

V. Goals and Action Items

A number of goals have been identified throughout the planning process, based on the concerns and subsequent watershed assessment. Water quality monitoring results, historical water quality and fisheries data, soil types, land use and zoning information were presented at stakeholder meetings along with potential measures to reduce pollutants. Stakeholders were included in the selection and development of the goals and action items for reduction of non-point source pollution. This section itemizes the goals along with proposed action items by which to achieve the goals.

Goal #1: Reduce E. Coli, Nitrates, and Total Suspended Solids (TSS) in Rhineheart Lateral

The Rhineheart Lateral at the Indiana – Michigan State Line exhibited very high levels of *E. Coli* during the sampling events conducted for this Watershed Management Plan. The water quality samples gathered at this site also exhibited higher levels of nitrates and TSS than the other five (5) sampling locations. The existing condition average concentrations are shown below:

Rhineheart Lateral – Existing Condition

<i>Parameter</i>	<i>Wet Weather Average Concentration</i>	<i>Dry Weather Average Concentration</i>	<i>Annual Loading</i>
<i>E. Coli</i>	16,200 col/100 mls	2,050 col/100 mls	1.1xE14 cols
Nitrates	1.44 mg/L	0.57 mg/L	3,300 lb.
TSS	29.5 mg/L	83.5 mg/L	133,000 lb.

Action Items:

- *Identify Specific Source(s) of Contamination*

The sampling results in Rhineheart Lateral indicate high levels of *E. Coli*, suggesting either contamination from septic systems, wildlife or livestock contamination or runoff from agricultural land use. A system of dye testing any homes in Michigan that are adjacent to Rhineheart Lateral should be conducted to identify the specific source of the contaminants if it is determined that the contamination source is from a septic system. It is conceivable that the source or sources may be some distance from the Rhineheart Lateral sampling site, and is transported through agricultural field tiles. The Elkhart County Health Department would need to coordinate with the Cass County (Michigan) Health Department in order to identify the source(s) of the contamination.

- *Eliminate Source(s) of Contamination*

Since the Rhineheart Lateral sampling site is located at the Indiana – Michigan state line, the Elkhart County Health Department would need to coordinate with the Cass County (Michigan) Health Department in order to eliminate the source of the contamination. The two (2) respective Health Departments could work with the property owner(s) to rectify the situation. If public sewer is available and the source is determined to be from a failing septic system, the failing system should be connected to a public sewer. In areas with high concentrations of failing systems, other alternatives to providing wastewater treatment should be explored (see Goal #4).

- Explore Funding Source(s) To Eliminate Septic Waste

Typically, property owners fund repair to their septic systems. However, if it is determined that the source of the *E. Coli* contamination in Rhineheart Lateral is due to a failing septic system, the Michigan State Revolving Fund (SRF) may be a potential source of funding to help assist Cass County in the elimination of failing on-site wastewater systems. The SRF does not provide funding to individual homeowners for the correction of their systems, but it does provide funding to municipalities for construction of sewage treatment works.

The cost to repair or replace a septic system can vary from \$2,000-\$12,000+ per system depending on site specific conditions.

Indicators of Success:

There are several indicators of progress associated with Goal #1 including:

- Identification of source or sources of contamination.
- Coordination with property owner or owners to develop a plan to remedy failing septic system or systems.
- Completion of septic system repair/replacement or connection to public sewer.
- Reduced *E. Coli*, nitrates, MBAS (surfactants) and TSS concentrations in Rhineheart Lateral. The levels of *E. Coli* during the sampling were extremely high in Rhineheart Lateral and the nitrate and TSS levels were higher than the sampling results at the other five (5) sampling locations that were monitored as part of this Watershed Management Plan. The actual source of the contamination is not clear. The source of the waste may be originating from a number of residences or just one residence or it may be a result of agricultural runoff. Once the source of the contamination is identified, an actual reduction in pollutant loading can be estimated. Target concentrations for Rhineheart Lateral are given below:

Rhineheart Lateral – Target Condition

<i>Parameter</i>	<i>Wet Weather Average Concentration</i>	<i>Dry Weather Average Concentration</i>	<i>Target Annual Average Concentration</i>	<i>Target Annual Load</i>
<i>E. Coli</i>	<1,620 col/100 mls (90% Reduction)	<235 col/100 mls (State Standard)	<800 col/100 mls (93% Reduction)	1.03xE13 cols.
TSS	<2 mg/L	<0.5 mg/L	<2 mg/L	5,690 lb.
MBAS	0.1 mg/L	0.1 mg/L	0.1 mg/L	285 lb.

