

FFY 2008 Project Application

Kentucky Nonpoint Source Pollution Control Program

Use this form to apply for Section 319(h) Nonpoint Source Implementation Grant Funds.
This application Must Be Submitted on this Form or an Identical Copy.

1. Project Title: Surface and Groundwater Remediation and Landowner Education in the Pleasant Grove Creek Subwatershed

2A. Lead Agency & Primary Contact Western Kentucky University Research Foundation, Dr. Phil Myers			3A. Project Manager Name and Title Dr. Andrew Ernest, Director Center for Water Resource Studies		
B. Street Address 1906 College Heights Blvd. #11016			B. Street Address 1906 College Heights Blvd. #11075		
C. City Bowling Green	D. State KY	E. Zip 42101-1016	C. City Bowling Green	D. State KY	E. Zip 42101-1075
F. Telephone Number 270-745-4652			F. Telephone Number 270-745-8895		
G. Fax Number 270-745-4211			G. Fax Number 270-745-2144		
H. Email Address Phillip.myers@wku.edu			H. Email Address Andrew.ernest@wku.edu		
4. Project Start Date: 07/01/08			5. Project End Date: 06/30/12		

6. Fiscal Summary: 319(h) Funding Requested: \$232,766 <u>60%</u> Non-Federal Match: \$155,178 <u>40%</u> Total Project Budget: \$387,944 <u>100%</u>	7. What type of Project: <input checked="" type="checkbox"/> Watershed-Based Plan (WBP) <input checked="" type="checkbox"/> WBP Implementation <input type="checkbox"/> BMP Technology Demonstration <input checked="" type="checkbox"/> Education/Technology Transfer <input type="checkbox"/> Other: _____
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8. River Basin: <input type="checkbox"/> Statewide <input type="checkbox"/> Kentucky <input type="checkbox"/> Salt	<input type="checkbox"/> Licking <input type="checkbox"/> Tygarts <input type="checkbox"/> Green <input type="checkbox"/> Tradewater	<input type="checkbox"/> Tennessee <input type="checkbox"/> Ohio tributary <input checked="" type="checkbox"/> Lower Cumberland <input type="checkbox"/> Upper Cumberland	<input type="checkbox"/> Big Sandy <input type="checkbox"/> Little Sandy <input type="checkbox"/> Mississippi
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NPS STAFF USE:

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<p>9. Geographic Coverage: (Check only one)</p> <p><input type="checkbox"/> Statewide</p> <p><input type="checkbox"/> Regional</p> <p><input checked="" type="checkbox"/> Watershed</p>	<p>10. NPS Pollutant(s) to be addressed:</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Low dissolved oxygen <input checked="" type="checkbox"/> Sedimentation/Siltation <input type="checkbox"/> Suspended Solids <input checked="" type="checkbox"/> Pathogens/Bacteria <input checked="" type="checkbox"/> Organic enrichment <input type="checkbox"/> Other: _____ </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Pesticides <input type="checkbox"/> Oil and grease <input checked="" type="checkbox"/> Nutrients <input type="checkbox"/> pH </td> </tr> </table>	<input type="checkbox"/> Low dissolved oxygen <input checked="" type="checkbox"/> Sedimentation/Siltation <input type="checkbox"/> Suspended Solids <input checked="" type="checkbox"/> Pathogens/Bacteria <input checked="" type="checkbox"/> Organic enrichment <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pesticides <input type="checkbox"/> Oil and grease <input checked="" type="checkbox"/> Nutrients <input type="checkbox"/> pH
<input type="checkbox"/> Low dissolved oxygen <input checked="" type="checkbox"/> Sedimentation/Siltation <input type="checkbox"/> Suspended Solids <input checked="" type="checkbox"/> Pathogens/Bacteria <input checked="" type="checkbox"/> Organic enrichment <input type="checkbox"/> Other: _____	<input type="checkbox"/> Pesticides <input type="checkbox"/> Oil and grease <input checked="" type="checkbox"/> Nutrients <input type="checkbox"/> pH		

11. NPS Pollution Source(s) to be addressed. Select up to five sources and include the percentage to which the project addresses the source. Total must equal 100%:

