

Table 19: Strategies and Actions

Goal 1: Reduce soil erosion and sediment inputs into streams that result in a 1% reduction in 5 years.					
		Schedule			
Strategy	Action Item	2009-2010	2010-2012	2012-2019	Responsible Party
Reduce sediment loads from agricultural run-off	Work with NRCS, SWCDs, and county drainage boards to identify partners in the agricultural community and communication mechanisms	✓			BWCWA Committees, SWCDs, NRCS, ISDA, FSA, Drainage Boards
	Work with NRCS and SWCDs to increase cover crop practices, no-till practices, and grassed waterway locations		✓		BWCWA Coordinator, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Provide cost-share funding for education and demonstration projects		✓		BWCWA Committees and SWCDs
Reduce sediment loads from highly erodible areas	Work with NRCS and SWCD to identify areas with highly erodible soils and those areas impacted/eroded in flood events of 2008	✓			BWCWA Coordinator, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Work with NRCS and SWCD to target BMP installation to areas with highly erodible soils	✓			BWCWA Committees, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Identify steep grade changes in the streams and look for areas to implement floodplain improvements or high flow storage	✓			BWCWA Coordinator and SWCDs/NRCS/ISDA, possible consultant assistance

Table 19: Strategies and Actions (cont)

Goal 1: Reduce soil erosion and sediment inputs into streams that result in a 1% reduction in 5 years.					
Strategy	Action Item	Schedule			Responsible Party
		2009-2010	2010-2012	2012-2019	
Reduce sediment loads from floodplains and land adjacent to streams	Work with NRCS and SWCDs to identify areas with poor buffer widths adjacent to streams	✓			BWCWA Coordinator and SWCDs/NRCS/ISDA
	Target BMPs installation to floodplains and land adjacent to streams to help with bank stabilization and slow erosive flows		✓		BWCWA Committees, Coordinator, and SWCDs/NRCS/ISDA
Increase Rule 5 enforcement and improve SWPPP plan development and review	Get staff training in plan review and incentive or enforcement programs		✓		BWCWA Coordinator and SWCDs
	Identify partner that could help monitor and report any problem sites		✓		BWCWA Committees, Coordinator, and SWCDs
	Educate local contractors about Rule 5 and status of local water quality	✓			BWCWA Committees, Coordinator, and SWCDs

Table 19: Strategies and Actions (cont)

Goal 2: Reduce Total Phosphorus and Nitrate inputs by 20% in 5 years and Nitrate inputs by 40% in 10 years.					
Strategy	Action Item	Schedule			Responsible Party
		2009-2010	2010-2012	2012-2019	
Reduce nutrient loads from agricultural run-off	Work with NRCS, SWCDs, and county drainage boards to identify partners in the agricultural community and communication mechanisms	✓			BWCWA Committees, SWCDs, NRCS, ISDA, FSA, Drainage Boards
	Work with NRCS and SWCDs to educate agricultural landowners on fertilizer reduction and application timing practices	✓			BWCWA Committees, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Provide cost-share funding for education and demonstration projects		✓		BWCWA Committees, Coordinator, and SWCDs/NRCS/ISDA
	Work with NRCS and SWCDs to increase conservation tillage practices, buffers and nutrient management planning	✓			BWCWA Committees, Agricultural Liaison, and SWCDs/NRCS/ISDA
Reduce nutrient load by increasing riparian buffers/floodplain zones and wetland acreage	Work with NRCS, SWCDs, The Nature Conservancy, CILTI, and IDNR to identify suitable areas for restoration and partners		✓		BWCWA Committees, Coordinator, and conservation partners (CILTI, IDNR, TNC, SWCDs)
	Provide cost-share funding for buffers and wetland restoration and widely market the practices to appropriate landowners		✓		BWCWA Committees, Coordinator, and SWCDs/NRCS/ISDA

Table 19: Strategies and Actions (cont)

Goal 2: Reduce Total Phosphorus and Nitrate inputs by 20% in 5 years and Nitrate inputs by 40% in 10 years.					
		Schedule			
Strategy	Action Item	2009-2010	2010-2012	2012-2019	Responsible Party
Reduce nutrient load from suburban and urban runoff	Develop and deliver education and outreach programs regarding sustainable fertilizer use		✓		BWCWA Committees, Coordinator, and SWCDs
	Identify local partners including realtors, home improvement stores, and chemical applicators that can share messages and provide phosphorus free fertilizers	✓			BWCWA Committees, Coordinator, and SWCDs
	Provide cost-share funding for education and residential demonstration projects		✓		BWCWA Committees, Coordinator, and SWCDs

Table 19: Strategies and Actions (cont)

Goal 3: Reduce <i>E. coli</i> inputs such that all sample sites meet the State water quality standard of 235 cfu/100mL during base flow conditions and no more than 15% of the sites exceed the standard during storm flow conditions in 5 years. The long-term goal (10 years) is for all storm flow events to meet State water quality standards.					
		Schedule			
Strategy	Action Item	2009-2010	2010-2012	2012-2019	Responsible Party
Reduce <i>E. coli</i> levels from livestock with access to streams	Work with NRCS, SWCDs, and county drainage boards to identify partners in the agricultural community and communication mechanisms	✓			BWCWA Committees, SWCDs, NRCS, ISDA, FSA, Drainage Boards
	Install livestock exclusion fencing and alternative watering sources		✓		BWCWA Committees, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Continue monitoring in critical areas to further pinpoint sources and locations			✓	BWCWA Coordinator, SWCDs, and DePauw
Reduce <i>E. coli</i> levels from agricultural runoff	Work with agricultural community to promote timing of manure application to fields and alternative manure management strategies		✓		BWCWA Committees, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Install buffers and wetlands via a cost share program and market their benefits		✓		BWCWA Committees, Agricultural Liaison, and SWCDs/NRCS/ISDA
	Continue monitoring in critical areas to further pinpoint sources and locations			✓	BWCWA Coordinator, SWCDs, and DePauw

Table 19: Strategies and Actions (cont)

Goal 3: Reduce <i>E. coli</i> inputs such that all sample sites meet the State water quality standard of 235 cfu/100mL during base flow conditions and no more than 15% of the sites exceed the standard during storm flow conditions in 5 years. The long-term goal (10 years) is for all storm flow events to meet State water quality standards.					
		Schedule			
Strategy	Action Item	2009-2010	2010-2012	2012-2019	Responsible Party
Reduce <i>E. coli</i> levels from failing or absent septic systems	Work with health departments to identify areas with failing or no septic systems	✓		✓	BWCWA Coordinator, SWCDs and County Health Departments
	Host septic system care and maintenance workshops		✓		BWCWA Committees, SWCDs, and County Health Departments
	Work with health departments to create an ordinance requiring all properties sold with septic systems to have an inspection done at time of sale		✓		BWCWA Coordinator, SWCDs, County Health Departments, and realtors
	Continue monitoring in critical areas to further pinpoint sources and locations		✓		BWCWA Coordinator, SWCDs, and DePauw

Table 19: Strategies and Actions (cont)