While the near term goals are stated in the above table, the long term goal for *E. Coli* shall be to reduce the concentrations to levels at or below water quality standards.

The nitrate levels in Rhineheart Lateral are less than the state standard of 10 mg/L, but this area should be monitored as it consistently had the highest level of nitrates of any of the six (6) water quality sampling locations.

Repair/replacement of failing septic systems will have a positive effect on water quality, but the actual reduction in loading is somewhat dependent on the level of septic system failure and on how much pollutant enters the surface water. An annual pollutant loading reduction for TSS, ammonia and phosphorus per system repaired or replaced is as follows:

Domestic TSS Contribution from Septic Tank Effluent: 0.08 lb./cap/day*
Persons per household: 2.5
TSS reduction per system repair = 0.08 lb./cap/day x 2.5 persons x 365 days per year
= 73 lb/year

Ammonia Contribution from Septic Tank Effluent: 0.01 lb./cap/day**
Persons per household: 2.5
NH4-N reduction per system repair = 0.01 lb./cap/day x 2.5 persons x 365 days/year
= 9 lb./year

Phosphorus Contribution from Septic Tank Effluent: 0.006 lb./cap/day***
Persons per household: 2.5
Total P reduction per system repair = 0.006 lb./cap/day x 2.5 persons x 365 days/year
= 5.5 lb./year

* TSS loading based on average contribution of 0.2 lb./cap/day, 60% removal in septic tank.

** Ammonia loading based on average domestic wastewater strength of 15 mg/L, 80 gal/cap/day and no removal in septic tank.

*** Phosphorus loading based on average domestic wastewater strength of 10 mg/L, 80 gal/cap/day and 10% removal in septic tank.

E. Coli reduction is not calculated, as its concentrations vary significantly based on the length of time it can survive out of its host.

Timeframe:

It is anticipated that the identification of the contamination source and subsequent elimination can be completed within two to three years.

Goal #2: Reduce Surfactants and Suspected Septic Contamination in Mather Ditch

Mather Ditch exhibited high levels of surfactants during the water quality sampling portion of this study.

Action Items:

- Identify Specific Source(s) of Septic Waste

The sampling results in Mather Ditch indicate high levels of surfactants, suggesting contamination from septic systems or household floor drains. The contamination may be a result of a failing on-site wastewater system or an illicit discharge. A system of dye testing the homes that are adjacent to Mather Ditch should be conducted to identify the specific source of the contaminants. It is conceivable that the source or sources may be some distance from the Mather Ditch sampling site, and thus is transported through field tiles. The Elkhart County Health Department can conduct these studies as part of their ongoing septic system program.

- Eliminate Source(s) of Septic Waste

Once the specific source(s) is found, the Elkhart County Health Department will work with the property owner to rectify the situation. The failing system should be connected to a public sewer, if available. In areas with high concentrations of failing systems, other alternatives to providing wastewater treatment should be explored.

The cost to repair or replace a septic system can vary from \$2,000-\$12,000+ per system depending on site specific conditions.

- Explore Funding Source(s) to Eliminate Septic Waste

Typically, property owners fund repair to their septic systems. However, the Indiana Department of Environmental Management State Revolving Fund Program is initiating a program to provide financial assistance for nonpoint source projects. Failing septic systems is one nonpoint source of pollution that IDEM envisions funding. Funding is available to cities, towns, counties, townships, non-profit organizations, regional water, sewer or waste districts or conservancy districts. Funding is available as a low interest loan (below market rates) for typically a 20-year period. While these funds are not directly available to the individual homeowner, a separate entity could apply for the funds and administer the funds as appropriate.

Indicators of Success:

There are several indicators of progress associates with Goal #2 including:

- Identification of source or sources of contamination.
- Coordination with property owner or owners to develop a plan to remedy a failing septic system or systems or to eliminate an illicit discharge.
- Completion of septic system repair/replacement or connection to public sewer.

