Project 02-500
Ballard Creek BMP Implementation Project
Washington County Conservation District
FY 2002, CWA Section 319(h)

FINAL REPORT

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30 September 2005

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I. EXECUTIVE SUMMARY

The Illinois River, Arkansas was identified in the report *Illinois River Cooperative River Basin Resource Base Report* (1991) as an impaired stream due to the influx of non-point source pollution, and it identified phosphorus as the limiting nutrient in the basin. Several other reports have also indicated the water quality impairment of this river including the State of Arkansas' *Water Quality Assessment Report*, the *Soil Conservation Service River Basin Study*, and several University of Arkansas studies. The Illinois River is impounded in Oklahoma to form Lake Tenkiller, a lake that has experienced degraded water quality for many years. The symptoms of degraded water quality in this reservoir include excessive algal growth, hypolimnetic anoxia, and increased turbidity. The conclusions of the United States Environmental Protection Agency funded *Cooperative "Clean Lakes" Project* was that "source control of impinging phosphorus loads is the optimum management alternative".

The state of Oklahoma and agencies of the state of Arkansas such as Arkansas Natural Resources Commission and the Arkansas Department of Environmental Quality have agreed to reduce by 40% the phosphorus loading in Lake Tenkiller. This reduction in lake phosphorus loading can only be achieved by controlling the inputs of phosphorus in the Illinois River basin. This reduction is considered sufficient to arrest the lake's current rate of eutrophication. One of the recognized methods for controlling the runoff of nutrients into the Illinois River basin focuses on implementing land use management practices or Best Management Practices (BMPs).

In 1996, the University of Arkansas completed a project that estimated the phosphorus loading from each of the thirty-seven sub-watersheds that comprise the Illinois River Basin. This report indicated that Ballard Creek was impaired, by excessive phosphorus load, and ranked high in priority for phosphorus reductions.

The selection of the Ballard Creek sub-watershed for intensive, voluntary BMP implementation was based on the following criteria: (1) the sub-watershed had to be above the current medium ranking value for total phosphorus (TP) (0.065- 0.950 Kg TP/ha-yr or 1,018 – 14,883 lb TP/yr, (2) there are no sewage treatment discharges in the sub-watershed, and (3) there had to be sufficient landowner interest in the project as indicated by successful completion of the Education Phase as conducted by University of Arkansas, Cooperative Extension Service.

The Upper Ballard Creek watershed met all these requirements and was funded for Phase I through Phase IV implementation. Phase I of the project included an assessment of the Ballard Creek Watershed that was conducted by the Washington County Conservation District in 1999. This assessment identified three primary sources of phosphorus in the Ballard Creek watershed: Soil phosphorus eroded from stream banks, soil bound phosphorus moved from eroded pastures, and eroded road banks.

We estimated that the amount of soil test phosphorus (STP) entering the stream and its tributaries was approximately 376 pounds from an estimated 4,207 tons of delivered sediment. The majority of this STP was assumed to be from soil washed into Ballard Creek and its tributaries from stream bank erosion, which comprises 51% of STP additions. Sheet and rill erosion from pastureland accounted for 40% of the total STP, while only 9% of the STP load was attributable to road bank erosion.

The goal of this project was to implement conservation practices (BMPs) throughout the Ballard Creek and other areas of the Illinois River Watershed that would reduce phosphorus pollution in the Illinois River, Arkansas. The areas of concentration were as follows: unstable stream banks, agricultural land at risk of nutrient transport, and eroded road banks in need of re-vegetation. Another important goal of this project was to demonstrate the effectiveness of BMPs through education of the general public, public agencies, the University of Arkansas students and professors, and others.

This project provided implementation of four of the five proposed action items for Phase IV of the Ballard Creek Watershed Assessment Project, which proposed the following: (1) establish cost-shared BMPs throughout the watershed, (2) develop Nutrient Management Plans (implement non cost-shared BMPs), (3) install stream bank stabilization practices and a stream bank stabilization demonstration project, (4) install roadside erosion control practices, and (5) provide an education and Technology Transfer program.

This project has been completed within the original proposed timeframe of 08/01/2002 and 10/01/2005. The cooperators involved included the Arkansas Soil and Water Conservation Commission (project and reporting review); Washington County Soil and Water Conservation District (WCCD) (education, information, nutrient management plan development, contract development, and reporting), Washington County Road Department (roadside hydromulching projects), Natural Resources Conservation Service (NRCS) (information and technical assistance, BMP funding), the University of Arkansas, Cooperative Extension Service (information, education, survey development), and public participation (Conservation District Board of Directors, landowners).

