hoosier Riverwatch methods) occurred during macroinvertebrate assessments]*

Lesson Learned: Water sampling is an expensive venture and all items must be properly budgeted, including laboratory analysis, personnel, equipment, and mileage expenses. Originally, the idea of adding the IDEM TMDL sites was intended to be beneficial in providing a broader expanse of data for the Busseron watershed. However, laboratory analysis for E.coli, TSS, Nitrates/Nitrites, and Total Phosphorus amounts to approximately $92/sample and equipment/personnel/mileage also attributes to the costliness of the project. Significant budget discrepancies were noted in 2013 and water monitoring had to be discontinued. In the future, extra care should be taken to stay within the boundaries of the itemized budget during the early stages of a 319 grant. At any rate, it was determined that enough data had been collected to demonstrate that no significant changes in water quality were noted during the study. Fluctuations noted were mostly attributed to seasonal precipitation and were expected with monthly and quarterly monitoring frequency.

Another factor to consider is how the water monitoring will be of use during the current project. For an implementation project, it seems ill-timed to bolster the monitoring program. The data is most beneficial when it can be collected and analyzed before implementation. In this case, the abundance of data collected did little to affect change in the critical areas of the watershed at such a late stage in the project. Because analysis was ongoing, no changes were made to the critical areas during implementation as originally intended. Nonetheless, this abundance of data will be available should future monitoring and analysis of water quality in the Busseron watershed occur.

☑ Complete one QHEI assessment on all sites.

A QHEI was conducted in 2011 by a student intern and an additional QHEI was completed in 2013 after staff received training in the field from the IDEM Project Manager. The duplicate QHEI was completed in order to verify results of the original QHEI.

☑ Conduct annual macroinvertebrate sampling on all sites.

Macroinvertebrate sampling was to be conducted once per year from July to mid-November at all sites, however some deviations from this original proposal occurred. All collected data can be found in the IDEM Spreadsheet in **Appendix C** on the Busseron Final Report CD. A summary sheet of QHEI and Macroinvertebrate data can also be found in the same location.

In 2011, the watershed coordinator had been concerned with very low numbers of macroinvertebrates collected during the previous Busseron 319 Planning and Implementation monitoring program and opted to conduct further studies using Hester-Dendy and Leaf Pack collection devices. An intern was hired to complete this study and the results were included in the data set in **Appendix C.**

A pervasive and severe drought occurred in 2012 that prevented all macroinvertebrate collection. Most streams were completely dry and others that contained any water were characterized by disconnected, stagnant pools. Any collected data would have been found to be anomalous, so no macroinvertebrate study was conducted in 2012.

In 2013 and 2014, macroinvertebrate studies were conducted as originally intended. Scores were given to each site based on the PTI (Pollution Tolerance Index). All data is included in **Appendix C.**

☑ Analyze sampling results to identify zones in which BMP implementation is expected to be most effective for overall water quality and to provide more efficient use of funds for BMP implementation.

Comprehensive analysis of monitoring data was not completed to the degree originally intended. At the time the second watershed coordinator began duties in 2013 record-keeping was far behind. A large portion of the data entry was incomplete from 2011-2012 so a considerable amount of time was spent updating and organizing collected monitoring data. Based on a preliminary review of the data, it was determined that time spent on in-depth analysis would not provide helpful information for BMP implementation. Achieving the original goal of identifying zones where BMPs would be most effective would have been possible if the data had been analyzed comprehensively before implementation began.

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

The Busseron QAPP was revised and approved in July 2011 to include the additional IDEM TMDL monitoring sites and other applicable changes. The updated version can be found in **Appendix C** on the Busseron Final Report CD.

Task D: Demonstration Project

☑ Implement at least one demonstration project according to the IDEM 319 program requirements.

Originally, the Union High School (Dugger) bioswale project was the intended site for the Busseron 319 Implementation project's demonstration BMP. However, it could not be used for this purpose because it was not located within a critical area of the watershed. Instead, the BMP chosen for the Demonstration Project was a mile of two-stage ditch to be constructed in a publicly visible location in the Roger's Ditch subwatershed as part of an INDOT stream mitigation project.