<input type="checkbox"/> NPS All <input checked="" type="checkbox"/> Agriculture 70% <input type="checkbox"/> Construction <input type="checkbox"/> Silviculture <input type="checkbox"/> Urban Runoff	<input type="checkbox"/> Resource Extraction <input checked="" type="checkbox"/> Habitat Modification 10% <input checked="" type="checkbox"/> Improper Waste Disposal (including Onsite Waste issues) 20% <input type="checkbox"/> Hydrologic Modification <input type="checkbox"/> Recreation <input type="checkbox"/> Other: _____
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12. Project Area:

- ◆ Project deals directly with groundwater, springs, or karst? yes no
- ◆ **For Watershed Projects Only, complete the following:**
- Project implements TMDL? yes no
- Project addresses TMDL that is under development? yes no
- Project is on a 2006 Integrated Report, Assessment Category 5A:
- Nonsupport stream? yes no
- OR Partial Support stream? yes no
- Project is on an Outstanding Resource Water with identified threats? yes no
- Project is on a High Quality Water with identified threats? yes no
- Project has other impairments or identified threats? (describe in app.) yes no

13. Location: Pleasant Grove Creek Subwatershed, Logan County, Kentucky

Map Attached: Yes N/A

A. Watershed(s) (Include watershed size in square miles):
Red River Watershed (Approximately 1,500 square miles), Pleasant Grove Creek Subwatershed

B. HUC(s): 05130206

C. County(s): Logan County, Kentucky

14. Project Summary (Two page limit):

Since 2002, Pleasant Grove Creek Subwatershed (also referred to as Pleasant Grove Spring) has been considered by the Kentucky Division of Water to be a 303(d) List 1st Priority Listing. Suffering from excessive nutrient and pathogen levels suspected to be linked to pasture grazing and onsite wastewater systems or septic tank failure, the creek is listed as only partially supporting aquatic life and non-supporting of human contact/recreational activities. According to the Cumberland River Compact's (CRC) Red River Watershed Map, Pleasant Grove Creek is described as a threat to human health and/or ecology.

In recent years there has been increased attention and funding aimed at remediating the Creek. The Cumberland River Compact's Building Outside the Box project, supported by the EPA and nearing completion, focuses largely on the implementation of agriculture-related best management practices (BMPs) in the Subwatershed. Austin Peay State University's Center for Field Biology (CFB) project is geared toward restoring sinkholes and educating landowners about karst connections to groundwater. Both projects are striving to reduce pollutant loads to the Creek.

Similarly, the goal in this application is measurable pollutant load reductions. This project will both draw from and build on the findings and efforts of the aforementioned groups and any other relevant work in the Pleasant Grove Creek Subwatershed to date. In particular, the farm campus restoration work done at the Jeff Campbell property in Adairville by the CRC, will serve as a demonstration model for other landowners in the area.

Western Kentucky University's Center for Water Resource Studies (CWRS) and project partner Red River Watershed Association (RRWA) will refine and implement a watershed based plan for this area. The aforementioned CFB plan will serve as a basis to which other relevant data will be added as it is available. CWRS sees watershed based plans as dynamic documents that should continually be refined as the implementation process necessitates. An integral part of the plan will be to identify specific landowners and select best management practices to be put into place on targeted properties. As part of the BMP determination process, the Center will conduct pre-BMP water quality monitoring for bacteria, nutrients and pathogens. Specifically, microbial source tracking will be used to differentiate microbial indicators of fecal pollution that is human-derived from that stemming from other species.

During the implementation phase, the RRWA will seek to put an effective array of best management practices and wastewater system repair strategies into place on targeted properties in the Pleasant Grove Creek drainage area and along smaller feeder streams in the watershed. Selection of these BMPs will be based in part on pre-BMP water quality findings. While the general assumption is that many of the pollutants affecting the Creek are agriculture-related, the potential contributions from onsite wastewater system failures among residences merit further investigation and restorative action if found to be a contributor of pollutants.

One of the main project objectives is landowner/citizen education regarding non-point source and wastewater system pollution and the primary causes of surface and groundwater impairment in the project area, specifically as it pertains to nutrients and pathogens from livestock grazing and failing septic tanks/sewers. WKU and project partners will host stakeholder meetings to generate public interest and involvement.