- Reduced surfactant levels in Mather Ditch. Due to the presence of surfactants, the source of contamination is of a domestic nature but the actual source (any particular home(s)) is not clear. The source may be originating from a number of residences or one residence. Once the source of the flows is identified, a reduction in surfactant loading may occur. The target concentration of surfactants should be less than 0.1 mg/L during both wet and dry weather. Existing and target MBAS levels are shown below:

Mather Ditch – MBAS (Surfactants)

<i>Parameter</i>	<i>Wet Weather Average Concentration</i>	<i>Dry Weather Average Concentration</i>	<i>Annual Loading</i>
Existing Condition MBAS	10 mg/L	0.15 mg/L	35,500 lb/yr
Target Condition MBAS	0.1 mg/L	0.1 mg/L	680 lb/yr

- Reduced TSS, *E. Coli*, phosphorus and nitrogen concentrations.

Repair/replacement of failing septic systems will have a positive effect on water quality, but the actual reduction in loading is somewhat dependent on the level of septic system failure and on how much pollutant enters the surface water. An annual pollutant loading reduction for TSS, ammonia and phosphorus per system repaired or replaced is as follows:

Domestic TSS Contribution from Septic Tank Effluent: 0.08 lb/cap/day*
 Persons per household: 2.5
 TSS reduction per system repair = 0.08 lb/cap/day x 2.5 persons x 365 days per year
 = 73 lb/year

Ammonia Contribution from Septic Tank Effluent: 0.01 lb/cap/day**
 Persons per household: 2.5
 NH4-N reduction per system repair = 0.01 lb/cap/day x 2.5 persons x 365 days/year
 = 9 lb/year

Phosphorus Contribution from Septic Tank Effluent: 0.006 lb/cap/day***
 Persons per household: 2.5
 Total P reduction per system repair = 0.006 lb/cap/day x 2.5 persons x 365 days/year
 = 5.5 lb/year

* TSS loading based on average contribution of 0.2 lb/cap/day, 60% removal in septic tank.

** Ammonia loading based on average domestic wastewater strength of 15 mg/L, 80 gal/cap/day and no removal in septic tank.

*** Phosphorus loading based on average domestic wastewater strength of 10 mg/L, 80 gal/cap/day and 10% removal in septic tank.

E. Coli reduction is not calculated, as its concentrations vary significantly based on the length of time it can survive out of its host.

Timeframe:

It is anticipated that the identification of the contamination source and subsequent elimination can be completed within one to two years.

Goal #3: Increase Dissolved Oxygen (DO) levels in Kindig/Kellog Ditch and Bishop Ditch

Kindig/Kellog Ditch and Bishop Ditch exhibited low levels of dissolved oxygen during the water quality sampling phase of this Watershed Management Plan. Dissolved oxygen is an indicator of the waterbody's ability to support aquatic life.

Action Items:

- Identify Specific Source of Contamination

The sampling results in Kindig/Kellog Ditch and Bishop Ditch indicated low levels of DO. Kindig/Kellog Ditch drains directly to Bishop Ditch which in turn drains to Heaton Lake. The water in these two (2) ditches at the sampling locations was fairly stagnant which may be a contributor to the low DO concentrations. Organic matter may be decomposing in these areas and thus contributing to the low DO readings. The DO levels can fluctuate under normal conditions but consistently low levels may be an indicator of biodegradable organic materials being introduced to the surface waters by human activities.

- Eliminate Source of Contamination

Once the contamination source has been identified, if it has been determined that organic materials are being introduced to the ditches by human activities, the Elkhart County Health Department will work with the property owner to rectify the situation.

Indicators of Success:

There are several indicators of success associated with Goal #3 including:

- Identification of source or sources of contamination.
- Coordination with property owner or owners to develop a plan to eliminate the contamination contributing to the low DO levels in Kindig/Kellog Ditch and Bishop Ditch.
- Increased DO levels in Kindig/Kellog Ditch and Bishop Ditch.

Timeframe:

It is anticipated that the identification of the contamination source and subsequent elimination can be completed within one to two years.

Goal #4: Explore Methods to Plan, Construct, Operate, Maintain and Finance Public Wastewater Systems

Outside of the municipalities in the area, public wastewater utilities are limited to Conservancy Districts which cover a limited geographic region. Therefore, communities that may have need of an alternative method (to on-site systems) for treating and disposing of their wastewater have limited abilities to provide such alternative methods. At this time, the County Health Department is able to assist the homeowners on a case by case basis. However, there are some areas where a public system (alternative or conventional) may be a more permanent and economically feasible option. Elkhart County has formed a Regional Sewer District. This provides a means for unincorporated communities within the County to plan, construct, operate, maintain and finance public wastewater systems.