Planning for the conversion of portions of Roger's Ditch (locally referred to as the "9-Mile Ditch") to two-stage ditch began during the previous Busseron A305-7-187 grant project and included a variety of partners. After a time, the groups primarily involved in the effort were the Gill Township Levee Association, The Nature Conservancy, and INDOT. A number of sites were evaluated and the corresponding landowners were approached for permission. In the end, the northernmost upstream mile of the "9-Mile Ditch" was selected as a site for INDOT stream mitigation. The Nature Conservancy was not financially involved, but continued to stay in communication regarding future projects downstream.

The two-stage ditch project was engineered by Bernardin, Lochmueller, and Associates. After considerable delays, construction was completed during the summer of 2013. The finished project was not looked upon favorably by one of the landowners who had been under the impression that the ditch would be 'cleaned out' as part of the process. The ditch contained an abundance of vegetative material that impeded flow, causing water to flow around the vegetation and onto the benches instead. There was also considerable damage to the landowner's property including large rocks distributed throughout the crop field, excessive wheel ruts and debris, as well as damaged tiles that caused pooling water in the crop field. Repairs were made by the landowner to correct some of these issues. The landowner is still seeking recompense at the time of this report.

Supporting documentation and photos can be located in **Appendix D** on the Busseron Final Report CD.

Lessons Learned: There were several aspects of this project that proved to be problematic, though the crux of the issues stem from the fact that the parties involved had differing visions for what a successful outcome would entail. The Gill Township Levee Association and participating landowners were interested in the two-stage ditch project primarily because they believed this would be a way for the ditch to be dredged at no cost to them. Communication was not sufficient during the planning process, leaving them to feel mislead and frustrated as a result of this project. This failure in communication has left future two-stage ditch projects in the area jeopardized. Consideration should be taken in the future if planning similar projects in this area.

☑ Provide a pollutant load reduction estimate of the demonstration BMP.

This information can be found in **Appendix B and D** on the Busseron Final Report CD. The two-stage ditch project was 7,328 linear feet long. Both sides of the ditch were converted to two-stage ditch so load reductions were calculated for each side of the stream. According to the Region 5 model, this project resulted in the following pollutant load reductions:

- Total Nitrogen Load Reduction = 2,491.60 pounds/year
- Total Phosphorus Load Reduction = 1,245.80 pounds/year
- Total Sediment Load Reduction = 1,245.80 tons/year

Task E: Education and Outreach

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

- Update the Busseron Creek Watershed website and include information on reclaimed farmlands, abandoned mine lands, septic systems, rain gardens, and agricultural BMPs.

The original website http://busseron.org, also known as http://watershed-alliance.org was created using Microsoft FrontPage, a discontinued HTML editing program that is cumbersome and nearly obsolete by today's standards. In 2013, the website was completely overhauled with the help of a consulting web-developer (offering services in-kind). The new website now possesses a much more user-friendly interface and still includes pages that provide information on reclaimed farmlands, abandoned mine lands, septic systems, rain gardens, agricultural BMPs and more. The website can be currently found at http://watershed-alliance.org. The busseron.org-link was allowed to expire in 2014 in favor of a more expansive title that will include future conservation efforts, such as the TTK (Turtle Creek, Turman Creek, Kelley Bayou) 319 project.

In addition to the website, a Twitter account (@WCIWA) was regularly updated with agriculture and watershed-related news. Starting in 2013, watershed photos were posted to a Flickr account for WCIWA. It is updated periodically and can be found at the following link:

http://www.flickr.com/photos/100018070@N07/.

- Conduct quarterly Steering Committee meetings.

The Busseron Steering Committee, also known as the Technical and Advisory Committee was required to meet at least quarterly (a minimum of 16 times) during the time of the Busseron 319 Implementation grant. Meetings were sometimes more or less frequent than quarterly, depending on the group's needs, though they met on 16 occasions altogether.

Steering Committee meeting dates are listed below. Supporting documentation for all meetings can be found in **Appendix E** on the Busseron Final Report CD.

- January 18, 2011
- March 15, 2011
- July 27, 2011
- September 20, 2011
- November 15, 2011
- January 24, 2012
- May 22, 2012
- July 31, 2012
- November 27, 2012
- February 2, 2013
- May 21, 2013
- August 6, 2013
- September 19, 2013
- November 21, 2013
- February 20, 2014
- April 17, 2014

- Create and distribute a quarterly newsletter.