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Other measures of the project's success will include:

- a compilation report containing GIS maps showing BMP site details,
- photographs, and landscape/stream/habitat characterization pre and post-BMP implementation,
- positive changes in public knowledge levels from presentations addressing primary pollution concerns for the Pleasant Grove Creek Subwatershed,
- water quality monitoring results, and the dissemination of measures citizens can take to improve water quality,
- incorporation of restoration and water quality monitoring results into educational materials, and inclusion of project progress and reports on WKU, RRWA and CRC websites.

All BMPs implemented will be included in mapping/GIS products according to GPS coordinates and labeled with NRCS codes where possible.

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15. Introduction/Background (Two page limit):

Pleasant Grove Creek sub-watershed covers 34 square miles in Logan County, Kentucky and flows into Red River, which feeds the Lower Cumberland River. The topography in this area is dominantly karst with numerous sinkholes and springs. Land use is predominantly agricultural. A 2.2 mile segment of the creek is listed on the 2006 303(d) list of impaired surface waters for partial support of aquatic life and nonsupport of primary contact recreation (swimming). The identified pollutants include pathogens, nutrients, and organic enrichment (sewage) biological indicators. Suspected sources of contamination include grazing and on-site waste treatment systems.

In September 2006, KY Division of Water (KDOW) listed Pleasant Grove Creek as one of five Focus Watersheds in the state. The presence of local support strongly influenced the decision to select this impaired area as a Focus Watershed. The watershed is fortunate to have several active groups that promote awareness for the area, including:

- ❖ Adairville School
- ❖ Cumberland River Compact
- ❖ Four Rivers Basin Team
- ❖ Red River Watershed Association
- ❖ World Wildlife Fund

The Cumberland River Compact has worked in the Pleasant Grove Creek watershed since 2004 with the support of the EPA Targeted Watershed Initiative Grant (TWIG). Over a 3 year period, the Compact has established a strong working relationship with Jeff Campbell, a watershed landowner and community leader. The Compact partnered with Mr. Campbell, the World Wildlife Fund, and the Red River Watershed Association to conduct educational programs, landowner outreach, and visual stream assessment of Pleasant Grove Creek. A best management practices plan was designed and implemented on the Campbell farm, covering 500 feet on both banks of Pleasant Grove Creek. The following stream protection practices have been completed:

- ❖ Barn and house roof rainfall collection system with cistern water to be used for spraying fields (saving use of city water for this purpose)
- ❖ Cattle exclusion fencing along both banks
- ❖ Two alternative cattle watering sites with heavy use protection
- ❖ Repair and hard armoring of two large erosion gullies along stream banks
- ❖ Streambank restoration to repair serious bank erosion sites
- ❖ Habitat enhancement with re-establishment of in-stream riffle, pool, run features

Pre-BMP water quality monitoring and a macroinvertebrate study were conducted on the Campbell farm prior to implementation of the current BMPs. Monitoring outlined in this workplan will serve as post BMP data for the Campbell farm BMP work. A farm field day is planned for summer 2007 to publicize and promote the practices on this farm. Observations by CRC while working in the watershed during the last three years have led to the belief that human pathogen sources, in addition to agricultural sources, may be a significant contributor to pollution in this watershed.

A visual stream assessment was conducted in April 2006 through a cooperative agreement between the World Wildlife Fund's Southeast Rivers and Streams (SERS) Program and Cumberland River Compact. An abundance of algae and sediment was noted along the entire 2.2 mile stretch of stream. Recommendations included BMPs that target livestock exclusion fencing and improving riparian buffers. A recommendation was also made to review known sinkhole sites and consider sinkhole

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remediation as future BMP efforts.

Austin Peay State University is currently involved in a 319(h) project for the area titled "Sinkhole Education and Restoration for the Reduction of Nonpoint Source Pollution in the Pleasant Grove Creek Sub-watershed." This project focuses on protecting/restoring sinkholes and implementing vegetative buffers and riparian zone enhancements on select farmsteads in the proximity of Pleasant Grove Creek. Development of a Watershed Plan and Monitoring Plan are also components of APSU's project. The project began in October 2005 and is expected to be completed in November 2009.