II. PROJECT CHRONOLOGY

The project had five primary tasks as follows:

- Task 1, Education and Technology Transfer
- Task 2, Technical Assistance (develop NMPs)
- Task 3, BMP Cost Share (fund landowner installed BMPs and roadside erosion control)
- Task 4, Stream bank Stabilization Demonstration Project
- Task 5, Reporting

Task 1: Education and Technology Transfer

Objectives: Educate the public about the program goals and benefits, and the project's accomplishments and conclusions. Audience: Landowners, University of

Arkansas students and faculty, Cooperative Extension Service, Washington County Soil and Water Conservation District, and the Natural Resources Conservation Service.

The WCCD conducted public education and technology transfers using field days, posters and booths, an hydromulcher demonstration, numerous newsletter articles, and public meetings (see appendix A). We held three farm demonstrations (Umberson, Cuzick, and Chenoweth farms) to inform other landowners, the general public, University of Arkansas students and faculty, etc. of the effectiveness of best management practices in controlling the runoff of nutrients from land surfaces. Attendance at these meetings was generally good averaging about 25 persons at each.

The Umberson demonstration was held on October 30, 2003. The conservation district discussed the benefits of using prescribed grazing, temporary electric fencing, portable watering facilities, nutrient management planning, and litter truck calibration. This demonstration included researchers from the University of Arkansas: the Agriculture Department presented information on the benefits of prescribed grazing, and the Biological and Agricultural Engineering Department discussed water quality issues in the Illinois River, Arkansas. The NRCS grazing land specialist was on hand to discuss electric fencing, prescribed grazing, and the benefits of nutrient management.

The Cuzick demonstration (Poultry Litter Calibration Workshop and Field Day) was held on March 30, 2004. In this project, the district discussed the Ballard Creek BMP Implementation Project, and the Cooperative Extension Service demonstrated the process of poultry litter calibration. We weighed both poultry litter trucks and de-cake machines then measured the amount of litter per unit area that was applied by each machine. We discussed the importance of knowing the actual amounts of litter that are land applied and how knowing this information was vital for nutrient management to be successful.

We also held a stacking shed (waste storage facility) demonstration on July 15, 2003 at the Chenoweth farm. The district discussed the environmental benefits of utilizing a stacking shed, available cost share, and nutrient management utilizing a stacking shed. The Cooperative Extension Service discussed its litter truck calibration service, and NRCS discussed the costs and engineering requirements required to receive cost share for the stacking shed practice.

We, along with the Arkansas Association of Conservation Districts, were successful in organizing a group of Ballard Creek citizens who have formed the Western Washington County Watershed Group. This group (approximately 20 persons) produced a Business Plan for the Ballard Creek Watershed, and will represent the interests of all Illinois River landowners in the future (see work plan in Appendix A). They discussed the need to be inclusive of all stakeholders including those who may be hostile to farming.

In January of 2005, we cooperated with area Hmong Farmers most of whom live and farm in the Illinois River Watershed. We presented information in the Hmong language and discussed the Ballard Creek project as well as other programs and technical services that local agencies provide. We found that many Hmong farmers were confused by NRCS engineering standards and specifications for BMPs. As a result, the NRCS has

committed to work with the WCCD to provide standards and specifications written in Hmong. We are planning another Hmong meeting in December 2005 where NRCS will provide a Hmong-speaking engineer. We estimate that there are approximately 100 Hmong farmers in the Northwest Arkansas Area (including Ft. Smith) that will benefit from this continued education effort.

Obstacles Encountered: No substantive obstacles were encountered in delivering our information and technology components.

Figure 1. Conservation district hosts Hmong Grower's Group meeting in Lincoln, Arkansas in cooperation with University Arkansas Cooperative Extension Service, NRCS, and Farm Service Agency.

Task 2: Technical Assistance

Nutrient Management Planning

Objective: Provide technical assistance to landowners within the Ballard Creek Watershed. Our goal was to reduce the rate of nutrient transport by providing landowners with comprehensive nutrient management plans and by developing cost-share contracts.