The Busseron 319 Implementation project was to be promoted through the distribution of a quarterly E-Newsletter (16 total). Initially, the newsletters were quite lengthy and as a result, fell far behind schedule. In 2013 and 2014 the newsletters were distributed every other month in an effort to fulfill the requirement of 16 total. The E-Newsletter was shortened considerably, though dates of important events were reaching Busseron contacts more frequently as a result. All newsletters can be found in **Appendix E** on the Busseron Final Report CD.

- V4 Issue 1 (Spring 2011)
- M1 (November 2011)
- M2 (February 2012)
- M3 (March 2012)
- M4 (July 2012)
- M5 (February 2013)
- M6 (April 2013)
- M7 (June 2013)
- M8 (August 2013)
- M9 (October 2013)
- M10 (December 2013)
- M11 (February 2014)
- M12 (May 2014)
- M13 (June/July 2014)
- M14 (September/October 2014)

- M15 (November/December 2014)

Lesson Learned: A high quality, lengthy newsletter requires a large time commitment. There are other tasks within the scope of the 319 grant that may be deemed 'higher priority' than a newsletter. In the future, create a template for a concise newsletter and send it out on time.

- Submit media releases quarterly.

An abundance of news regarding the Busseron watershed project was featured in local newspapers as well as in several other publications from 2011-2014. Specific records of every article published were not easily tracked down in many cases, but most media releases are listed under Task E in the Quarterly Progress Reports. If the original clippings from pertinent articles were located, they were scanned and saved in **Appendix E** on the Busseron Final Report CD. In total, 32 documented media sources were reported, which exceeds the requirement of 16 total publications for the project. Listed below is a summary of known media releases and corresponding dates, when available.

6/14/11 "Rain Barrels on EBay" (Sullivan Daily Times)
7/12/11 "IDEM Shortens Cover Crop Commitment Policy" (Sullivan Daily Times)
8/7/11 "Workshop for Real Estate Professionals" (Terre Haute Tribune Star)
8/10/11 "Grant to Help Reduce Sediment Flow to Lake Sullivan" (Sullivan Daily Times)
8/16/11 "Septic Workshop Coming to Jasonville…" (Sullivan Daily Times)
8/19/11 "Gary Ready is Recognized as River Friendly Farmer" (Sullivan Daily Times)
8/24/11 "Conservation Day Aims to Get Kids Outdoors" (Sullivan Daily Times)
10/23/11 "Your Green Valley: Looking for an Excuse to Clean Out Your Medicine Cabinet?" (Terre Haute Tribune Star)
10/31/11 "Operation Medicine Cabinet-Locals Unload Unwanted Medicine" (Sullivan Daily Times)
12/2/11 "Cover Crop Trend Picks Up Steam in Indiana" (Indiana Prairie Farmer magazine)
1/23/12 "Union's Outdoor Classroom Gets Upgrade with Peabody Grant Money" (Sullivan Daily Times)
2/19/12 "Cover Crop Tour to Assist Valley Farmers" (Terre Haute Tribune Star)
2/19/12 "Master Gardeners Plan Annual Seminar…" (Terre Haute Tribune Star)
2/22/12 "Your Chance to See Cover Crops Up Close and Personal" (Indiana Prairie Farmer magazine)
2/27/12 "Master Gardener Seminar is March 10" (Greencastle Banner Graphic)
3/14/12 "Septic Workshop Scheduled" (Brazil Times)
3/27/12 "County's 3rd Free Drug Disposal Day Hopes to Build on Past Successes" (Sullivan Daily Times)
9/18/12 "Emergency Programs for Livestock, Cover Crops Bring New Users" (Indiana Prairie Farmer magazine)
9/18/12 "Why Would You Pull Stalk Samples this Year?" (Indiana Prairie Farmer magazine)
10/2/12 "Raft Trip Teaches Students About the Wabash River" (WTHI)
January 2013 "New Watershed Coordinator: Laura Young" (Sullivan Daily Times)
March 2013 "Prescribed Burn Workshop Coming to Hymera Elementary School" (Sullivan Daily Times)
4/26/13 "Carrie Green is New Face at Sullivan Co. SWCD" (Sullivan Daily Times)
5/29/13 "Operation Medicine Cabinet Takes in About 200lbs of Old Prescriptions" (Sullivan Daily Times)
July 2013 "Busseron Creek Watershed Landowners have Cover Crop Funds Available" (Sullivan