KDOW began pre-TMDL monitoring in January 2007, which includes water quality sampling and nutrients analysis for 1 creek site and 4 spring sites in the watershed. A macroinvertebrate survey may be conducted as part of this study.

Although significant time and effort have been contributed to the improvement of water quality in this watershed, much work is still needed in order to accomplish the ultimate goal of delisting this creek and restoring its usefulness to the citizens of the Commonwealth.

16. NPS Pollution Control Project Goal, Objectives, and Activities:

Goal: Improve water quality in Pleasant Grove Creek subwatershed through landowner education and BMP implementation within the watershed.

Objective 1: BMPs implemented that support the reduction of nutrient, pathogen and sediment loading in the watershed. The BMPs will be based on the recommendations in APSU's Watershed Based Plan.

Activity 1: BMP selection

Activity 2: Train volunteers for BMP deployment

Activity 3: BMP implementation

Activity 4: Refine APSU's Watershed Plan

Objective 2: Improved citizen awareness through education of landowners and stakeholders regarding nonpoint source issues within the watershed.

Activity 1: Hold stakeholder meetings throughout the duration of the project

Activity 2: Create educational materials and revise existing materials

Activity 3: Develop BMP Interest Survey Tool and conduct survey

Activity 4: Distribute materials via the web, newspaper, radio, etc.

Objective 3: Documented improvements in water quality as a result of this project. Demonstrated NPS load reduction through pre- and post-BMP monitoring for bacteria, nutrients and pathogens.

Activity 1: Develop Quality Assurance Project Plan (QAPP) and submit to KDOW

Activity 2: Select monitoring sites based on a historic data review for the area

Activity 3: Conduct pre- and post-BMP monitoring

Activity 4: Report findings to KDOW

17. Describe the NPS Pollution Control Plan of Work:

The project partners will work to determine the most appropriate BMPs to be utilized on the identified properties of the Pleasant Grove Watershed (PGW). The RRWA will recruit, train, and supervise the work of volunteers that may be needed to perform BMP installation. If volunteer services are utilized during the installation of BMPs, the RRWA will develop a Volunteer Service Evaluation form to follow up with the volunteers to provide them an opportunity to comment on their volunteer experience.

The RRWA will determine the pricing, and oversee the deployment of the BMPs on the properties. The RRWA will also oversee the contracting process associated with BMP installation. This will include the following:

- a. conducting research necessary to choose contractors
- b. hiring contractors and negotiating terms of contracting
- c. monitoring the work of the contractors on an ongoing basis to ensure quality and timely installation of BMPs.

To assist in these efforts, CRC will serve as an advisor on the restoration team for ongoing assessment and BMP work in the watershed. CRC will provide organizational capacity building guidance to the project partners, including:

- a. management of restoration projects
- b. assistance with BMP planning, budgeting and implementation
- c. networking connections for contractors, suppliers, stakeholders and volunteers
- d. field oversight of BMP implementation as requested by RRWA.

The RRWA and CRC will work with CWRS to update the PGW Watershed Plan created by APSU to include all current, planned and new BMPs determined appropriate by past, current and proposed field work including microbial source tracking.

To improve citizen awareness of nonpoint source issues within the watershed, the project partners will hold stakeholder meetings throughout the duration of the project to educate the public about the project's goals and objectives, and to encourage public participation in all project areas.

RRWA will develop a BMP Interest Survey Tool to determine the level of interest among landowners in possible BMP application on their land. The survey will take into account all preceding work in and knowledge about the PGW area. A pilot test will be conducted on a small group and revised as needed prior to conducting the full survey. Once the survey is complete, the data will be compiled and analyzed. Based on the results, educational and capacity building materials will be revised and distributed in the form of fact sheets, websites, brochures, newspapers and PowerPoint presentations.

CRC will provide technology and information transfer from the recently completed TWIG project. This will include the creation of PowerPoint presentations and summary papers on river restoration and BMP implementation, covering the process, economics, outcomes and lessons learned. CRC will also distribute educational materials via website distribution and educational forums, and share baseline and ongoing water quality monitoring data in a meaningful format.