Goal 4: Protect and enhance important and unique natural aspects of Big Walnut Creek and its watershed (endangered and high quality species/natural areas).					
		Schedule			
Strategy	Action Item	2009-2010	2010-2012	2012-2019	Responsible Party
Raise public awareness of the importance of the protection/conservation of natural areas and impacts on water quality	Host fieldtrips - watershed tours, river trips through nature preserves in watershed		✓		BWCWA Committees, Coordinator, and conservation partners (CILTI, IDNR, TNC, SWCDs)
	Build on McCloud Nature Park as an example property		✓		BWCWA Committees and Hendrick County parks and SWCD
	Purchase or assist with conservation easements on important properties			✓	BWCWA Coordinator and conservation partners (CILTI, IDNR, TNC, SWCDs)
	Fund plantings outside of 100-year floodplain to get whole field plantings		✓		BWCWA Committees, NRCS and SWCDs
	Restore lands adjacent to unique resources through cost-share funding or local mitigation projects/coordination		✓		BWCWA Committees and development community
	Collect data and create case studies and/or marketing material about the impacts of the 2008 floods and role of floodplains	✓			BWCWA Committees, Coordinator, and Putnam Co SWCD

Table 19: Strategies and Actions (cont)

Goal 4: Protect and enhance important and unique natural aspects of Big Walnut Creek and its watershed (endangered and high quality species/natural areas).					
Strategy	Action Item	Schedule			Responsible Party
		2009-2010	2010-2012	2012-2019	
Raise public awareness of the importance of the protection/conservation of natural areas and impacts on water quality	Work with IDNR to hold training sessions for local interpreters/naturalists		✓		BWCWA Coordinator and IDNR
	Work with TNC, IDNR, and CILTI to promote field work days (e.g. invasive species removal, clean-ups, habitat improvements, etc.)		✓		BWCWA Committees, Coordinator, and conservation partners (CILTI, IDNR, TNC, SWCDs)
Influence landuse planning at the local and county levels	Participate and/or attend Plan Commission meetings	✓			BWCWA Coordinator and SWCD staff
	Review local planning documents and make recommendations to staff regarding protection of important natural areas	✓			BWCWA Committees and Coordinator
Document 2008 flood impacts and identify important floodplains and riparian areas	Use 2008 damage assessments to identify areas for restoration	✓			BWCWA Coordinator, NRCS, and Putnam Co SWCD
Identify important corridors for habitat	Work with CILTI, IDNR, and TNC to identify corridor management strategies and locations	✓			BWCWA Committees, Coordinator, and conservation partners (CILTI, IDNR, TNC)
	Work with DePauw University to get students involved in planning and assessment of area habitats	✓			BWCWA Coordinator and DePauw University

Table 19: Strategies and Actions (cont)

Goal 5: Develop public awareness on how individual activities and actions will/do impact the watershed.					
		Schedule			
Strategy	Action Item	2009-2010	2010-2012	2012-2019	Responsible Party
Provide "hands-on" opportunities for people to learn about individual BMPs	Host fieldtrips - watershed tours, river trips showing land use and impacts, both positive and negative		✓		BWCWA Committees, Coordinator, and conservation partners (CILTI, IDNR, TNC, SWCDs)
	Promote and provide cost-share for equipment purchase and/or rental program for self-installation of BMPs		✓		BWCWA Committees, Coordinator, Agricultural Liaison and SWCDs
	Host workshops that teach about what can be done on individual residential properties (backyard conservation)		✓		BWCWA Committees, Coordinator, and SWCDs
	Give presentation and conduct interactive activities at neighborhood meetings, local service club meetings, etc.	✓			BWCWA Coordinator and SWCDs
	Create demonstration sites on public properties with help from volunteers		✓		BWCWA Committees and conservation partners (CILTI, IDNR, TNC, SWCDs)

Table 19: Strategies and Actions (cont)

Goal 5: Develop public awareness on how individual activities and actions will/do impact the watershed.					
Strategy	Action Item	Schedule			Responsible Party
		2009-2010	2010-2012	2012-2019	
Develop an targeted educational program and materials	Conduct a statistically valid, widespread watershed survey		✓		BWCWA Committee, , Coordinator, and Purdue Univerity
	Create a logo and key messages	✓			BWCWA Committee
	Identify partnerships with other stakeholders to find new venues to educate the public about water quality issues (partner with MS4s)	✓			BWCWA Committees, , Coordinator, conservation partners (CILTI, IDNR, TNC, SWCDs), and MS4s
	Utilize the Visitor Centers and tourism community	✓			BWCWA Coordinator, counties officials, and cities/towns
	Create tangible materials based on survey findings (e.g. website tools, graphics, brochures, handouts, displays, etc.)		✓		BWCWA Committees and Coordinator
	Create and build upon school programs		✓		BWCWA Coordinator and SWCDs
Create a comprehensive septic system education program	Work with health departments to identify areas with failing or no septic systems	✓			Coordinator, SWCDs and County Health Departments
	Host septic system care and maintenance workshops		✓		BWCWA Committees and SWCDs
	Work with health departments to create an ordinance requiring all properties sold with septic systems to have an inspection done at time of sale		✓		BWCWA Committees, Coordinator, County Health Departments, Realtors
	Develop septic system exhibit for county fair (demonstrate impacts on water quality)		✓		BWCWA Committees and SWCDs

Table 20: BMP Selection Criteria

	Priority Subs	Current Land Use	NPDES Discharger	Wetland Restoration Potential (hydric soils)	Buffer Restoration Potential	CFO/Livestock in Streams	Floodplain Restoration Potential
B	Big Walnut Creek - Dry Branch	Agriculture	Int'l Business Machines	Low	Low	Low	Medium
D	Big Walnut Creek - Greencastle	Suburban/ Forest	Greencastle Dept of Water; Greencastle STP; United (Speedway Gas)	Low	Low	Medium	High
G	Big Walnut Creek - Snake Creek/Maiden Run	Forest	Reelsville Elem School; Reelsville Water Treatment Plant	Low	Low	High	High
H	Clear Creek Headwaters (Putnam)	Agriculture	Clear Creek Conservancy District - Sewerage System	Low	Medium	Low	High
I	Clear Creek - Miller Creek	Agriculture		Low	Medium	High	Medium
K	Deer Creek - Leatherwood Creek	Forest		Low	Low	Low	Low
M	Deer Creek - Mosquito Creek	Forest	Putnamville Correctional Facility	Low	Low	Low	High
N	Deer Creek - Owl Branch	Suburban/ Forest		Low	Low	High	Medium

Table 20: BMP Selection Criteria (cont)