The initial evaluation should be in terms of an identified community that is in need of a public wastewater system. This would provide a pilot project for Elkhart County to address other areas in the future.

Action Items:

- Evaluate Options with Regional Sewer District

The increased development within the watershed as well as other areas in Elkhart County is a stress on the water quality of both surface and ground water sources. The Puterbaugh Creek – Heaton Lake Watershed has soil characteristics such that the capacity for on-site disposal systems is limited. In many cases, specialized systems such as mound systems are required. These systems are quite costly to the individual homeowner. With respect to the Puterbaugh Creek – Heaton Lake Watershed, the evaluation would most likely be limited to the opportunities for expansion of existing systems (City of Elkhart, Heaton Lake) due to its close proximity and the design limitations of existing infrastructure. The community around Heaton Lake is currently working with the Regional Sewer District to provide a public wastewater system. Currently the District is exploring funding sources for project construction. The planning and design phases for the Heaton Lake Project are complete.

- Discuss Options with Adjacent Public Sewer Systems of the City of Elkhart

The City of Elkhart sewer service area includes a small portion of the Puterbaugh Creek – Heaton Lake Watershed. Discussions with the City of Elkhart on the potential to expand their service area to minimize nonpoint source pollution due to failing septic systems should be initiated.

- Explore Funding Sources

There are several funding sources available to the County or other public agencies for planning, construction, operation and maintenance of a public sewer system. The types of funding available depend on the type of entity that is operating the system. Grant and loan funds are also available; typically, on a competitive basis. Grant and loan funds include but are not limited to SRF Funding and USDA Rural Community Assistance Program.

Indicators of Success:

The primary indicator of success for this goal is the identification of a preferred method to plan, finance, construct, operate and maintain a public wastewater system.

Timeframe:

The evaluation of options with the Regional Sewer District as well as discussions with adjacent public sewer systems and exploring funding sources should be conducted as the need arises.

Goal #5: Eliminate Direct Discharges of Septic Tank Effluent

The sampling conducted as part of the 205(j) Grant Project indicated that there are both increasing and decreasing levels of pollutant concentration as you travel downstream from one sample location to the next during both wet and dry weather events indicating that there are sources of waste that are highly variable. Factors that influence the concentrations include the intensity of the rain events, and groundwater levels. For example, in times of a seasonally high water table, a marginally operating septic system may be impacting the surface waters. In any case, there are portions of the various creeks within the watershed that appear to contain sources of human and/or animal wastes. The following table summarizes the wet and dry weather average concentrations of various water quality parameters at the Indiana – Michigan State Line (Rhineheart Lateral), the most upstream point in the watershed and at Bristol Street (Puterbaugh Creek), the most downstream sampling point in the watershed.

**State Line Road (Rhineheart Lateral, Site 1)
and
Bristol Street (Puterbaugh Creek, Site 6) – Existing Conditions**

<i>Parameter</i>	<i>Wet Weather Average Concentration</i>	<i>Dry Weather Average Concentration</i>
<i>E. Coli</i> State Line Road	16,200 col/100 mls	2,050 col/100 mls
<i>E. Coli</i> Bristol Street	2,250 col/100 mls	350 col/100 mls
TSS State Line Road	30 mg/L	84 mg/L
TSS Bristol Street	2 mg/L	8 mg/L
Nitrates State Line Road	1.44 mg/L	0.57 mg/L
Nitrates Bristol Street	0.15 mg/L	0.18 mg/L

Action Items:

- Continue to Monitor E. Coli Levels in Puterbaugh Creek and its Tributaries for Source(s) of Contamination

E. Coli measured during the Elkhart County 205(j) Grant Project sampling exceeded the standard of 235 col/100 mls maximum daily concentration in all but one sample during wet weather events. The Elkhart County Health Department should monitor these areas, if possible, and continue to sample for *E. Coli* in Heaton Lake.

The estimated cost of a monitoring event is \$400 per monitoring site.

- Conduct a Sanitary Survey of Puterbaugh Creek and its Tributaries

A sanitary survey should be completed to generate a comprehensive inventory of outfalls discharging to Puterbaugh Creek and its tributaries. The survey areas should be prioritized such that the tributaries identified as critical areas (Mather Ditch, Rhineheart Lateral, Kindig/Kellog Ditch and Bishop Ditch) are surveyed first.