CRC will also assist the project partners with stakeholder outreach and relationship building in the

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watershed by participating in stakeholder outreach events, identifying and cultivating new partners in the watershed, and developing new outreach tools and community connections. CRC will use its success with landowner Jeff Campbell as a basis to introduce RRWA to surrounding landowners.

Pre- and post-BMP monitoring will be conducted in order to quantify improvements in the water quality of Pleasant Grove Creek. A QAPP will be developed and monitoring sites will be selected based on a historic data review of the area, including APSU's proposed monitoring plan. Initial monitoring and analysis will provide baseline levels of contaminants to be shared with the community to increase awareness of nonpoint source pollution. This will strengthen the case for implementing BMPs as an effective means of improving water quality. The results of the monitoring efforts, as well as BMP implementation progress and educational activities conducted, will be reported to KDOW.

18. Environmental Data Collection:

In the first year of the project, the Center for Water Resource Studies (CWRS) at Western Kentucky University (WKU) will deploy a trained field crew to collect samples from the impaired segment and upstream of the impaired segment. One campaign will be conducted per month for three consecutive months within 12-36 hours of a significant rain event (1 inch or greater within a 12-hour period). Each campaign will consist of collecting water samples from pre-determined locations and analyzing the water samples for nutrients and pathogens. Sampling sites within the watershed will be selected based upon a historical documentation review consisting of previous environmental reports, census, land-use data, topographic maps and aerial photography. Sites will be placed in strategic locations to maximize data quality, locate potential contamination sources, maintain project cost effectiveness and incorporate accessibility issues such as road and bridge locations. The field crew will also record GPS points, photographs, and directions to stream/site for each sample location.

The samples will be placed on ice immediately after collection and kept at temperatures below 5°C until ready for analysis. The samples will be analyzed for E. coli, total phosphorus, orthophosphate, nitrate, nitrite, ammonia nitrogen, total kjeldhal nitrogen (TKN), total organic carbon (TOC), biochemical oxygen demand (BOD) and total suspended solids (TSS). In addition to this standard suite of analytes, microbial source tracking (MST) will be conducted at each site.

DNA analysis will target Bacteroides strains known to be associated with human, bovine, swine, and equine sources. The Bacteroides-Prevotella taxonomic group of bacteria has emerged as the most informative and practical genotype for molecular MST studies for several reasons: Bacteroides strains comprise some 30-40% of the total bacterial component of feces (Layton et al., 2006) and have a high degree of host specificity (Carson et al., 2005; Dick et al., 2005). They are obligate anaerobes found only in the digestive tracts and body cavities of warm-blooded animals (Bernhard and Field, 2000).

Based on the results of the analyses, more targeted BMPs will be able to be implemented in Years 1-3. In year 4, a second deployment will be conducted. Samples will be collected and analyzed as they were in year one, and compared to the previous results in order to determine reductions in contaminant loading.

During discussions with the NPS Program Advisor for this proposed project, it was determined that since it would be difficult to provide a comprehensive Quality Assurance Project Plan (QAPP) before a monitoring plan is determined, a QAPP would not be required with this proposal submission. Once monitoring locations have been finalized and approved, a QAPP will be submitted prior to any monitoring outlined under this proposal.

19. Public Involvement:

The mission of the Red River Watershed Association (RRWA) is to enhance and protect the quality and quantity of water in its creeks and streams through activities that educate, promote community cooperation, and encourage responsible stewardship.

The RRWA will take the lead in identifying and contacting potential and current stakeholders in the Pleasant Grove Watershed (PGW) to educate and involve them in the processes and programs underway and solicit their support and/or cooperation. This will include contacting stakeholders through one or more of the following processes:

- ❖ publication and posting of flyers in the PGW area and surrounding communities
- ❖ notifications placed in local newspapers
- ❖ telephone contact with identified potential key stakeholders
- ❖ notification sent via U.S. Postal Service
- ❖ notifications sent via email
- ❖ notification posted on the RRWA website, <http://redriverwatershed.org>
- ❖ speaking engagements at local civic groups

The RRWA will develop public relations materials to be used in stakeholder education regarding the programs and processes being conducted in the PGW. These materials may include:

- ❖ printed flyers to be posted in surrounding communities and/or mailed to individual stakeholders
- ❖ published print brochure on applicable project components
- ❖ web-based informative page(s)
- ❖ an educational computerized slideshow (PowerPoint)
- ❖ a video/DVD presentation of the programs and processes.