Several years ago, the poultry integrators in Northwest Arkansas began requiring their contract farmers to receive Nutrient Management Plans (NMPs) from the WCCD and NRCS. This project provided additional technical assistance to provide NMPs for all known poultry operations in Ballard Creek Watershed. Technical assistance for BMP planning and implementation was provided by the Washington County Soil and Water Conservation District (WCCD) technician and NRCS personnel.

Nutrient Management plans are designed to guide land managers in properly utilizing plant nutrients (primarily nitrogen and phosphorus) that are found in animal waste and commercial fertilizer. The goal of nutrient management is to provide for agronomic gains while protecting ground and surface waters from NPS pollution. In this project, we developed 83 nutrient management plans throughout the whole Illinois River Watershed in Washington County. We developed 35 plans within Ballard Creek providing NMPs for all known poultry producers and many poultry litter users within the watershed (Figure 1).

We developed plans after making site visits, interviewing landowners about their management goals and management methods, and collecting soil samples and other physical data. While the emphasis was on the work in the Ballard Creek Watershed, we

also performed work outside the watershed but within the Illinois River referred to in this document as Illinois River, Other Sub Watersheds (Tables 1 and 2). The planning process included the calculation of the Arkansas P-index, which is a mathematical model that relies on land characteristics that influence soil loss (e.g., slope, slope length, percent cover). The P-Index allows us to calculate the maximal amount of poultry litter that can be applied to a field while minimizing the risks of non point source pollution from soluble phosphorus.

Our methods included the planning of Best Management Practices (BMPs). Best Management Practices or Conservation Practices are specific treatments, such as structural or vegetative measures, or management techniques, commonly used to meet specific needs (e.g., NPS pollution abatement, reducing soil erosion, etc.) in planning and implementing conservation, for which standards and specifications have been developed. In this project, routine BMPs included Buffer Zones (Filter Strips), Forage Harvest Management, Pest Management, Prescribed Grazing, and Nutrient Management. When implemented, these BMPs promote grass cover and vigor (forage harvest management and prescribed grazing), maintain stands of grass cover (nutrient management and pest management), and prevent the movement of nutrients from fields to water bodies (filter strips). These BMPs are typically low or no cost. Other more expensive BMPs such as Waste Storage Facilities (stacking sheds) were cost shared with a combination of cost share dollars provided by NRCS and the district through this Section 319 project (Table 3).

Note: The project work was primarily focused in the Ballard Creek sub watershed located in HUC#11110103. This report contains project data that includes Ballard and numerous other sub watersheds that are distributed throughout the entire Illinois River basin within Washington County, Arkansas. Plans developed in areas other than Ballard Creek are distributed sporadically over a very large area (approximately half of the county) and are presented in this report as "Illinois River-Other Sub Watersheds".

Figure 2. Washington County Road Map with Ballard Creek Watershed Outline and Property Boundaries for all Cooperating Landowners within Illinois River, Washington County, Arkansas.

Figure 3. Aerial Photograph: Ballard Creek Watershed Boundary with Project Cooperator Property Boundaries.

Table 1. Best Management Practices Implemented in Ballard Creek Watershed and Other Sub Watersheds of the Illinois River

(HUC #11110103), Washington County, Arkansas			
		BMPs Implemented	
BMP #	BMP Name	Total number of farms with this BMP	Total Area Impacted (ac, ft, etc.)
382	Fencing	13	50,169 ft
614/642	Trough/Tank	9	9 No.
516	Pipeline	5	7,800 ft
393	Filter Strip	77	1,379 ac
511	Forage Harvest Mgt	77	4,884 ac
590	Nutrient Management	82	6,258 ac
595	Pest Management	72	4,224 ac
633	Waste Utilization	67	5,181 ac
528	Prescribed Grazing	64	5,189 ac
312	Waste Mgt Systems	12	12 No.
313	Waste Storage Facility	16	16 No.
316/317	Animal Mortality Facility	4	4 No.
786	Alum Treatment	8	82.5 Tons
342	Critical Area Planting	4	5.3 ac
561	Heavy Use Area	1	2.1 ac
351	Well	1	1 No.
512	Pasture and Hay Planting	9	250 ac
378	Pond	1	1 No.