This activity should be coordinated with the Elkhart County Health Department, the Elkhart County Surveyor's Office, and the City of Elkhart. Additionally, surveys along the Rhineheart Lateral would need to be conducted in cooperation with the Cass County (Michigan) Health Department. This action is also required within the MS4 Urban Areas as part of the NPDES Phase II Stormwater Rules, and IDEM Rule 13.

- Dye Testing to Identify Source(s) of Septic Tank Effluent

Once specific areas of potential septic contamination are identified, a program of dye testing should be conducted to identify which homes or businesses may be contributing to the contamination.

- Eliminate Source(s) of Septic Waste

Once the specific source(s) is found, the Elkhart County Health Department will work with the property owner(s) to rectify the situation. The failing system should be connected to a public sewer, if available. In areas with high concentrations of failing systems, other alternatives to providing wastewater treatment should be explored (see also Goal #4).

- Explore Funding Source(s) to Eliminate Septic Waste

Typically, property owners fund repair to their septic systems. However, the Indiana Department of Environmental Management State Revolving Fund Program is initiating a program to provide financial assistance for nonpoint source projects. Failing septic systems is one nonpoint source of pollution that IDEM envisions funding. Funding is available to cities, towns, counties, townships, non-profit organizations, regional water, sewer or waste districts or conservancy districts. Funding is available as a low interest loan (below market rates) for typically a 20-year period. While these funds are not directly available to the individual homeowner, a separate entity could apply for the funds and administer the funds as appropriate.

Indicators of Success:

There are several indicators of progress associated with Goal #5 including:

- Collection of additional water quality data.
- Identification of source or sources of contamination.
- Coordination with property owner or owners to develop a plan to remedy failing septic system or systems.
- Completion of septic system repair/replacement or connection to public sewer.
- Reduced *E. Coli*, nitrogen, TSS, phosphorus, and MBAS (surfactants) concentrations in Puterbaugh Creek and its tributaries.

The specific source(s) of *E. Coli*, TSS, nutrients and MBAS are not known at this time, so the exact total target reduction due to Goal #5 alone cannot be determined. However, reasonable reduction targets associated with all action items for the watershed are listed in the following table:

Puterbaugh Creek and Tributaries Target Conditions

<i>Parameter</i>	<i>Wet Weather Average Concentration</i>	<i>Dry Weather Average Concentration</i>	<i>Annual Average Concentration*</i>	<i>Target Annual Loading*</i>
<i>E. Coli</i>	Reduce 30%	Reduce 20%	975 col/100 mls (25% Reduction)	1.4xE14 col/yr
MBAS	<0.1 mg/L	<0.1 mg/L	0.1 mg/L	3,250 lb/yr
TSS	Reduce 30%	Reduce 20%	4 mg/L (25% reduction)	134,000 lb/yr
Nitrates	Reduce 30%	Reduce 20%	0.13 mg/L (25% reduction)	4,080 lb/yr

* Based on Sample Site 6.

While the near term goals are stated in the above table, the long term goal for E.Coli shall be to reduce the concentrations to levels at or below water quality standards.

Repair/replacement of failing septic systems will have a positive effect on water quality, but the actual reduction in loading is somewhat dependent on the level of septic system failure and on how much pollutant enters the surface water. An annual pollutant loading reduction for TSS, ammonia and phosphorus per system repaired or replaced is as follows:

Domestic TSS Contribution from Septic Tank Effluent: 0.08 lb/cap/day*
 Persons per household: 2.5
 TSS reduction per system repair = 0.08 lb/cap/day x 2.5 persons x 365 days per year
 = 73 lb/year

Ammonia Contribution from Septic Tank Effluent: 0.01 lb/cap/day**
 Persons per household: 2.5
 NH4-N reduction per system repair = 0.01 lb/cap/day x 2.5 persons x 365 days/year
 = 9 lb/year

Phosphorus Contribution from Septic Tank Effluent: 0.006 lb/cap/day***
Persons per household: 2.5
Total P reduction per system repair = 0.006 lb/cap/day x 2.5 persons x 365 days/year
= 5.5 lb/year

- * TSS loading based on average contribution of 0.2 lb/cap/day, 60% removal in septic tank.
- ** Ammonia loading based on average domestic wastewater strength of 15 mg/L, 80 gal/cap/day and no removal in septic tank.
- *** Phosphorus loading based on average domestic wastewater strength of 10 mg/L, 80 gal/cap/day and 10% removal in septic tank.