Daily Times)
July 2013 “Busseron, TTK 319 Watershed Grants to Run Concurrently” (Sullivan Daily Times)
August 2013 “Ditch Project Overcomes Many Potential Pitfalls” (Sullivan Daily Times)
9/20/13 “Union Science Students Learn by Getting Their Feet Wet” (Sullivan Daily Times)
10/23/13 “Operation Medicine Cabinet Sees Similar Yield to Spring Event” (Sullivan Daily Times)
1/16/14 “County Habitat Management Company Honored as IASWCD Corporate Friend of Conservation” (Sullivan Daily Times)
October 2014 “Thursday Workshop in Merom on Invasive Species” (Sullivan Daily Times)
October 2014 “Invasive Species Workshop” (Vigo Co. SWCD newsletter and Terre Haute Tribune Star)

- Participate in at least three regional SWCD field days, customer appreciation days, or other agriculture-related events each year.

The Busseron watershed stretches into four counties (Sullivan, Greene, Clay, and Vigo), which created many opportunities to partner with other agencies for regional events that promote conservation practices. The WCIWA assisted and participated in a wide variety of events, seminars, workshops, and field days. Listed below is an account of known events that personnel from the WCIWA assisted with in some way. In many cases, the Watershed Coordinator gave a presentation regarding the Busseron 319 Implementation program and its mission to improve regional water quality. Attendees were tracked at most events, as represented below. Further discussion regarding each individual event can be found within the Quarterly Progress Reports, which have been compiled in **Appendix G** on the Busseron Final Report CD.

Additional workshops and events that were attended by WCIWA personnel are also listed below. Even if WCIWA personnel had no direct involvement in the planning of an event, the networking, training, and idea-sharing opportunities were beneficial to the project on a broader scale. Workshops highlighted in **blue** indicate those in which the WCIWA served as a primary partner in organizing as a part of the Busseron 319 Implementation project. A minimum of 12 events were needed to satisfy the requirement of this task.

2011
2/25/11 Pigg Implement Planter Clinic (*Presentation) – 120 growers
3/1/11 Ceres Crop Solutions (*Presentation) – 50 growers
3/7/11 Pioneer Seed Corn (*Presentation) – 25 producers
3/11/11 Agrigold Seed meeting (*Presentation) – 20 growers
3/10/11 Master Naturalist (*Presentation) – 15 attendees
4/26/11 West Central Indiana Watershed Public Forum, sponsored by Indiana Wildlife Federation (*Presentation)
6/30/11 Reclamation Field Day: Somerville Mine, Warrick County
8/18/11 Rain Garden/Rain Barrel workshop, Vigo Co (*Presentation) – 15 attendees
8/19/11 Septic Workshop, Jasonville, IN (*Presentation) – 20 attendees
8/26/11 Ceres Answer Plot (Cover Crop Stop) – 300 attendees
11/17/11 Sullivan PARP workshop (*Presentation)
12/6/11 Cover Crop workshop (Partner with Vigo, Greene, Clay SWCDs) – 68 attendees

2012
1/9/12 IASWCD Annual Conference (*Presentation)
2/2/12 On Farm Network Grower meeting
2/29/12 Pigg Planter Clinic (*Presentation) – 100 attendees
March 2012 Soil Health Series Self-Guided Tour

3/7/12 Cover Crop Bus tour – 50 attendees
3/10/12 Wabash Valley Master Gardeners (*Rain Garden Presentation) – 175 attendees
3/23/12 Brown Trout Series/Septic Workshop – 20 attendees
11/8/12 Fluvial Erosion Hazard Workshop, Vincennes University
11/9/12 Our Green Valley Sustainability Conference (*Presentation) – 25 attendees
11/28/12 Cover Crop Round Table – 30 attendees, including Sullivan FFA students