Table 2. Non Cost Shared Best Management Practices Implemented In Ballard Creek Sub Watershed (HUC #11110103)			
BMP #	BMP Name	Total number of farms with this BMP	Total Area Impacted (ac, ft, etc.)
393	Filter Strip	33	728 ac
511	Forage Harvest Mgt	35	4,235 ac
590	Nutrient Management	35	4,235 ac
595	Pest Management	30	2,952 ac
633	Waste Utilization	35	2,060 ac
528	Prescribed Grazing	35	1,854 ac
312	Waste Mgt Systems	7	7 No.
313	Waste Storage Facility	8	8 No.
316/317	Animal Mortality Facility	2	2 No.
786	Alum Treatment	3	82.5 Tons
342	Critical Area Planting	3	3.26 ac

Obstacles Encountered: Over the course of the project, many farms were sold or divided resulting in new property boundaries and operational changes. These changes

required updates to existing plans. Many new farmers were non English speaking Hmong people. We encountered difficulty in explaining the planning process and the requirements of the state poultry litter regulations, so we added a special Hmong language program to our existing education and technology transfer objectives in Ballard Creek, expanded it to include Hmong speakers from across the county, and held an education day for the Hmong people (see discussion, Section IV).

Task 3: BMP Cost Sharing

Objectives: Share the costs of implementing BMPs on agricultural land within the Ballard Creek Watershed. Our goal was to reduce the rate of nutrient transport (especially phosphorus) in rainfall runoff by promoting the proper timing and placement of animal and commercial fertilizer, reducing the phosphorus content of soil through the establishment of pasture forages and prescribed grazing (for P mining), and establishing buffer zones to reduce the transport of phosphorus in land surface runoff (Edwards, et. al., 1996, 1997; Vendrell, et. al., 1997).

BMP Cost Share: While many BMPs are routine and require only management changes (e.g., forage harvest management), others BMPs require financial investment. These include for example Fencing, Watering Facilities, Waste Storage Facilities, and Pasture and Hay Planting. Fencing and Pasture and Hay planting promote ground cover and reduce soil erosion hazards; watering facilities prevent animals from entering streams and ponds to drink thereby reducing the amounts of waste deposited directly into water systems; Waste Storage Facilities reduce the risks of non point source pollution by providing a covered area to store animal waste until optimal environmental conditions are present (e.g., when it is not raining) or allows them the option to stockpile litter until it can be sold and moved off farm.

We developed a total of 43 cost share contracts and funded all or part of 31 of these (Table 3). The majority of the BMPs funded by this project included waste storage facilities, fencing, and water facilities (for Prescribed Grazing). The success of the BMP cost share program was due to our ability to cooperate with NRCS to provide complimentary cost share contracts for the Environmental Quality Incentives Program (EQIP). The EQIP program contracted for many of the same BMPs at the rate of 75%, but due to the differences in the actual vs. estimated costs of installation, we were able to write back up contracts for many persons providing a maximum combined cost share of 75%.

Table 3. Cost Shared Best Management Practices Implemented In Ballard Creek Watershed (HUC #11110103)					
		Ballard Creek		Illinois River-Other Sub Watersheds	
BMP #	BMP Name	Total number of farms with this BMP	Total Area Impacted (ac, ft, etc.)	Total number of farms with this BMP	Total Area Impacted (ac, ft, etc.)
382	Fencing	10	45,372 ft	3	4,797
614/642	Trough/Tank	2	15 No.	-	-
516	Pipeline	3	3,210 ft	-	-
313	Waste Storage Facility	8	No.	8	8 No.
561	Heavy Use Area	-	-	4	4 No.
351	Well	-	-	1	4 No.
512	Pasture and Hay Planting	-	-	5	106.2 ac
378	Pond	2	2 No.	-	-
		Ballard Cost Share		Illinois-Other Cost Share	
		319	$ 45,689.31	319	$ 48,178.40
		EQIP	$ 93,364.10	EQIP	$146,796.65
		Landowner	$ 97,369.72	Landowner	$ 98,363.70
		Sub Total	$236,423.13	Sub Total	$293,328.75
		Project Total $ 529,751.88			

There were three sources of funding for the cost shared practices: 319 project funds, EQIP funds, and landowner matching funds.

Obstacles Encountered: In the first year of the project, we limited cost sharing to landowners located in Ballard Creek although we retained the option of coupling EQIP and 319 Project Funding. In the first year, we only developed four contracts. In year two, we broadened the scope of the cost share program to include other areas of the Illinois River in Washington County. This proved successful as we eventually developed 44 contracts, completing 31 including 12 in Ballard Creek Watershed. The greatest obstacle for the cost share portion of the project was the low rate of cost share available to landowners who did not have EQIP contracts: the cost share rate of 40% is not enough enticement for most landowners to undertake land management practices.