	Priority Subs	Current Land Use	NPDES Discharger	Wetland Restoration Potential (hydric soils)	Buffer Restoration Potential	CFO/Livestock in Streams	Floodplain Restoration Potential
O	Deweese Creek	Suburban/Forest	Lone Star Industries Landfill; Buzzi Unicem	Low	Low	Low	Low
S	Jones Creek	Agriculture		Low	Low	Medium	Low
T	Limestone Creek	Agriculture/Forest	Martin Marietta; South Putnam HS; Altra Indiana	Low	Low	Medium	Low
X	Main Edlin Ditch - Grassy Branch	Agriculture		High	Medium	Low	High
Y	Main Edlin Ditch - Smith Ditch	Agriculture		High	High	Low	High
AA	Owl Creek	Agriculture	Van Bibber Conservancy District - Sewerage System; Van Bibber Water Treatment Plant	Low	Low	Low	Low
CC	West Fork Big Walnut Creek Headwaters	Agriculture		High	Medium	Low	High
DD	West Fork Big Walnut Creek - Lower	Agriculture	Jamestown WWTP	Medium	Low	High	High

Table 21: BMP Selections

Priority Subs		Preferred BMPs to Address Water Quality Issues in Priority Subwatersheds	Other Recommendations
B	Big Walnut Creek - Dry Branch	livestock fencing; alternative watering; streambank stabilization; cover crops; nutrient management for cropland; CNMPs; fertilizer storage	
D	Big Walnut Creek - Greencastle	urban practices (rain gardens); buffers/floodplain restoration; livestock fencing; alternative watering; nutrient management for cropland; CNMPs; fertilizer storage; streambank stabilization	septic system education; forest stand improvement; grazing practices
G	Big Walnut Creek - Snake Creek/Maiden Run	livestock exclusion fencing; floodplain restoration; nutrient management for cropland; CNMPs; fertilizer storage; manure management - pit closure (CFO)	septic system education; forest stand improvement; grazing practices
H	Clear Creek Headwaters (Putnam)	urban residential practices (rain gardens); livestock fencing; alternative watering sources; buffers; manure management; cover crops	septic system education
I	Clear Creek - Miller Creek	livestock fencing; alternative watering sources; buffers; manure management; nutrient management for cropland; CNMPs; fertilizer storage; cover crops	septic system education
K	Deer Creek - Leatherwood Creek	instream grade stabilization	additional monitoring to isolate location of pollution impacts (landuse does not reconcile with large nutrient and sediment loads)
M	Deer Creek - Mosquito Creek	buffers/floodplain restoration	NPDES Dischargers compliance

Table 21: BMP Selections (cont)

Priority Subs		Preferred BMPs to Address Water Quality Issues in Priority Subwatersheds	Other Recommendations
N	Deer Creek - Owl Branch	urban practices (rain gardens); bioswales/parking lot islands; livestock fencing; alternative watering sources; nutrient management for cropland; CNMPs; fertilizer storage; buffers/floodplain restoration	forest stand improvement; grazing practices
O	Deweese Creek	urban practices (rain gardens); manure management; nutrient management for cropland; CNMPs; fertilizer storage	NPDES Dischargers compliance; septic system education
S	Jones Creek	livestock fencing; alternative watering sources; cover crop	additional monitoring to isolate location of pollution impacts
T	Limestone Creek	livestock fencing; alternative watering sources; manure management; cover crop	NPDES Dischargers compliance
X	Main Edlin Ditch - Grassy Branch	wetland restoration; buffer/floodplain restoration; cover crop; mulch and no-till; manure management	
Y	Main Edlin Ditch - Smith Ditch	wetland restoration; buffer/floodplain restoration; cover crop; mulch and no-till; manure management	
AA	Owl Creek	land use planning/zoning	septic system education; NPDES Discharger compliance; additional monitoring south of reservoir
CC	West Fork Big Walnut Creek Headwaters	wetland restoration; buffer/floodplain restoration; cover crop; mulch and no-till	junkyard clean-up/compliance
DD	West Fork Big Walnut Creek - Lower	wetland restoration; buffer/floodplain restoration; cover crop; livestock fencing; alternative watering; nutrient management for cropland; CNMPs; fertilizer storage; urban practices	NPDES Dischargers compliance

Table 22: BMP Installation Recommendations for Load Reduction

BMP	Option A	Option B	Option C	Option D
Livestock Exclusion Fencing	3000 linear feet	-----	10000 linear feet	15000 linear feet
Streambank Stabilization	1000 linear feet	-----	10000 linear feet	5000 linear feet
No-Till Conversion	5500 contributing acres	7800 contributing acres	2500 contributing acres	4000 contributing acres
Buffer/Filter Strips	2500 contributing acres	-----	5000 contributing acres	1500 contributing acres
Grassed Waterways	12500 linear feet	-----	15000 linear feet	17500 linear feet
Bioretention	5000 contributing acres	-----	15000 contributing acres	10000 contributing acres
Wetland Restoration	2000 contributing acres	-----	11000 contributing acres	3000 contributing acres

12.2 Cost Estimates

The Steering Committee has identified a number of different types of BMPs that they would like to see implemented to meet goals. Several of these practices are listed above in Table 22. General costs have been estimated for the installation of these practices. Table 23 reflects the costs for each of the options shown above. The costs for BMP options listed in Table 23 are calculated using the highest estimated cost available. Also, reduction options for several of the BMPs in Table 23 are (no-till conversion, buffer/filter strips, wetland restoration) calculated based on contributing of acres as seen in Table 21: BMP Installation Recommendations for Load Reductions. BMPs for these options are typically installed on per acre, per foot, or linear foot basis, not the number of contributing acres. Therefore if costs were calculated for these options, they would not be representative of actual costs for installation. If one of these BMP options is selected for installation and a location is determined the number of acres contributing to the BMP can be determined and the chosen BMP sized as necessary.

In addition to the costs for Table 23, there are numerous other practices that can be implemented to educate the public on water quality and related issues. These practices include such things as workshops, demonstration sites, and many others. Table 24 lists these BMPs in addition to a variety of other practices and associated costs that might be implemented in the watershed to reach goals.

12.3 Technical Assistance

A number of the BMPs selected for implementation will need assistance from technical specialists. The type and amount of technical assistance will vary from project to project. Below is a list of just a few of the technical resources available.

- Soil and Water Conservation Districts
- Natural Resource Conservation Service
- County Health Departments
- Resource Conservation and Development Council
- Indiana Department of Natural Resources

- Indiana Department of Environmental Management
- United States Geological Survey
- Central Indiana Land Trust, Inc.
- The Nature Conservancy
- County Surveyor's Offices
- County Drainage Boards

12.4 Financial Assistance

Financial assistance will be needed to implement a number of the BMPs. Assistance can come in the form of actual monetary notes or in the form of in-kind or technical services. Several funding options are available for BMP implementation, most of which are in the form of grants. Agencies that provide grants for BMP implementation include, but are not limited to:

- IDEM – Section 319 watershed management program for watershed implementation projects, staff and education programs/projects
- IDNR – Division of Fish and Wildlife Lake and River Enhancement (LARE) Program for watershed implementation projects and future monitoring, Division of Nature Preserves Heritage Trust Program for easements and restoration projects
- EPA – Several topical grant programs (stormwater projects, research projects, environmental justice projects, Community Action for a Renewed Environment (CARE) program, etc.)
- USGS – Topical research grants for nutrient transport or other nonpoint source water quality studies
- USACE – Some limited restoration funding
- Hoosier Riverwatch (IDNR) – Grants for advanced monitoring equipment
- Clean Water Indiana – Small grants to SWCDs for water quality, conservation and education projects
- United Way – Planning and restoration funds for flood stricken areas
- National Fish and Wildlife Foundation – Five-Star Restoration Matching Grants Program for watershed restoration projects, water quality and habitat projects
- Local developers – Mitigation projects/dollars associated with planned wetland or stream impacts

In addition to these sources, Appendix B of the Indiana Watershed Planning Guide put together by the IDEM Office of Water Quality Watershed Management Section, lists other sources and websites of potential funding sources.