2013
1/30/13 On Farm Network Group meeting – 20 attendees
3/8/13 Caring for Cover Crops workshop, Sullivan, IN – 25 attendees
3/18/13 Master Naturalist (*Presentation) – 15 attendees
3/23/13 Hymera CRP Mid-Contract Management Workshop – 14 attendees
4/18/13 Earth Day program (*Presentation) at RCA school
5/16/13 Sullivan 3rd Grade Ag Day (*Presentation)
6/27/13 Dubois County Field Day – Soil Health on Reclaimed Minelands
8/21/13 Cover Crop workshop, Vigo County Carter Farms – 50 attendees
9/19/13 Union High School Outdoor Classroom dedication – 35 attendees (students included)

2014
1/2/14 Master Naturalist meeting (*Presentation) – 15 attendees
1/19/14 CCSI Brocksmith Field Day, Vincennes, IN – 125 attendees
2/25/14 On Farm Network group meeting – 20 attendees
2/28/14 RCA Science Fair judging
4/9/14 Greene/Monroe Co SWCD American Bottoms Cover Crop workshop – 20 attendees
5/13-14/14 Project WET Teacher's workshop, Hymera, IN – 20 attendees
8/7/14 Gill Township Levee Association Annual Meeting (*Presentation) – 15 attendees
10/30/14 Invasive Species workshop – 40 attendees

Displays, Trainings, and Other Events
2/8/11 Greene Co. SWCD Annual Meeting (*Presentation) – 100 attendees
2/10/11 Vigo Co. SWCD Annual Meeting (*Received 'Educator of the Year' Award) – 100 attendees
2/21/11 Sullivan Co. SWCD Annual Meeting (*Presentation) – 110 attendees
7/8/11-7/15/11 Sullivan County 4-H Fair Display (Cover Crops, Two-Stage Ditch)
9/28-29/11 Annual Raft Trip (*Presentation) to participating 8th graders – 300 students
10/4-6/11 Sullivan SWCD 8th Grade Raft Trip (*Presentation) – 300 students + 50 volunteers
10/29/11 Operation Medicine Cabinet, Sullivan County
2/11/12 LaPorte County SWCD Annual Meeting (*Presentation)
2/20/12 Sullivan SWCD Annual meeting (*Presentation) – 150 attendees
3/31/12 Ag Day Display – 300 attendees
6/13-14/12 IWRA (Indiana Water Resources Alliance) seminar, Lost Creek Watershed
6/15/12 SWCS – Spring workshop, water quality monitoring
8/7/12 NRCS EQIP Locally Led Meeting
9/7/12 The Nature Conservancy Two Stage Ditch workshop (Lafayette, IN)
9/24-25/12Annual Raft Trip (*Presentation) to participating 8th graders – 300 students
10/2-4/12 Sullivan SWCD 8th Grade Raft Trip (*Presentation) – 300 students + 50 volunteers
10/29/12 Operation Medicine Cabinet, Sullivan County
11/13/12 VUJC Land Stewardship Initiative/Cover Crop Plot Open House
11/15/12 Soil Health Training, Indianapolis
11/16/12 SWCS Soil Health Symposium, Indianapolis
11/29/12 Ohio Valley Precision Ag. Conference, Evansville
2/7/13 Soil Health Hub, McCormick's Creek State Park

2/13/13 Intro to Soil Health workshop, Jennings County
2/18/13 Sullivan SWCD Annual meeting (*Presentation)
2/19/13 Greene Co. SWCD Annual meeting
2/20/13 Vigo Co. SWCD Annual meeting
3/5/13 SWCD Staff/Supervisor Training, Washington, IN
3/9/13 Ag Day Display, Sullivan County – 300 attendees
3/14/13 Advanced Cropping Systems Training, Jennings County
3/19-20/13 Two Stage Ditch Workshop, The Nature Conservancy, Kokomo, IN
6/19-21/13 IWRA Symposium, Muncie, IN
7/1218-13 Display at Sullivan County Fair
8/12/13 Pathway to Water Quality Volunteer, Indiana State Fair
10-1-3/13 Sullivan SWCD 8th Grade Raft Trip (*Presentation) – 300 students + 50 volunteers
10/16/13 Operation Medicine Cabinet
12/9-10/13 ISMR Conference, Jasper, IN
1/13/14 Sullivan Wellhead Protection Planning meeting, Indiana American Water – 10 attendees
2/17/14 Sullivan SWCD Annual Meeting (*Presentation) – 100 attendees
2/18/14 National Soil Health Forum, Vincennes, IN
2/26/14 Greene Co. SWCD Annual Meeting
3/8/14 Sullivan Co. Ag Day Display – 300 attendees
3/10/14 CCSI Advanced Cover Crop Training, Vincennes, IN
7/11-17/14 Sullivan County Fair Display

- Conduct at least one septic workshop.