Install Roadside Erosion Control Practices

Objectives: The goal of this program was to install critical area plantings along road ditches and road banks to reduce sediment transport resulting from road construction and maintenance practices.

In 1997, the WCCD entered into a four-county program to share in the use of a hydromulcher, which is available for use by each county's road department. To date the old hydromulcher-sharing program is largely unsuccessful for Washington County as the hydromulcher was and is stored in a distant county. The poor location makes it difficult to utilize on the majority of Washington County's road projects which are located in western Washington County. To offset this problem, the conservation district developed a new hydromulching program with the Washington County Road Department. The district purchased a new hydromulcher and 5 tons of mulching supplies, which it then donated to the county for its use. The county and the district used the new hydromulcher to install six sites throughout the Illinois River, Washington County.

This project was successful in promoting the county's use of the hydromulcher in critical areas of the Ballard. Critical areas include roads running adjacent to streams, roads that cross streams, and roads with severe erosion problems. Hydromulched ditches and banks (Critical Area Plantings) provide erosion control and traps sediment that washes from road surfaces and roadside ditch banks.

The county worked with the district to install roadside erosion control plantings in six locations (nineteen application sites) including three in the Ballard Creek Watershed (3.26 acres) and three additional areas in the Illinois River (1.02 acres) (see Table 4 and Appendix B). At the Ballard Creek sites, we hydromulched roadsides that had been graded and shaped prior to planting; these were moderately successful resulting in BMP efficiencies of about 45-50% resulting in a load reduction of 4,412 lb phosphorus/year and 4,412 Tons sediment/year. The other Illinois River hydromulched sites included bridge construction sites and soil-borrow areas. These were also successful averaging BMP efficiencies of 65-75% yielding Phosphorus and sediment load reductions of 3,015 lb/year and 3,015 tons/year (Table 4).

Figure 4. Hydromulched Road Sites within Ballard Creek and Other Watersheds of Illinois River, Washington County, Arkansas.

Figure 5. Washington County Road Department and Washington County Conservation District install roadside hydromulching site on Ballard Creek, Illinois River, Arkansas.

Figure 6. Washington County Road Department uses hydromulch to stabilize a newly installed bridge site located on a tributary of the Illinois River, Arkansas.

Obstacles Encountered: Hydromulching obstacles included problems with logistics and personnel. It took considerable effort from our district and the county's road department to prepare a hydromulching site. The mulcher requires a very large truck capable of hauling the mulch (1000 cubic feet of mulch would be a very small project), a truck large enough to pull the loaded hydromulcher, and personnel to load mulch, seed, and fertilizer, add water, and direct traffic. Water availability was a problem as well. We often drew water from streams, but appropriate water pick up locations were often located considerable distances from the mulching sites. Water pick up areas required the following criteria: have sufficient depth to insert a pick up hose, have adequate flow, be free of sediment, and provide a safe area where traffic would not cause a hazard to personnel. Increased water hauling distances required the addition of time, personnel, and vehicles to the filling efforts. As with any other grass planting project, weather conditions caused reduced seed germination and spotty stands. In some cases, it was also difficult for grasses to germinate because existing roadsides were built on poor soil. We considered 40% cover to be maximal in certain cases due to large areas of the soil surface being covered in stones and shale. Shade along narrow road areas also reduced the germination rate and prevented some species (e.g., fescue) from growing adequately.

Task 4: Stream bank Stabilization cost share program

Objectives: Our goal was stabilize eroding stream banks and to reduce the amount of sediment being transported into Ballard Creek and other parts of the Illinois River by installing various stream bank stabilization practices (e.g., cedar tree revetments, rip rap, and riparian vegetation establishment). We also intended to develop a stream bank demonstration project to show landowners the various stabilization practices that are available and to recruit other participants in the cost share project.

Obstacles encountered: The WCCD promoted and planned practices that were aimed at controlling stream bank erosion (such as grading and shaping, rip rap, revetments, etc.) in conjunction with riparian forest buffer establishment, but we were unsuccessful in completing any plans. One landowner died and another was unwilling to install the practices according to specifications. Several other landowners expressed interest, but were unwilling to match the financial obligation. The district suffered a 100 year flood in April, 2004 and we witnessed extensive, countywide stream destruction including two of our previously stabilized sites. The known damage to our existing stream bank sites, the high costs of installation, and the lengthy planning process, combined to squelch what little interest our remaining landowners had in installing stream bank stabilization

structures. Due to a lack of interest, we turned back $to ANRC in year two of the project.