E. Coli reduction is not calculated, as its concentrations vary significantly based on the length of time it can survive out of its host.

Timeframe:

The collection of additional water quality data should be an on-going activity to monitor the watershed for new concerns and identify specific sources as well as to verify the results of the efforts to eliminate pollutant sources. However, once an area of concern is identified, the area should be investigated within one year to identify the specific source. Once source(s) of contamination are identified, it is anticipated that it may take 1 to 2-years to remove the contamination.

Exploring funding sources should be initiated within one year. However, this activity should be on-going as the amount and types of funding available vary from year to year as well as the requirements to qualify for such funding.

Completion of the sanitary survey for Puterbaugh and its tributaries should take place within 5-years.

Goal #6: Discourage Medium to High Density Development Requiring On-Site Wastewater Systems where the Soils are not Adequate to Treat the Septic Effluent in Order to Protect Surface Waters and Groundwater

Currently, new subdivisions and developments are reviewed by the Planning Commission for approval. The developments must meet the requirements of the current subdivision and planning ordinances. Any new on-site systems also must be permitted by the Elkhart County Health Department and meet State Standards.

Action Items:

- Review existing ordinances and policies, and revise as-needed, with respect to existing subdivision and zoning regulations.
- Review Watershed Management Plan with Planning Commission to demonstrate issues with on-site wastewater treatment systems in limiting soils.
- Participate with Planning Commission on zoning issues.

Indicators of Success:

- Monitor number, location and type of septic system permits. Compare permit locations with zoning and land use plans.
- With respect to water quality in Puterbaugh Creek and its tributaries, the target for this goal is to see no increase in *E. Coli*, NH₃-N or TDS due to new development.

Timeframe:

The timeframe for this goal is to review the existing ordinances and policies and revise as needed within 1-year. Attention to planned development with respect to appropriate uses and protecting water quality should be an on-going activity.

Goal #7: Use the Puterbaugh Creek – Heaton Lake Watershed Management Plan as a Template to Address E. Coli in Other Elkhart County Watersheds

As identified during the Elkhart County Commissioner’s 319 Grant Project for the Yellow Creek (lower) Watershed Management Plan, there are several watersheds within Elkhart County that currently experience high *E. Coli* levels due to either development or agricultural practices.

Action Items:

- Continued Sampling by the Elkhart County Health Department to identify areas of water quality impairment.
- Develop a Watershed Management Plan(s) for other areas. The estimated cost of developing a Watershed Management Plan of similar scope and detail as this plan is \$60,000-\$80,000.
- Develop a program of sanitary surveys for the entire County.
- Explore methods for funding Watershed Management Plans and Water Quality Improvement Projects. Grant funding sources include IDEM 205(j) Grants and IDEM 319 Grants.

Indicators of Success:

Indicators of success for this goal include the development and implementation of Watershed Management Plans for other impaired watersheds.

Timeframe:

The water quality investigations conducted by the Elkhart County Health Department are an on-going activity to monitor watersheds and identify areas of concern. The initiation of a Watershed Planning Project in another Elkhart County Watershed should occur within 5-years.

Goal #8: Continue to Educate Residents of On-Site Wastewater Systems

Action Items:

- Distribute education information at appropriate locations and events. Educational information can be distributed at public locations such as County Buildings, Public Libraries and at Public Meetings addressing water quality. The Elkhart County Fair is also a good location for distribution of these educational materials.
- Continue to educate public through the investigation of failing septic systems.
- Collect educational materials from various sources (i.e. IDEM, USEPA, and National Small Flows Clearinghouse) for use and distribution within the watershed.
- Develop a web-page. The estimated cost for this activity is \$1,000.

Indicators of Success:

- Web page development.
- Tally events and locations educational information is distributed.
- While providing educational and information opportunities regarding on-site systems does not have a direct effect on water quality in the short term, the long term goal is to increase awareness and better on-site system operation and maintenance resulting in decreased nutrients, *E. Coli* and TDS to the surface waters.

Timeframe:

Goal #8 is an on-going process to increase awareness and promote good management practices for residences and commercial establishments with on-site disposal systems. This goal should be initiated within 1-year.

Goal #9: Continue an Education Program on Water Quality and Management Practices to Reduce Contaminants to Surface Waters

Action Items:

- Encourage a science program within the local school systems to address water quality and watershed issues. The information provided in the Watershed Management Plan could be incorporated as well as a site visit to give a local tie to water quality. The Elkhart County Soil and Water Conservation District can provide educational training, materials and assistance to interested educators for a project, specifically through current programs such as “project wet” and “project wild”. The program should be structured such that the state science standards are met. Providing educational opportunities in the classroom not only informs a future generation, but also provides another avenue for information to be supplied to their parents.