A septic workshop was conducted on March 23, 2012 in partnership with Clay, Vigo, and Greene Co. SWCDs as well as Purdue Extension, the Indiana State Department of Health, and Indiana Onsite Wastewater Professionals Association. Supporting documentation can be found in **Appendix E** on the Busseron Final Report CD

An additional septic workshop was held on 8/19/11 in Jasonville, IN. It was most likely reported in association with the Busseron 319 Planning/Implementation grant A305-7-187.

- Conduct at least one workshop on rain gardens, lakeside landscaping, or other urban BMP.

A workshop on rain gardens and the use of rain barrels was conducted in Terre Haute, IN on 8/18/11. Partners for the workshop included Vigo County SWCD and St. Mary of the Woods. Lisa Holscher gave a presentation on water quality concerns and basic design and installation of rain gardens. Approximately 15 individuals attended the workshop. Photos and other related documentation can be found in **Appendix E** on the Busseron Final Report CD.

In the spring of 2012 (3/10/12) a very large presentation on Rain Garden design was conducted for the Wabash Master Gardeners. Approximately 175 individuals were in attendance. This event was structured in a similar manner to the workshop conducted in 2011.

- Conduct a field day showcasing the demonstration project (Task D).

Due to the controversy associated with the construction of the INDOT Two-Stage Ditch, it was decided that a field day to showcase the project could serve to inadvertently agitate some of the associated individuals. Instead, it was decided to plan a low-key presentation for interested

individuals, in an attempt to share information in a way that would benefit future projects of a similar nature.

During planning, however, it was discovered that the primary INDOT representative had retired. Her replacement was invited to attend this event, but never responded. Other formerly interested parties declined to participate in the event, as well. In the end, a comprehensive summary and final 'wrap-up' was presented to the Gill Township Levee Association at their Annual Meeting on 8/7/14. A large demonstration sign was erected at the site of the two-stage ditch. This sign is publicly visible to all who drive by the site.

- Update municipal organizations such as County Council, County Commissioners, and the Conservancy District three times.

Municipal organizations were directly addressed on a regular basis. Listed below is a summary of occurrences.

- 1/6/11 Greene County SWCD Board meeting
- 8/15/11 Sullivan Co. Commissioner update
- 8/23/11 Sullivan Co. Commissioner update
- 4/23/13 Sullivan County Council update
- 4/26/13 Gill Township Levee Association update
- 8/22/13 Gill Township Levee Association Annual Meeting update
- 8/27/13 Sullivan County Council Budget Hearing update
- 11/18/13 Sullivan County Commissioner update

- Conduct at least one workshop for teachers using the "Outdoor Classrooms" program.

The DNR program, Project W.E.T. was an ideal choice for providing a workshop specifically tailored for local teachers and educators. The Northeast School Corporation in Sullivan County was particularly supportive when it came to the promotion and hosting of this event on the afternoons of May 13th and 14th (2014).

The free, two-day workshop was held at Hymera Elementary school, with refreshments being provided by the school. Warren Gartner was the instructor for a total of 18 local teachers and educators who reported the workshop to be very beneficial.

- Create and maintain a database of volunteers, partners, and potential donors.

The free software called Plaxo (www.plaxo.com) was used for this purpose. Existing contacts were synced into the program from Outlook and updated accordingly. This software requires login information which has been shared with the Sullivan SWCD Coordinator/Educator. New contacts can be easily added to this list, sorted into groups, and edited quickly. Group emails can be sent efficiently using this software. In **Appendix E** on the Final Report CD, there is a screen-capture photo of this software's interface.

- Track the number of attendees at all field days and workshops.

It is difficult to estimate the exact number of individuals affected by the Busseron 319 grant, but it would be safe to assume that thousands of people have been reached in one way or another, whether through local newspapers and radio, the WCIWA website, annual meetings and planter

clinics, E-newsletters, Ag Day and 4-H Fair booths, field days, or word-of-mouth through producers. By referring to the list of attendees for events (above) in which WCIWA participated, planned, or contributed in some way, an estimate can be achieved. Excluding all manner of electronic or printed media, it can be assumed that at least 4,537 individuals came into direct contact with the Busseron 319 Implementation project on some level.