The RRWA will plan, advertise, and facilitate initial and ongoing stakeholder meetings quarterly, or more often if deemed necessary, to discuss the planning and subsequent progress of the programs and processes in the PGW.

The RRWA will develop an "Interest Survey Tool" to be distributed to the stakeholders of the PGW to determine their interest level in bringing the programs and process to their property. This survey will be in the form of a U.S. Postal Service mailing, web-based submission, and/or telephone survey. The results of this survey tool will be used in determining appropriate PGW stakeholder properties to implement Best Management Practices (BMPs) and possible acceptability of specific BMPs.

The mission of the Cumberland River Compact (CRC) is to enhance the water quality of the Cumberland River and its tributaries through education and by promoting cooperation among citizens, businesses, and agencies in Kentucky and Tennessee. CRC will support RRWA's outreach efforts by assisting with the development of educational materials, participating in stakeholder meetings, and facilitating networking between landowners, volunteers, and contractors.

20. Project Partners: Letters of support are required from all partners (see 2008 NPS Grant Guidance)

Agency Name: Red River Watershed Association
Agency Address: P.O. Box 1185, Springfield, TN 37172
Role/Contribution to Project: stakeholder education, BMP selection and implementation
Contact Person: Jim Pascoe, President Phone No. 615-202-0201
E-mail address: jimpascoe@bigfoot.com

Agency Name: Cumberland River Compact
Agency Address: P.O. Box 41721, Nashville, TN 37204
Role/Contribution to Project: info/technology transfer, relationship building, field assistance
Contact Person: Dr. Gwen Griffith Phone No. 615-353-0272
E-mail address: Avegwen@aol.com

Agency Name:
Agency Address:
Role/Contribution to Project:
Contact Person: Phone No.
E-mail address:

Agency Name:
Agency Address:
Role/Contribution to Project:
Contact Person: Phone No.
E-mail address:

Agency Name:
Agency Address:
Role/Contribution to Project:
Contact Person: Phone No.
E-mail address:

Agency Name:
Agency Address:
Role/Contribution to Project:
Contact Person: Phone No.
E-mail address:

21. Project Measures of Success:

Deliverables will include:

- Number and types of BMPs implemented in Pleasant Grove Creek Subwatershed
- Photographs and landscape/stream/habitat characterization pre and post-BMP implementation
- Refined Watershed Plan for Pleasant Grove Creek based on APSU's plan
- Attendance records and minutes from public stakeholder meetings
- Copies of educational/informational materials developed, methods of distribution, and estimated number of recipients
- Copy of BMP interest survey and survey results
- Water quality monitoring results pre- and post-BMP implementation for bacteria, nutrients and pathogens to show a measurable improvement in water quality
- A compilation report containing GIS maps with BMP site details

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22. Milestone Schedule: Milestones	Expected Begin Date	Expected Completion Date
Notify NPS staff of quarterly stakeholder meetings	July 2008	June 2011
Hold quarterly stakeholder meetings in a central location	July 2008	June 2011
Finalize monitoring plan based on historic data	July 2008	Sept 2008
Develop QAPP and submit draft to KDOW	July 2008	Sept 2008
Create educational materials and submit draft to KDOW	July 2008	Sept 2008
Conduct pre-BMP water quality monitoring	October 2008	December 2008
BMP selection and implementation	October 2008	June 2011
Meet with Project Partners quarterly to discuss progress	October 2008	December 2011
Submit finalized educational materials to KDOW	December 2008	December 2008
1 st annual progress report to KDOW	December 2008	December 2008
Develop BMP Interest Survey Tool and conduct pilot study	October 2008	March 2009
Conduct Interest Survey	April 2009	June 2009
Submit draft of refined watershed plan to KDOW	June 2009	June 2009
Train volunteers for BMP deployment	July 2009	Sept 2009
Compile and analyze survey data	July 2009	Sept 2009
Revise educational materials based on survey results	July 2009	Sept 2009
Submit revised educational materials to KDOW	Sept 2009	Sept 2009
2 nd annual progress report to KDOW	December 2009	December 2009
Distribute materials through web, newspaper, radio, etc.	January 2010	June 2011
3 rd annual progress report to KDOW	December 2010	December 2010
Conduct post-BMP water quality monitoring	October 2011	December 2011
4 th annual progress report to KDOW	December 2011	December 2011
Final report to KDOW	June 2012	June 2012