13.0 SUCCESS MEASURES

The overall success of a watershed management plan depends up on the implementation of action items as set up by goals. Below are measureable success indicators or milestones which will help the BWCWA track its progress and aid in updating and revising the Plan as accomplishments/goals are met. Some of the goals are long term and regular monitoring will be necessary to make certain that stakeholder actions and prescribed strategies are helping realize the actual water quality targets.

Table 23: BMP Installation Recommendation Costs

BMP	Costs*	Option A Costs	Option B Costs	Option C Costs	Option D Costs
Livestock Exclusion Fencing	\$1.60/linear foot	\$4,800.00	\$0.00	\$16,000.00	\$24,000.00
Streambank Stabilization	\$22-\$32/linear foot	\$32,000.00	\$0.00	\$320,000.00	\$160,000.00
No-Till Conversion**	\$10/acre	**	**	**	**
Buffer/Filter Strips**	dependent on type	dependent on type	dependent on type	dependent on type	dependent on type
filter strips or	\$190/acre	**	**	**	**
forested buffer or	\$500/acre	**	**	**	**
herbaceous buffer	\$225/acre	**	**	**	**
Grassed Waterways	\$2-\$3.50/linear foot	\$43,750.00	\$0.00	\$52,500.00	\$61,250.00
Bioretention**	\$5-\$40/square foot	**	**	**	**
Wetland Restoration**	\$1000-\$2000/acre	**	**	**	**

NOTES: *Costs are calculated using highest value listed.

**Options for these BMPs were calculated based on contributing number of acres as seen in Table 21: BMP Installation Recommendations for Load Reductions. BMPs for these options are typically installed on a per acre, per foot, or linear foot basis, not the number of contributing acres. Therefore if costs were calculated for these options, they would not be representative of actual costs for installation. If one of these BMP options is selected for installation and a location is determined the number of acres contributing to the BMP can be determined and the chosen BMP sized as necessary.

Table 24: Other BMP Costs

BMP	Cost	Notes
Training Sessions/Workshops	\$500 each	Variable depending on size and scope.
Newsletter/Mailing	\$500 each	Variable depending on size and scope.
Newspaper Article	Free	Does not include staff/volunteer preparation time.
Educational Signage	Variable	Variable
Volunteer Water Quality Monitoring Program	\$15,000/year	Includes part-time staff person and cost of test kits.
Nutrient Management	\$9.00/acre	Costs related to technical assistance.
Chemical Management	\$5.00/acre	Costs related to technical assistance.
Critical Area Planting	\$1300/acre	Includes grading, planting, herbicides, mulch, and labor.
Water and Sediment Control Basin	\$1700 each	
Grade Stabilization Structure	\$1000 each	
Stripcropping	\$12.00/acre	
Detention Ponds	\$35,000-\$110,000/acre	Cost includes engineering, excavation, fill, compaction, inlet and outlet installation, landscaping, and legal fees.
Field Windbreaks, Hedgerows	\$1.50/linear foot	
Cover Crops	\$14.00/acre	
Pasture/Hay Planting	\$120-\$150/acre	Cost dependent on type of grasses used.
Rain Garden/Bioretenion Cell	\$5.00-\$40.00/square foot	Cost dependent on site requirements. Industrial and commercial sites may require professional engineering and control structures

Table 24: Other BMP Costs (cont)

BMP	Cost	Notes
Rain Barrel	\$75-\$200/each	Dependent on size and features.
Green Roof	\$12.00-\$24.00/square foot	Includes root repellent/waterproof membranes, and irrigation. Cost dependent on site requirements.
Streambank Stabilization	\$22.00-\$32.00/square foot	Dependent on site and method used.
Tree Planting	\$0.50-\$300/per tree	Dependent on size and species of tree, and if mulching and staking are involved.
Check Dams	\$15.00/linear foot	
Parking Lot Islands/Bioswales	\$0.04-\$2.50/square foot	Cost dependent on site conditions and are based on seeding.
Downspout Disconnections	\$15.00-\$25.00/downspout	
Infiltration Trench	\$4.00/linear foot	Assumes a 2 foot wide trench. Costs are variable depending on site requirements
Permeable Surfaces	\$1.00-\$5.00/square foot	Dependent on material type
Retrofit Detention Basin	\$0.05-\$3.00/square foot	Cost dependent on site conditions and are based on seeding.

13.1 Goal 1: Reduce soil erosion and sediment inputs into streams that result in a 1% reduction in 5 years.**Indicators:**

- ✓ Number of buffer strips/riparian buffers
- ✓ Increase in no-till acres
- ✓ Number of workshops (contractors, fairs)
- ✓ Number of urban BMPs (rain barrels, rain gardens) installed
- ✓ Number of acres of BMPs installed on highly erodible soils
- ✓ Number of practices implemented to reduce velocity in steeply graded areas
- ✓ Number of forestry BMPs installed
- ✓ Number of log jams removed/banks stabilized
- ✓ Number of demonstration sites
- ✓ Increased training and certification of Rule 5 staff and contractors
- ✓ Development of detailed buffer maps
- ✓ Reduced TSS concentrations and loads in water quality samples
- ✓ Improved mIBI scores
- ✓ Track weather and link to water quality samples (use water treatment plants)

13.2 Goal 2: Reduce Total Phosphorus and Nitrate inputs by 20% in 5 years and Nitrate inputs by 40% in 10 years.**Indicators:**

- ✓ Number of sites identified for implementation
- ✓ Number of sites with BMPs implemented
- ✓ Number of linear feet of livestock fencing installed
- ✓ Number of acres/linear feet of riparian buffers
- ✓ Number of two-stage ditches installed
- ✓ Increase in no-till acres
- ✓ Number of nutrient management plans developed
- ✓ Number of field days and attendees
- ✓ Number of workshops/meetings and attendees
- ✓ Number of follow-up emails, appointments, etc. from field days/workshops
- ✓ Number of demonstration sites
- ✓ Number of stores carrying phosphorus free fertilizer
- ✓ Number of companies/applicators carrying phosphorus free fertilizer
- ✓ Number of lawn application of fertilizer or requests for phosphorus-free
- ✓ Reduced nutrient concentrations and loads in water quality samples
- ✓ Improved mIBI scores

13.3 Goal 3: Reduce *E. coli* inputs such that all sample sites meet the State water quality standard of 235 cfu/100mL during base flow conditions and no more than 15% of the sites exceed the standard during storm flow conditions in 5 years. The long-term goal (10 years) is for all storm flow events to meet State water quality standards.**Indicators:**