- Submit two electronic copies of all products to IDEM.

This Final Report as well as all supporting documentation for the Busseron 319 Implementation project will be stored on a CD. Two copies of this CD were provided to the State at the close of this project.

Task F: Reporting

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

A total of 17 Progress Reports were submitted during the course of the Busseron 319 Implementation project. A minimum of 16 Progress Reports were required. Copies of all Progress Reports can be found in **Appendix F** on the Final Report CD.

- December 18, 2010 – April 17, 2011
- April 18, 2011 – June 30, 2011
- July 1, 2011 – July 31, 2011
- August 1, 2011 – August 31, 2011
- September 1, 2011 – December 15, 2011
- December 16, 2011 – April 20, 2012
- April 21, 2012 – July 15, 2012
- July 16, 2012 – October 15, 2012
- October 16, 2012 – January 30, 2013
- January 30, 2013 – April 15, 2013
- April 15, 2013 – May 21, 2013
- May 22, 2013 – June 25, 2013
- June 26, 2013 – September 15, 2013
- September 16, 2013 – January 3, 2014
- January 4, 2014 – April 17, 2014
- April 18, 2014 – August 28, 2014
- August 29, 2014 – November 23, 2014

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

The Busseron 319 Implementation project Final Report and all supporting documentation was submitted to the State on two CDs.

Discussion of Monitoring Results

A large quantity of data was collected for the Busseron 319 Implementation project despite some changes to the program from unforeseeable circumstances, such as a severe drought in 2012 and an inability to continue monitoring in 2014 due to deficient funds.

When coupled with the data collected for the IDEM TMDL study of the Busseron watershed along with the testing that occurred as a part of the Busseron 319 Planning and Implementation project (A305-7-187) there is a tremendous amount of material to analyze. Ultimately, it should be emphasized that it is unrealistic to analyze large amounts of data during implementation in order to obtain 'real-time' BMP prioritization. Since data analysis cannot be used at this time for further BMP Implementation, it will be necessary to revisit it in the future if implementation continues in the Busseron watershed. It is recommended that this collected data be further analyzed before new projects commence in the Busseron watershed. For the purposes of this report, the monitoring results will be briefly highlighted and summarized.

All collected data can be found in **Appendix C** on the Busseron Final Report CD. In addition, pertinent data sets have been singled-out and organized to show impairments in red. These documents can also be found in **Appendix C** on the Busseron Final Report CD. Information regarding the collection methods and sampling events can be found on page 9 of this report.

The Busseron watershed has a number of known impairments and water quality concerns which are thoroughly discussed in the Busseron Watershed Management Plan. Primary concerns that were to be addressed through the implementation of BMPs included Sediment, Nutrients (measured in the form of Nitrate/Nitrite and Total Phosphorus), and E.coli (to what degree it could be reduced through the 319 program). A unique concern of the Busseron watershed involves the detrimental effects to water quality as a result of abandoned minelands, which are quite prevalent in this region. At certain monitoring sites, excessively low pH data was collected and macroinvertebrate scores were found to be extremely poor (sometimes no living creature could be collected).

Notably, there are still many documented impairments throughout the Busseron watershed. Below is a brief summary of some of the results. This data indicates the degree to which the streams in the Busseron watershed still exhibit high pollutant concentrations. A total of 47 sites were regularly monitored from 2011-2014, resulting in the collection of over 400 samples that were analyzed for a number of parameters, including E.coli, NO_2, NO_3, Total Phosphorus, TSS (Total Suspended Solids), Temperature, pH, Dissolved Oxygen, Flow, TDS (Total Dissolved Solids), Turbidity, Salinity, and Specific Conductivity.