Task 5: Reporting

Objectives: Report the progress in each task and sub-task, discuss accomplishments and problems encountered, and report on results of BMP implementation.

We submitted quarterly and annual reports as required throughout the term of the project.

Obstacles encountered: No obstacles to completing this task were encountered.

III. MEASURES OF SUCCESS AND PERFORMANCE

Our original measures of success in reducing NPS pollution in Ballard Creek Watershed were as follows: provide demonstration and public information, plan 5,000 acres of nutrient management, install pasture plantings, and install buffer zones (filter strips). We also sought to demonstrate the results of nutrient mining a process whereby soil phosphorus concentrations are reduced by coordinating intensive grazing and nutrient management practices. The overall goal of our Ballard Creek watershed project was to reduce the total annual load of phosphorus by a 3,960 lb/year.

For this project, we utilized the Region 5, Spreadsheet Tool for the Estimation of Pollutant Load (STEPL) model for the calculations of load reductions (see Tables 4 and 5).

Table 4. Load Reductions for Hydromulched sites in Ballard Creek Sub Watershed and Other Sub Watersheds of the Illinois River (HUC #11110103), Washington County, Arkansas

Site	% BMP Eff.	Load Reduction			Total Load Reduction		
		N (lb/yr)	P (lb/yr)	Sediment (tons/yr)	N (lb/yr)	P (lb/yr)	Sediment (tons/yr)
BALLARD Sub-Watershed							
CR 15							
A	40	218	109	109	-	-	-
B	50	1,711	855	855	1,929	964	964
CR 76							
A	50	1,428	714	714	-	-	-
B	50	1,302	651	651	2,730	1,365	1,365
CR 3622							
A	40	2,082	1,041	1,041	-	-	-
B	40	2,082	1,041	1,041	4,165	2,083	2,083

Ballard W.S. Subtotals					**8,824**	**4,412**	**4,412**
ILLINOIS RIVER: Other Sub-Watersheds							
Harmon							
A	75	165	82	82			
B	75	588	294	294			
Hickory A	-	-	-	-			
D	75	287	143	143			
E	75	149	75	75			
F	75	454	227	227	1,643	822	822
Hickory B							
B	65	638	319	319			
C	65	114	57	57			
D	65	1485	743	743			
E	65	646	323	323			
F	65	955	477	477			
G	65	547	274	274	4,386	2,193	2,193
Illinois River Totals-Other watersheds					**6,029**	**3,015**	**3,015**
Project Totals					**14,852**	**7,426**	**7,426**

Table 5. Load Reductions for Landowner-Installed BMPs for sites in Ballard Creek Sub Watershed and Other Sub Watersheds of the Illinois River (HUC #11110103), Washington County, Arkansas

		Nitrogen (lb/yr)	Phosphorus (lb/yr)	Sediment (Tons/yr)
Ballard Creek Sub-Watershed	Filter Strip (393)	4,329	374	27
	Pasture and Hay Planting (512)	29	15	9
	Waste Storage (313)	2,955	205	-
	Prescribed Grazing (528)	1,591	797	438
	Sub Totals	**8,904**	**1,391**	**474**
Illinois River-Other Watersheds	Filter Strip (393)	3,870	334	23
	Pasture and Hay Planting (512)	233	116	67
	Waste Storage (313)	2,463	170	-
	Prescribed Grazing (528)	2,425	1,215	640
	Sub Totals	**8,991**	**1,835**	**730**
Illinois River Combined Data	Filter Strip (393)	8,199	708	50
	Pasture and Hay Planting (512)	262	131	76
	Waste Storage (313)	5,418	375	-
	Prescribed Grazing (528)	4,016	2,012	1,078
	Totals	**17,895**	**3,226**	**1,204**

We successfully planned 4,235 ac nutrient management and 728 acres buffer zones (filter strips) in Ballard Creek Watershed (6,258 ac throughout the Illinois basin). The project was also successful in reducing the loads of nitrogen, phosphorus, and sediment produced throughout the Illinois Watershed (see Tables 4 and 5). Our phosphorus load reductions in Ballard Creek watershed were as follows: 5,803 lb P/year (4,412 lb P from critical area plantings and 1,391 lb P from filter strips, pasture planting, waste storage structures, and prescribed grazing); sediment in Ballard Creek Watershed was reduced by 4,886 tons/year; Nitrogen was reduced by 17,728 lb N/year (8,824 lb N/year from critical area planting, 8,904 lb N/year from filter strips, pasture planting, waste storage facilities, and prescribed grazing).