- Recruit an individual or group (this could be a school classroom) to participate in the Hoosier River Watch Program to collect water samples for Puterbaugh Creek and its tributaries or Heaton Lake. The SWCD would also be involved in the training for water quality sampling in this program.
- Web-page. The estimated cost for this activity is \$1,000. This activity can be linked with Goal #8.
- The SWCD/NRCS incorporates their newsletter on a monthly basis into the local (Elkhart County) editions of the Farmer's Exchange Newspaper. An article(s) could be published on the Puterbaugh Creek – Heaton Lake Watershed Management Plan, as well as updates on the implementation of the plan.
- Newspaper articles on local water quality issues.
- Collect educational materials from various sources (i.e. IDEM, USEPA, IDNR, USDA, National Small Flows Clearinghouse) for use and distribution within the watershed.
- All forms of media (newspaper, radio, television and internet) are an avenue for continuing education.

Indicators of Success:

- Web page development.
- Tally events and locations educational information is distributed.
- Number of classrooms adopting watershed program as part of their science curriculum.
- Hoosier River Watch participation within the watershed.
- While providing educational and information opportunities regarding sound watershed practices does not have a direct effect on water quality in the short term, the long term goal is to have a positive effect on watershed management practices resulting in decreased nutrients, *E. Coli* and TDS to the surface waters.

Timeframe:

Goal #9 is an on-going process to increase awareness and promote a pro-active approach to watershed management by the citizens of the Puterbaugh Creek – Heaton Lake Watershed. The school science program, the collection of water quality samples, and the inclusion of water quality issues onto the web-page can occur within a 3-year period. The remaining action items can be considered on-going items.

Goal #10: Develop and Implement BMPs to Reduce Sources of Contaminants

Action Items:

- Agricultural BMPs:

A number of BMPs are appropriate to reduce sediment and pollutant load to surface waters. The two main BMPs to consider are Filter Strips and Crop Management Practices.

With respect to crop management, the following table provides existing (2002) conditions in Elkhart County, according to NRCS:

Existing Condition – Cropland Tillage Data

<i>Tillage Practice</i>	<i>2002 Cropland Tillage Data - Corn</i>	<i>2002 Cropland Tillage Data - Soybeans</i>
No Till – Any direct seeding system, including strip preparation, with minimal soil disturbance.	18%	39%
Mulch Till – Any tillage system leaving greater than 30% crop residue cover after planting, excluding no-till	10%	39%
Conventional – Any tillage system leaving less than 30% crop residue cover after planting.	71%	21%
Nonapplicable – Hay, CRP, fallow or other non-annually seeded crops.	1%	1%

Reference: www.in.nrcs.usda.gov

Increased conservation tillage is dependent on cooperation with the agricultural producers in the area and directly linked to the educational and informational efforts in Goal #9. Increases in conservation tillage practices are also a function of the funding sources available. However, a reasonable target for increased conservation tillage is a 5% increase over 5-years.

With respect to filter strips, approximately 100 acres on average are constructed in Elkhart County per year. A reasonable target for the Puterbaugh Creek – Heaton Lake Watershed is construction of 5 acres over 5-years.

Filter strip construction can range from \$13,000-\$30,000 per acre (depending if seed or sod is used). This cost does not include the land cost.

- Review County Subdivision and Roadway Standards, incorporate (if necessary) Best Management Practices (BMPs) to address erosion control for both construction and post construction cases.

BMPs to consider include silt fences, straw bales, catch basins, grassed swales, detention ponds and vegetative filter strips.

This action item is integral with the NPDES Stormwater Phase II Regulations (IDEM Rule 13) that affects a significant portion of the watershed.

- Explore funding sources for BMPs.

A number of funding sources are available to assist in implementation of BMPs. Several sources are described below:

LARE Funds (Lake and River Enhancement Program) – These funds are available for water quality project implementation when a diagnostic study has been completed for the watershed. The existing water quality sampling results can be augmented to meet the diagnostic study requirements, so that implementation funds can be applied for.

EQIP Funds (Environmental Quality Incentive Program) – These funds are cost sharing programs available to agricultural producers and can be used for filter strips and other agricultural BMPs. These funds are administered by the NRCS, and the amount of funds vary from year to year.