- ✓ Number of partners identified and new communication venues utilized

- ✓ Number of landowners identified amenable to fencing, alternative water supplies, and manure management strategies
- ✓ Fewer number of visual observations of cattle in the stream
- ✓ Number of animals removed from stream by fencing
- ✓ Number of alternative water supply systems created
- ✓ Number of lagoons safely closed
- ✓ Number of lagoons, manure systems added/implemented
- ✓ Number of homeowner receiving education on septic systems/wastewater disposal
- ✓ Number of homeowner receiving education on inflow and infiltration polices
- ✓ Local ordinances developed to require all properties sold with septic systems have septic tests done at time of sale – guidelines for ordinance developed
- ✓ Meetings with NPDES dischargers
- ✓ Increased NPDES compliance
- ✓ Reduced *E. coli* concentrations and loads in storm water quality samples
- ✓ Currently impaired segments removed from 303d list
- ✓ Follow-up monitoring/improvements in water quality at Dr. Gammon's sites

13.4 Goal 4: Protect and enhance important and unique natural aspects of Big Walnut Creek and its watershed (endangered and high quality species/natural areas).

Indicators:

- ✓ Number of key areas identified for protection or restoration
- ✓ Increase acres of natural areas through TNC, IDNR, and Wabash Land Trusts
- ✓ Increase acres planted in forest in bottom lands/floodplains
- ✓ Reduction in exotic/invasive infestations (aquatic and terrestrial)
- ✓ Number of learning opportunities about diverse habitat within basin
- ✓ Number of riparian buffer installed
- ✓ Number of easements on important ecological or corridor-building properties
- ✓ Increase smallmouth bass percentage in fish community
- ✓ Decrease algae blooms/reduced chlorophyll a concentrations
- ✓ Increase redhorse population, more gravel streambeds, less sedimentation observed in scientific surveys
- ✓ Increase acreage of Canadian/Eastern Hemlock
- ✓ Numbers of meeting with planning authorities
- ✓ Recommendations made to planning authorities
- ✓ Land use plans changed or amended to protect riparian areas
- ✓ Improved mIBI scores and QHEI scores

13.5 Goal 5: Develop public awareness on how individual activities and actions will/do impact the watershed.

Indicators:

- ✓ Number of students/year educated on how individual activities and actions will/do impact the watershed
- ✓ Number of individuals who attend tours or workshops
- ✓ Number of individuals in attendance at presentations or number of groups reached
- ✓ Number of articles published on watersheds/quality in local media

- ✓ Tangible educational materials produce and reproduced
- ✓ Increased coordination with DePauw University (coordinated research, engage sustainability program)
- ✓ Number of meetings with students at DePauw ('water group' newly formed)
- ✓ Increased coordination with TNC outreach programs and research
- ✓ Number of student/volunteer clean-up days for watershed maintenance
- ✓ Development of workshop/info package on septic system operations/maintenance
- ✓ Production of resource guide for where to find BMP information/soil information
- ✓ Number of people participating in committees
- ✓ Number of email inquiries
- ✓ Number of people receiving messages (pending deliver mechanisms identified in the survey)
- ✓ Development a display to take to fairs, festivals
- ✓ Number of contractors contacted or educated

14.0 MONITORING EFFECTIVENESS

14.1 Leadership Structure and Public Involvement

The Big Walnut Creek Watershed Alliance (BWCWA) is committed to generating and executing a successful watershed management plan that will protect, enhance, and conserve the Big Walnut Creek Watershed. In order to implement a successful management plan, continued cooperation, research, and financial support will be needed from key players in the watershed.

The steering committee of the Big Walnut Creek Watershed Alliance will continue to meet on a regular basis for the purpose of plan implementation. The steering committee will review project efforts according to the management plan's goals, objectives, and action items on an as needed basis.

The BWCWA has determined that the management plan will be a living document. As a living document it will occasionally need to be updated in order to address changing and future concerns of its group members. In order to understand changes within the watershed, the group will continue to host annual public meetings to gather public input and participation from watershed landowners.

14.2 Implementation Progress

Overall project progress will be tracked by measurable items such as workshops held, BMPs installed, and demonstration sites installed. Load reductions will also be calculated as each BMP is installed. These values and associated project details (e.g. BMP type, location, length of conservation commitment/easement, size, cost, etc.) will be tracked over time in a single spreadsheet. This spreadsheet will provide a single tracking mechanism for all projects installed and programs implemented in the watershed. Individual landowner information will be tracked by staff from various federal or state funding programs.

14.3 Water Quality Monitoring

Water quality monitoring will continue to be tracked with biannual sampling in order to determine annual load reductions. Pending funding opportunities, such monitoring may need to

be conducted via Riverwatch sampling methods. The sites sampled as part of this Plan will be revisited as part of this future monitoring plan. Additional sites may be added to help further identify possible pollution sources and/or document pre/post implementation effects.

15.0 INSTITUTIONAL RESOURCES

As noted above, implement a successful management plan will require participation of several key players in the watershed. A large variety of institutional resources exist in the watershed to aid in water quality improvement and implementation efforts. These range from local government offices, state and federal agency personnel/programs, and non-profit conservation organizations. The following sub-sections will outline some of their various roles, resources, and contact information.

15.1 Local County Government Offices

15.1.1 Soil & Water Conservation Districts

Indiana's Soil and Water Conservation Districts (SWCDs) were established by the Indiana Conservation Act (IC 14-32). SWCDs are chartered, legal subdivisions of State Government whose territories are aligned with county boundaries. SWCDs develop and implement conservation programs based on a set of resource priorities, and channel resources from all levels of government into action at the local/county level. Indiana's 92 SWCDs are each governed by a board of supervisors, consisting of three elected supervisors, who own or rent more than 10 acres of land in the district, and two appointed supervisors who maintain their permanent residence in the district.

BOONE COUNTY SOIL AND WATER CONSERVATION DISTRICT

The Boone County SWCD focuses on the delivery of traditional conservation programs to county residents. These include all of the Farm Bill programs and any other associated local initiatives. The District's was also recently awarded a Clean Water Indiana grant aimed at increasing and improving nutrient management practices. The grant centers around a cost-share program that includes soil testing and nutrient management plan development.

While the Boone County SWCD offers intermittent educational events and field days, the District does not have routine, formal, educational program. The current Clean Water Indiana grant has a conservation marketing component which will result in promotional materials and "shop meetings" with farmers at on-site field locations across the county.

Given the County Surveyor's role in stormwater management and erosion control, the District does not participate in Rule 5 inspections or enforcements. Due to limited resources and the desire to focus on the implementation of conservation programs, the District is not conducting any volunteer water quality monitoring.