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23. Reference/Literature Cited:

2006 Integrated Report to Congress on the Condition of Water Resources in Kentucky, Volume II. 303(d) List of Surface Waters. Kentucky Environmental and Public Protection Cabinet, Division of Water, November 2006.

Ellis, Rhonda. *Visual Stream Assessment, Pleasant Grove Creek Watershed, Logan County, Kentucky*. World Wildlife Fund and Cumberland River Compact, April 2006.

Barrass, Andrew. *Sinkhole Education and Restoration for the Reduction of Nonpoint Source Pollution in the Pleasant Grove Creek Subwatershed*. FFY 2005 Kentucky NPSPC Program Project Application, September 2004.

Layton, Alice et al. *Development of Bacteroides 16S rRNA Gene TaqMan-Based Real-Time PCR Assays for Estimation of Total, Human, and Bovine Fecal Pollution in Water*. Applied and Environmental Microbiology, June 2006. p. 4214-4224.

Carson, Andrew C. et al. *Specificity of a Bacteroides thetaiotaomicron Marker for Human Feces*. Applied and Environmental Microbiology, August 2005. p. 4945-4949.

Dick, Linda K. et al. *Host Distributions of Uncultivated Fecal Bacteroidales Bacteria Reveal Genetic Markers for Fecal Source Identification*. Applied and Environmental Microbiology, June 2005. p. 3184-3191.

Bernhard, Anne E. and Katharine G. Field. *Identification of Nonpoint Sources of Fecal Pollution in Coastal Waters by Using Host-Specific 16S Ribosomal DNA Genetic Markers from Fecal Anaerobes*. Applied and Environmental Microbiology, April 2000. p. 1587-1594.

24. Budget Summary

	BMP Implementa- -tion	Project Management	Education, Training, or Outreach	Monitoring	Technical Assistance	Other	TOTAL
Personnel	\$0	\$111,234	\$0	\$17,088	\$0	\$0	\$128,322
Supplies	\$0	\$1000	\$0	\$3000	\$0	\$0	\$4000
Equipment	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Travel	\$0	\$1000	\$0	\$3000	\$0	\$0	\$4000
Contractual	\$53,500	\$34,600	\$64,900	\$0	\$47,100	\$0	\$200,100
Operating Costs	\$1863	\$16,799	\$2208	\$6316	\$1656	\$0	\$28,842
Other	\$0	\$0	\$0	\$22,680	\$0	\$0	\$22,680
TOTAL	\$55,363	\$164,633	\$67,108	\$52,084	\$48,756	\$0	\$387,944

25. Detailed Budget

Budget Categories (itemize all categories)	Section 319(h)	Non-Federal Match	TOTAL
Personnel	\$92,976	\$35,346	\$128,322
Supplies	\$0	\$4000	\$4000
Equipment	\$0	\$0	\$0
Travel	\$0	\$4000	\$4000
Contractual	\$120,060	\$80,040	\$200,100
Operating Costs	\$19,730	\$9112	\$28,842
Other	\$0	\$22,680	\$22,680
TOTAL	\$232,766	\$155,178	\$387,944
	60%	40%	<u>100</u> %

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26. Budget Narrative (Two page limit):

Personnel

Time and effort expended by the Project Director will be used as cost share for this project. Dr. Ernest is paid by University funds.

Funds are requested to cover partial effort of a Project Coordinator for the life of the grant. Project coordination activities will include ensuring that deliverables are met by the field crew, laboratory and subcontractors. Status reports will also be generated by the Project Coordinator.

Partial effort from a Field Operations Manager and Field Operations Supervisor is also required in order to fulfill the water quality sampling obligations outlined in the proposal. An IT Manager for maintaining the data generated from the project and ensuring that all data are uploaded to the Division of Water in Compass format is also requested. Partial effort from an Office Manager to maintain budgetary obligations, including invoicing Sponsor and processing payments for subcontractors, is required.