Parameter	# of Samples Collected	# of Samples Exceeding WQT*	Total % of Impaired Samples
E.coli	406	167 (over 235 cfu/100ml)	41%
NO_2, NO_3	407	100 (over 2.0 mg/L)	25%
Total P	407	99 (over 0.2 mg/L)	24%
TSS	407	87 (over 25.0 mg/L)	21%
pH	415	217 (below 7.5)	52%

*WQT = Water Quality Targets (based on general EPA/IDEM guidelines)

The data represented above represents concentration only, but it is obvious that many sites consistently exceed the quality targets for healthy water. In fact, many of the samples exceeded the water quality targets by alarming proportions on a regular basis. The details of this data can be viewed in a summarized format in **Appendix C** of the Busseron Final Report CD and in full, intricate detail in the IDEM Spreadsheet, also in **Appendix C**. Indeed, if further analysis were conducted, the exact loads of pollutants discharged annually at each site could be better grasped. It is, however, sufficient evidence to allow one to perceive that the Busseron watershed stands to benefit greatly from the continued promotion and implementation of BMPs.

Though no significant reductions in pollutant concentrations could be detected from the monitoring results obtained through this study, the WCIWA is optimistic that the considerable amount of conservation work and promotion that was conducted in the Busseron watershed will yield measurable results in the future. It is speculated that water monitoring would need to be conducted in the future to better determine the effects these BMPs have had on water quality. Many producers have adopted new methods and strategies for implementing conservation on their farms through the back-to-back Busseron 319 programs. The numerous BMPs, workshops, field days, and cost-share opportunities will serve to influence producers to continue utilizing conservation practices for years to come.

Public Participation and Partnerships

The Busseron 319 Implementation program celebrated a successful outcome chiefly because of the dedication and commitment of those involved. Led by a motivated Technical and Advisory Committee, the project was highly-promoted through well-organized and well-attended field days and events. Many beneficial partnerships were forged as a result of the Busseron 319 Implementation project including Peabody Coal, Hoosier Energy, The Nature Conservancy, Wildlife, Land and Resource Management L.L.C., Sullivan County Highway Department, Sycamore Trails RC&D, INDOT, The Gill Township Levee Association, IDNR Division of Reclamation, E.C. Labs, Sullivan County Park and Lake, neighboring SWCDs (Clay, Greene, Vigo, Knox). 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 help advocate 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, Carrie Green, for her efficient administration skills and careful scrutiny of the finances.

One major credit to the Busseron 319 Implementation program is the fact that the Match requirement was not only fulfilled, but exceeded! Indeed, the match requirement was $377,050 and the final total reached $449,190.02, exceeding the goal by $72,140.02! This is a true testament to the commitment of local partners, producers, and volunteers.

Successes, Challenges, and Lessons Learned

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

- Exceeded match requirement by $72,140.02
- Large quantity of BMPs installed
- Large load reductions achieved
- Strong Advisory Committee involvement and overwhelming local interest
- Overwhelming interest and participation from landowners and producers
- Cultivated avid interest in new BMPs such as cover crops
- Collected a large amount of monitoring data from 2011-2014
- Other conservation efforts including:
    - $24,000 LARE grant for better ditch design
    - Clean Water Indiana funding for cover crops on reclaimed minelands
    - Involvement in Prime Farmlands Team and AML committee (Sycamore Trails RC&D)
    - On Farm Network group
    - Continued promotion of CREP and NRCS/FSA programs
    - Peabody donations for Outdoor Lab projects in local schools

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

- Transition between Watershed Coordinators halfway through the project can prove difficult; up-to-date record keeping and budget scrutiny are very important.
- Communication regarding out-of-the-norm practices is imperative if practices are to be executed correctly. (i.e. Two Stage ditch, bioswale)
- Too much funding was spent at the beginning of the grant, making it necessary to retool the budget in the final years in order to accomplish all objectives successfully.
- Time consuming, lower priority tasks (i.e. newsletter, website) were difficult to maintain in the midst of higher priorities, such as BMP implementation. Better prioritization of tasks and objectives should be considered.
- Side-ventures sometimes take away from the 319 goals instead of offering benefits in the form of match, partnerships, etc. The Watershed Coordinator must take care to focus on 319 objectives before 'branching out' into other conservation areas of interest.

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. The watershed group had literally outgrown the Busseron watershed alone and a more encompassing title for the group was adopted. In recent years, the WCIWA has expanded the 319 program into the Turman Creek, Turtle Creek, and Kelley Bayou watersheds. The Sullivan County SWCD continues to act as the backbone of the organization, overseeing the completion of required tasks and handling all expenditures. The WCIWA continues to look for opportunities to promote conservation in the region and anticipates returning to the Busseron watershed in the future for further implementation.