The SWCD Board meets the fourth Wednesday of the month at 7:30am in the Boone County Office Building, Connie Lamar Room

For questions regarding any of Boone County SWCD's programs contact:

Scheryl Vaughn
Boone County Soil & Water Conservation District
Office Administrator/Educator
416 W. Camp Street, Room 101
Lebanon, IN 46052
765-483-4449
svaughn@co.boone.in.us

HENDRICKS COUNTY SOIL AND WATER CONSERVATION DISTRICT

The Hendricks County SWCD staff review development plans, make recommendations regarding construction and stormwater BMPs, and conduct site inspection for municipal projects within the six MS4 entities in Hendricks County, which cannot be reviewed by the entities themselves. The District does not participate in Rule 5 enforcements. The District is not conducting any volunteer water quality monitoring at this time.

While the Hendricks County SWCD offers intermittent educational events and field days, the District does not have routine, formal, educational program. The District was recently awarded a Clean Water Indiana grant aimed at increasing and improving nutrient management practices. The current Clean Water Indiana grant has a conservation marketing component which will result in promotional materials and workshops for landowners at on-site field locations across the county.

For Rule 5 or stormwater concerns contact:

Jessica Norcross
195 Meadow Drive, Suite 2
Danville, IN 46122
(317) 745-2555

PUTNAM COUNTY SOIL AND WATER CONSERVATION DISTRICT

The Putnam County SWCD offers a variety of land owner assistance programs and technical guidance regarding the implementation of Best Management Practices (BMPs). In addition, the District also oversees the day-to-day management of the Rule 5 Erosion and Sediment Control statewide regulation for Putnam County. In this capacity SWCD staff review development plans, make recommendations regarding construction and stormwater BMPs, and conduct site inspection.

While the Putnam County SWCD offers intermittent educational events and field days, a routine, formal, educational program geared toward elementary students is offered throughout the school year. Volunteer water quality monitoring is somewhat dependent upon current needs or interests in the community.

For general questions regarding conservation initiatives contact: Sue Crafton
For Rule 5 enforcement or stormwater concerns contact: Laura Stearley

All can be reached at:
1007 Mill Pond Lane, Ste. C.
Greencastle, IN 46135
317.65.5716 Ext 3

15.1.2 Surveyors & Drainage Boards

County surveyors and drainage boards play a critical role in the implementation of streamside BMPs, as well as potential restoration efforts that may involve the manipulation of current above or below ground drainage infrastructure.

The Indiana Drainage Code of 1965 sets forth the authority to create a Drainage Board in each County. The Drainage Board consists of either the County Commissioners or a citizen board with one Commissioner as a member. The County Surveyor sits on the Board as an Ex-Officio Member. This position is a non-voting position, and the County Surveyor serves as a technical advisor to the Board. The Drainage Board has the authority to construct, maintain, reconstruct or vacate a regulated drain. They may also create new regulated drains if so petitioned by landowners. The Board is in charge of maintaining drains by putting the drain back to its original specifications by dredging, repair tile, clearing, removing obstructions or other work necessary to keep the drain in proper working order. The County surveyors are often the best contact for drainage projects or concerns, or to coordinate with the Drainage Boards.

The Surveyor's Office is also typically task with establishing, reestablishing and recording all section corners throughout the county; supervising all civil engineering work of the county; recording the location of legal surveys; supervising construction, reconstruction and maintenance of drains and ditches; developing drainage studies and specifications, issues drainage related permits; and calculating drainage assessments.

Many of the streams and ditches in the watershed are official 'regulated drains' and are therefore under the authority of the drainage boards and surveyors. Any project proposed along these waterways should be coordinated with the appropriate County Surveyor.

BOONE COUNTY

Kenny Hedge
County Surveyor
116 West Washington Street
Lebanon, IN 46052
765-483-4444

khedge@co.boone.in.us

The board meets the third Monday of the month at 8:30am in the Boone County Office Building.

HENDRICKS COUNTY

David Gaston

355 S. Washington St. #214

Danville, IN 46122

317-745-9237

Drainage Board meetings: 2nd and 4th Tuesday - 8:30am at the Hendricks County Government Center

PUTNAM COUNTY

David Penturf

1W. Washington St. Rm. 43

Greencastle, IN 46135

(765) 653-5603

Putnam County does not have an official drainage board therefore all drainage concerns fall to the commissioners. They meet on the first Monday at 9:00am and third Monday at 6:00pm at the Putnam County Courthouse Annex

15.1.3 Planning and Zoning Authorities

County-wide Comprehensive Plans can provide a significant amount of information on both natural resources in an area, as well as population statistics, traffic plans, and current and future land use zoning. Such zoning designations, if enforced, often drive where future residential and commercial/industrial growth will occur. The authority to rezone land into different land use categories and the power to grant variances from local ordinances related to development, often lie with local Zoning Boards or Plan Commissions.

BOONE COUNTY

The Boone County Area Plan Commission (APC) is in the process of completing a new comprehensive plan. An open house to discuss and view the new plan is set for September 12, 2008, 6:30pm at the County Fairgrounds. The Board of Zoning Appeals (BZA) is task with granting variances or special exceptions form the zoning ordinance. In addition, the BZA and the APC work together to administer land use and zoning regulations for the county; issue building permits; issues addressed for new homes and businesses; and maintain census data for the county. The APC meets the first Wednesday of each month at 7:00 pm in the Boone County Government Building – Lamar Room. The BZA meets the last Wednesday of each month at 7:00pm in the Boone County Government Building – Lamar Room. The best contact for watershed land use concerns related to development or zoning in Boone County is:

Steve Niblick

116 W Washington St.

Lebanon, IN 46052

(765) 482-3821

sniblick@co.boone.in.us

HENDRICKS COUNTY

Hendricks County has a comprehensive plan that was adopted in 2006. Printed copies are available. There is not a current schedule to amend the comp plan, but discussions of doing so have recently surfaced. The County Commissioners approve any rezoning requests upon a recommendation by the County Plan Commission. The Plan Commission meets monthly on the second Tuesday of the month at 6:30 p.m. in Rooms 4 and 5 of the Hendricks County Government Center. There is also a County Board of Zoning Appeals that meets on the third Monday of the month at 7:30 p.m. in Rooms 4 and 5 of the Hendricks County Government Center. The best contact for watershed land use concerns related to development or zoning in Hendricks County is:

Hendricks County Planning and Building
355 S. Washington Street #212
Danville, IN 46122
Planning Phone: (317) 745-9254
Zoning Phone: (317) 745-9243
www.co.hendricks.in.us

PUTNAM COUNTY

Putnam County's most recent Comprehensive Plan is dated 2007. The final draft was only recently accepted; therefore there are no plans for any near future updates. Putnam County is currently in the process of updating the Zoning and Subdivision Control Ordinances. The Plan Commission makes recommendations for rezoning and the County Commissioners make the final determination. There is one city in Putnam County that has up to a two mile jurisdictional area outside its city limits and an exact parcel would need to be known in order to make the determination as to who has jurisdiction. There is also Board of Zoning Appeals (BZA). The Plan Commission meets the second Thursday of the month at 5:30pm if there are agenda items to address. The BZA meets the second Monday at 7:30pm. The best contact for watershed land use concerns related to development or zoning in Putnam County is:

Kim Hyten, Plan Director
209 W. Liberty St., Room 3
Greencastle, Indiana 46135
Phone: (765) 653-5727
FAX: (765) 653-0231
pcplanning@airhop.com

15.1.4 Health Departments

BOONE COUNTY

The Boone County Health Department employs four Environmental Health Specialists. The focus of the Environmental Division of the Health Department is the prevention of disease, while ensuring a safe environment. Concern for environmental health has increased along with population growth, urbanization, advanced technology, industrialization and modern agriculture methods. Assessment and reduction of human health risks is accomplished through investigations, inspections and regulatory enforcement. Frequently, investigations and

inspections are conducted with other local and state government agencies and environmental organizations.