Supplies

Supplies in the form of laboratory and office consumables needed in order to accomplish the outlined tasks will be provided by the applicant as cost share.

Travel

In-state travel expenses including roundtrip mileage from WKU to the Pleasant Grove Creek sub-watershed in Logan County, KY in order to conduct water quality monitoring, and on an as-needed basis to meet with stakeholders and grant partners, will be provided by the applicant as cost share.

Contractual

WKU is partnering with the Red River Watershed Association (RRWA) and the Cumberland River Compact (CRC) to accomplish the outreach activities associated with the grant. It was originally envisioned that RRWA would take the primary role in the project, but due to temporary personnel constraints at RRWA during the grant writing process, it was decided that WKU would be the administrator for the project. RRWA will be responsible for stakeholder/landowner education, BMP selection and implementation, and volunteer coordination within the watershed.

RRWA's in-kind match will include:

- ❖ Volunteer time during the planning and attendance of all meetings related to this project
- ❖ Volunteer time for all travel and attendance on-site at the project
- ❖ Actual travel costs for the attendance of all meetings and on-site volunteer participation
- ❖ Volunteer time associated with all aspects of stakeholder contact and communication
- ❖ Volunteer time and travel costs associated with all aspects of contractor procurement
- ❖ Newsletter and web site production time and contract costs
- ❖ Production time associated with the development of educational materials and presentations
- ❖ Presenter's time and travel costs associated with educational presentations

CRC will be responsible for providing technology and information transfer to the watershed stakeholders/landowners, assisting with relationship building and BMP selection, and assisting with field implementation as requested by RRWA.

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CRC Matching funds to be provided through the following in-kind activities:

- ❖ Volunteer time during stakeholder outreach activities
- ❖ Travel costs
- ❖ Website and hard copy publications of TWIG project materials for outreach use
- ❖ Use of projection equipment for presentations
- ❖ Phone and postage costs
- ❖ In-kind donations and sponsorships for food, supplies and materials

Operating Costs

WKU charges F&A on 13.8% of the modified direct costs of the project. This rate is based on the total cost of WKU's portion of the project, and the first \$25,000 of each subcontractor's budget. The overhead costs pay for indirect expenses such as offices, electricity and institutional administration of the grant.

Other

Laboratory analyses are required in Years 1 and 4. Lab analyses will be conducted at the WATERS Laboratory at WKU, and will include bacteria, nutrient, and pathogen evaluations. Microbial source tracking using Bacteroides DNA will be performed using Real-Time PCR techniques. Costs associated with the analyses will be covered by the applicant as cost share.

27. Grant Application Conditions

Completion of this section is required in order to receive funding consideration.

- Applicant agrees that the proposed project will comply with all applicable state laws and rules.
 Yes N/A
- Applicant agrees to obtain all applicable permits. Yes N/A
- Reporting will be conducted in accordance with the legal contract. Yes N/A
- All Project Partners have agreed to participate. Yes N/A
- **I have read and agree to comply with all applicable conditions as specified in the Guidance Document.**
 - Education Materials Condition (See Section 27, Page 26) Yes N/A
 - Material Review Condition (See Section 27, Page 26) Yes N/A
 - QAPP Condition (See Section 27, Page 26) Yes N/A
 - BMP Implementation Plan Condition (See Section 27, Page 26) Yes N/A
 - Onsite Wastewater Condition (See Section 27, Page 27) Yes N/A
 - AFO Condition (See Section 27, Page 27) Yes N/A
 - Stream Restoration Condition (See Section 27, Page 28) Yes N/A
 - GIS Condition (See Section 27, Page 28) Yes N/A
 - Annual Report Condition (See Section 27, Page 28) Yes N/A
 - Project Partners Condition (See Section 27, Page 28) Yes N/A

WARNING: Any application which is determined to be deficient, not eligible or missing KEY components will not be considered for funding.

28. Application Signature:

 Signature of Lead Agency's Authorized Representative

 Date

Dr. Phillip Myers, Director of WKU Research Foundation

270-745-4652

Typed Name and Title of Representative

Telephone Number