CRP Funds (Conservation Reserve Program) – These funds are cost sharing funds available to agricultural producers and can be used for Crop Management Practices.

IDEM 319 Grants – These funds are grant funds available for water quality improvement projects. There is a requirement for 25% cost sharing of cash or in-kind services with this grant program.

Indicators of Success:

- Tally BMPs implemented within watershed by type and date.
- Agricultural BMPs:

Increased conservation tillage and filter strips will result in decreased nutrient and solids loading to Puterbaugh Creek and its tributaries. The sediment, nutrient and phosphorus loading reductions can be estimated for the agricultural BMPs, once specific projects are identified. The reductions are typically based on contributing area, soil type and land use. The *Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual*, (MDEQ, June 1999) can be used to estimate pollutant loading reductions for each BMP implemented.

The *Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual* and pollutant load reduction estimate program was utilized to estimate reductions in soil loss, nitrogen and phosphorus due to the construction of filter strips and increasing conservation tillage practices in the watershed.

Assuming 5 acres of filter strips were constructed in an area of Gilford Soils (prime farmland) which are loamy sandy soils, the following load reductions are estimated:

Estimated Sediment Load Reduction = 7 ton/year
Estimated Phosphorus Load Reduction = 10 lb/year
Estimated Nitrogen Load Reduction = 18 lb/year

Using the target of increasing the conservation tillage by 5% in 5 years in the watershed, the load reduction in nutrients can also be estimated. The following assumptions were used to estimate the sediment, phosphorus and nitrogen load reductions:

- 124 Acres (5% of agricultural land-use)
- Soybeans
- Gilford soils (prime farmland)
- No-Till, 30% cover practice vs. conventional, fall plow

Based on the above assumptions, the following load reductions a due to increased conservation tillage practices are estimated:

Estimated Sediment Load Reduction = 125 tons/year
Estimated Phosphorus Load Reduction = 133 lb/year
Estimated Nitrogen Load Reduction = 266 lb/year

Soil reduction estimate worksheets are included in Appendix E. The actual reduction will be dependent on where the BMPs are applied.

The reduction in pollutants from other BMPs (i.e. manure management and exclusion fencing) are site specific; and, therefore, cannot be reasonably estimated until specific agricultural land areas are identified for increased conservation practices.

- Residential and Commercial BMPs:

The residential and commercial BMPs suggested are tied most specifically to new construction and future development. As such, they will not have a major impact on existing pollutant loads. However, inclusion of the BMPs in the development standards will minimize impacts of future development on water quality primarily with respect to nutrients, solids and quantity of flows.

- Estimate load reduction based on specific BMPs as they are implemented.

Timeframe:

Encouraging the implementation of BMPs should be an ongoing effort. With respect to specific BMPs, the following timeframes and targets are suggested:

- Conservation Tillage – Increase 5% in 5-years.
- Filterstrips – Construct 5 acres in 5-years.

Goal #11: Identify a Watershed Coordinator

Action Items:

- A number of water quality and wet weather issues exist within Elkhart County, including those outlined in the Puterbaugh Creek – Heaton Lake Watershed Management Plan and NPDES Stormwater Phase II. It may be appropriate to identify a watershed coordinator within the County or SWCD to oversee the implementation of this Management Plan as well as other water quality issues. The coordinator would provide water quality continuity throughout the County. In absence of a Watershed Coordinator, the Elkhart County Administrator will oversee the implementation of this Plan. It should be noted that Elkhart County currently has a position for an Urban Conservationist in the Soil and Water Conservation District Office. This position's primary responsibility would be the implementation of the requirements of IDEM's Rule 13 which addresses the new NPDES Stormwater Phase II regulations.
- Explore Funding Sources for a Watershed Coordinator. A logical funding source could be General County Revenues in conjunction with the SWCD.

Indicators of Success:

The indicator of success for this goal is to have a watershed coordinator for this Plan as well as other potential plans within the County.

Timeframe:

A watershed coordinator should be identified within 1 year.

Goal #12: Continue to Work Cooperatively with Other Watershed Groups within the St. Joseph River Basin

Action Items:

- Attend Joint Steering Committee Meetings.
- Present status updates on the implementation of the Watershed Management Plan at the Committee Meetings.

Indicators of Success:

The indicator of success is a log of meetings and watershed groups.