Food safety is assured through inspections of nearly 180 food establishments in Boone County. Water quality inspections of public and semi-public swimming pools and spas are performed. Information on indoor air quality and radon is available in our office. In addition, a certified lead inspector provides information on lead hazards.

Septic system installation is a regulated activity in Boone County. After a process of plan review, septic permits are issued by the Health Department and inspected before final approval. All new and repaired residential drinking water wells are permitted, inspected, and tested. General environmental health complaints and housing complaints are investigated if they involve any condition that transmit, generate or promote disease. The best contact for watershed septic system concerns is:

Sharon Adams
Environmental Health Department
116 W Washington Street, B201
Lebanon, IN 46052
Phone: (765) 483-4458
Fax: (765) 483-5243
shadams@co.boone.in.us

HENDRICKS COUNTY

The Hendricks County Health Department does not conduct routine water quality monitoring. The Department provides voluntary training for septic system installers. Conversations with representatives from the Health Department indicate that one of the primary concerns in rural areas is septic discharges into field tiles. The Department has geographically located all improved properties with undocumented/unknown wastewater disposal as well as those with permitted system information in order to document problem areas; however, they are in need of funding to implement corrections in concentrated problem areas. The best contact for watershed septic system concerns is:

Cathy Grindstaff, REHS
Environmental Health
Hendricks County Government Center
355 S. Washington St., #210
Danville, Indiana 46122
Phone: (317) 745-9217

More information can be found online at:

<http://www.co.hendricks.in.us/GovernmentCenter/HealthDepartment/EnvironmentalHealth/tabid/82/Default.aspx>

PUTNAM COUNTY

The Putnam County Health Department plays an important role in septic systems siting, education, and enforcement. The Putnam County Health Department does not conduct regular water quality monitoring; however, they will collect and analyze samples based on public complaints. According to Health Department staff, no notable septic systems concern areas exist in the watershed due to the earlier sewer installation around the lakes. If significant development were to occur within the watershed, consideration would need to be given to the capacity of the receiving wastewater treatment plant and/or the soil suitability in the area. The best contact for watershed septic system concerns is:

Dr. Robert Heavin
Greencastle Courthouse Annex
209 West Liberty Street
Greencastle, IN 46135
Phone: (765) 653-5210

15.2 State & Federal Government Offices

15.2.1 IDNR & IDEM

The Indiana Department of Natural Resources (IDNR) and the Indiana Department of Environmental Management (IDEM) have a variety of programs and staff dedicated to water quality assessments and watershed planning initiatives. The most relevant contacts at these agencies to assist local leaders in water quality planning efforts are listed below. While there are countless specialists at these agencies, the below staff should be able to guide local questions to appropriate personnel.

Indiana Department of Natural Resources

Division of Fish & Wildlife – Lake & River Enhancement Program (LARE)

Mr. Kent Tracey
1353 S. Governors Dr.
Columbia City, IN 46725
Phone: (260) 244-7470

Indiana Department of Natural Resources

Division of Nature Preserves

Thomas O. Swinford
Regional Ecologist, Central Indiana
402 W. Washington St. Rm. W267
Indianapolis IN
Desk: 317/233-4849
Mobile: 317/697-5508

Indiana Department of Environmental Management

Office of Water Quality

Ms. Bonnie Elifritz, Watershed Specialist

100 N. Senate Ave.

Indianapolis, IN 46206

(317) 234-0922

15.2.2 Indiana State Department of Agriculture (ISDA)

The Division of Soil Conservation belongs to the Indiana Conservation Partnership; however is situated in the State Department of Agriculture (ISDA). As part of the Partnership, ISDA provides technical, educational, and financial assistance to citizens to solve erosion and sediment-related problems occurring on the land or impacting public waters. The Division of Soil Conservation is divided into Conservation Implementation Teams (CIT) that cover specific counties. These teams can deliver advice to landowners regarding best management practices, assist with engineering design, and secure/coordinate associated project permits and cost share amounts.

CIT Leader for Hendricks and Boone Counties is:

Boone County Service Center serves Hendricks County

Ruth Montgomery - USDA/NRCS

801 West Pearl Street

Lebanon, IN 46052

(765)482-6355 ext. 3

ruth.montgomery@in.usda.gov

CIT Leader for Putnam County is:

William Elliot

1007 Mill Pond Lane, Ste. C

Greencastle, IN 46135

(765)653-5716 ext. 8

william.elliott@in.usda.gov**15.2.3 National Resources Conservation Service (NRCS)**

The NRCS is a Federal agency that works with land owners and managers to conserve their soil, water, and other natural resources. NRCS employees provide technical assistance based on a customer's specific needs in such areas as animal husbandry and clean water, ecological sciences, engineering, resource economics, and social sciences. They also provide financial assistance for many conservation activities. The NRCS programs are all voluntary participation programs.

District Conservationists for the counties are listed below.

Boone County

Angela Garrison
801 W Pearl Street, Ste C.
Lebanon, IN 46052
765-482-6355

Hendricks County

Henry Wallis
195 Meadows Drive, Ste I
Danville, IN 46122
317-745-2555

Putnam County

Matt Jarvis
1007 Millpond Lane, Ste C.
Greencastle, IN 46135
765-653-5716 ext 3

15.2.4 United States Geological Survey (USGS)

The USGS is a multi-disciplinary science organization focused on biology, geography, geology, geospatial information, and water. They work to study the study of the landscape, our natural resources, and the natural hazards that threaten us.

Jeffrey W. Frey
5957 Lakeside Boulevard
Indianapolis, IN 46278
(317)290-3333 ext.151
jwfrej@usgs.gov

15.3 Local Non-Profit Organizations**15.3.1 Resource Conservation and Development Council (RC&D)**

Resource Conservation and Development Councils (RC&D) are non-profit organizations established to address natural resource needs and cultivate opportunities in economic, environmental, and social areas. The primary natural resource focus is on air, water, land, woods, plants, and wildlife. The combined efforts of the community and volunteers look to achieve four primary goals:

1. Promote Better Woodland Management
2. Balance Rural and Urban Land Use Needs
3. Develop Partnerships to Address Water Quality and Quantity
4. Increase Community Involvement in Natural Concerns

Two RC&Ds serve the counties of the Big Walnut Creek Watershed: Hoosier Heartland RC&D and Sycamore Trails RC&D.

Hoosier Heartland RC&D

The Hoosier Heartland RC&D serves Boone, Brown, Hamilton, Hancock, Hendricks, Johnson, Marion, Monroe, Morgan, and Shelby Counties. The Hoosier Heartland RC&D Council can be contacted at:

Hoosier Heartland RC&D Council

6041 Lakeside Blvd.

Indianapolis, IN 46278-1989

Phone: (317)290-3250

Fax: (317)290-3150

Email: hhrccd@hhrccd.org

Web: www.hhrccd.org

Sycamore Trails RC&D

The Sycamore Trails Resource Conservation and Development Council was incorporated in 1987 and serves Clay, Fountain, Montgomery, Owen, Parke, Putnam, Sullivan, Vermillion, Vigo Counties. The Sycamore Trails RC&D Council can be contacted at:

Sycamore Trails RC&D Council

1007 Mill Pond Lane, Ste. B

Greencastle, IN 46135

Phone (765) 653-9785

strcd@sycamoretrails.org

15.3.2 Central Indiana Land Trust, Inc. (CILTI)

Land Trusts can be invaluable organizations in efforts to conserve and restore important lands. Hand-in hand planning with land trusts can help assist in region-wide corridor connectivity and large-scale conservation goals for individual species or habitat types. Land trust can also often assist conservation groups by being the land holding entity and using its volunteers to maintain the property long-term.

The CILTI Land Trust is a non-profit organization aimed at preservation of important natural lands in north-east Indiana. CILTI was incorporated exclusively for charitable, educational and scientific purposes. It has five general purposes:

1. As a part of the continued growth of the communities in which it operates, as a land trust to acquire interests in and to preserve natural areas and to discourage unnecessary development of natural areas.
2. Impartially to educate communities as to the value to them of the preservation of natural areas.
3. To promote the knowledge and appreciation of natural areas as living museums.
4. To develop such scientific, educational and public recreational uses of natural areas as are consistent with their preservation as living museums.
5. To cooperate with and to encourage other organizations and individuals in carrying out the foregoing activities.

CILTI can be contacted at:

Central Indiana Land Trust, Inc.
Heather Bacher
324 W. Morris St., Ste. 210
Indianapolis, IN 46225
Phone: (317) 631-LAND (5263)
www.CILTI.org

15.3.3 The Nature Conservancy (TNC)

The Nature Conservancy's mission is to preserve the plants, animals and natural communities that represent the diversity of the life on Earth by protecting the lands and waters they need to survive.

Indiana Field Office
1505 N. Delaware Street, Suite 200
Indianapolis, IN 46202
Phone: (317) 951-8818
Fax: (317) 917-2478
[Chip Sutton](#), Director of Communications

Tippecanoe River Project Office
436 Northwest Street
Winamac, IN 46996
Phone: (574) 946-7491
[Chad Watts](#), Program Manager
www.nature.org/indiana

REFERENCES

Bell, Charles. February 5, 2007. [Personal Communication]. Located at: Indiana Department of Environmental Management (IDEM), Assessment Information Management System (AIMS) Database, Indianapolis, Indiana.

Benda, Robert S. and J. R. Gammon. "The Fish Populations of Big Walnut Creek." Proceedings of the Indiana Academy of Science for 1967. 77 (1968): 193-205.

Davis, Todd E. Feb. 5, 2007. [Personal Communication]. Located at: Indiana Department of Environmental Management (IDEM), Assessment Information Management System (AIMS) Database, Indianapolis, Indiana.

Dufour R.L. (Biological Studies Section, Assessment Branch, Office of Water Management, Indiana Department of Environmental Management). 1997. A preliminary appraisal of the biological integrity of Indiana streams in the West Fork White River watershed using fish communities. Report Nr IDEM/32/03/003/1997. 30p.

Dufour, R.L. 2001. DRAFT: Fish Community Assessment of the Middle and Lower Wabash River, Kankakee River, and Iroquois River Basins, Indiana, 1999. Written for the Indiana Department of Environmental Management, Office of Water Quality, Assessment Branch, Biological Studies Section, Indianapolis, Indiana. IDEM 032/03/003/2001.

Gammon, James R. "The Distribution of Fishes in Putnam County, Indiana and Vicinity." Proceedings of the Indiana Academy of Science for 1963. 74 (1965) 353-359.

Gammon, James R. "The Status of Riparian Wetlands in West-Central Indiana Streams." Proceedings of the Indiana Academy for Science. 103(3-4) (1994) 195-213.

Gammon, James R., Wayne C. Faatz, and Thomas P. Simon. "Patterns in Water Quality and Fish Assemblages in Three Central Indiana Streams with Emphasis on Animal Feed Lot Operations." Biological Response Signatures: Indicator Patterns Using Aquatic Communities. Florida: CRC Press, (2003) 373-417.

Holmbeck-Pelham, S.A. and T.C. Rasmussen. 1997. Characterization of temporal and spatial variability of turbidity in the Upper Chattahoochee River. K.J. Hatcher, ed. Proceedings of the 1997 Georgia Water Resources Conference. March 20-22, 1997, Athens, Georgia

Indiana Department of Environmental Management, Office of Water Quality, 2008. Indiana 303(d) List of Impaired Waterbodies.

Indiana Department of Environmental Management, Office of Water Quality, 2003, "Indiana Watershed Planning Guide".

Indiana Department of Environmental Management, Office of Water Quality, 2001, “Eel-Big Walnut Watershed Restoration Action Strategy”.

Indiana Department of Natural Resources, Division of Fish and Wildlife. Hoosier Riverwatch Volunteer Stream Monitoring Training Manual. Spring 2007, 7th Edition.

Indiana Department of Natural Resources, Division of Nature Preserves. “Endangered, Threatened, and Rare Vascular Plant Species Documented from Indiana”, 2005.

Indiana Department of Natural Resources, Division of Water. “Significant Water Withdrawal Facilities” www.in.gov/dnr/water/8542.htm.

Indiana Geological Survey. GIS Data Layers. http://129.79.145.7/arcims/statewide_mxd/download.html

Indiana University-Purdue University Indianapolis - Center for Earth and Environmental Science, CIWRP Pilot Studies by IUPUI-CEES and CUPE (J. Wilson) 2003

Michigan Department of Environmental Quality: Surface Water Quality Division, “Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual”, June 1999.

Simon, Thomas P. Biological Response Signatures: Indicator Patterns Using Aquatic Communities. Florida: CRC Press, 2003.

Simple Method to Calculate Urban Stormwater Loads, The. www.stormwatercenter.net

Sobat, Stacey L. February 8, 2007. [Personal Communication]. Located at: Indiana Department of Environmental Management (IDEM), Assessment Information Management System (AIMS) Database, Indianapolis, Indiana.

U.S. Department of Agriculture – Natural Resource Conservation Service. Soil Data Mart. Survey Area Version 7 (2007). <http://soildatamart.nrcs.usda.gov/>

U.S. Department of Agriculture – Natural Resource Conservation Service. Geospatial Data Gateway. <http://datagateway.nrcs.usda.gov/>

U.S. Environmental Protection Agency - Enforcement and Compliance History Online (ECHO) www.epa-echo.gov/cgi-bin/ideaotis.org.