Load reductions achieved in this project within the entire Illinois River (Ballard Creek and other sub watershed of the Illinois) were as follows: 10,652 lb Phosphorus/year, 32,747 lb Nitrogen/year, and 8,630 tons of sediment/year.

Obstacles encountered: We expected to be able to recalculate P-Index values after BMPs were installed. This proved impractical because, under normal management conditions, the Arkansas P-Index does not yield substantial changes in transport functions unless certain BMPs (such as eliminating animal grazing, installing terraces, or fencing to exclude animals) are installed. None of our producers installed these BMPs. We also expected NRCS to adopt a revised P-Index, which would have required us to recalculate P-Index values, but, as of the date of this writing, no new P-Index has been adopted.

We also intended to use soil nutrient mining to deplete soil test phosphorus (STP). To measure soil nutrient mining, producers would have had to install Pasture and Hay Planting of annuals and eliminate phosphorus applications altogether. Our original goal was to demonstrate a soil test P reduction (predicted to be 18 lb P/ac/year) on fields utilizing these BMPs, but we were unable to find producers willing to install these practices (see further discussion in Section V., Technical Transfer).

IV. LESSONS LEARNED

We attribute the success of the Ballard Creek BMP Implementation Project to the cooperation of several partners including NRCS, and the Washington County Judge in conjunction with the Washington County Road Department. Part of our success was also due to the cooperation of the University of Arkansas including the Cooperative Extension Service and the leadership of the Northwest Arkansas Hmong People Grower's Group.

The Natural Resources Conservation Service: NRCS played a valuable role in helping the district develop cost share contracts and develop nutrient management plans. We were able to couple the 319 money (available at a maximum rate of 40%) with EQIP funds to provide a combined maximum cost share rate of 75%. Without these dual contracts, the district would have only paid ten landowners (11 contracts) for implementing BMPs. The district employees were also able to utilize NRCS vehicles,

computers, software, and technical support in the development of plans, maps, and contracts.

Washington County Judges Office: With the help of the Washington County Judge, Hon. Jerry Hunton, the district was able to develop a very successful hydromulching program with the Washington County Road Department. Like most districts, we have limited funds and personnel making it difficult for us to maintain district programs. Our agreement with the county will allow the district to provide funds, technical assistance, and materials (mulch, tackifier, fertilizer, and seed) while the county will provide trucks and personnel in the future. The county's contribution of a storage site, dump trucks, personnel, and water trucks allowed the WCCD to turn an investment into a much more valuable program that will likely be permanent. For example, following the completion of this project, the county installed a single project (Elkhorn River) in the Illinois River Watershed that is valued at approximately $. In the future, the county intends to utilize the hydromulcher throughout the county including the White, Illinois, and the Arkansas River Drainages.

Northwest Arkansas Hmong Grower's Group: Another successful outcome of this project was the district's work with the Northwest Arkansas Hmong people. The district and NRCS held a Ballard Creek meeting with this group to discuss our project and programs. We provided Hmong language written materials and an interpreter. This meeting was also used by some of the Hmong leadership to organize a Northwest Arkansas, Hmong People Grower's Group. We will work with this group in the future to provide further technical and financial assistance.

Cost Share BMP Implementation Problems: The district had less success promoting the cost share program including the BMP implementation program and the stream bank stabilization program. For a single contract, cost share for BMP implementation was restricted to a maximum payment of 40% not to exceed payments of $. This amount seems to be too low to entice most landowners to install practices particularly the very costly ones. For example, the average waste storage facility paid for in this project was approximately 4x and ranged from $3x to $8x. With 319 funding only, the payment for an average waste storage facility would equal only 25% of the actual costs of construction.

We had difficulty getting landowners to install contracted practices: only 68% of our contracts were completed including those that had additional funds from EQIP. The conservation district is not alone in this problem. Even NRCS has difficulty getting contract holders to complete contracted practices. The USDA has recently addressed this problem of uncompleted contracts by imposing a 20% penalty for those who sign up but fail to complete at least one practice within the specified timeframe.

Stream bank stabilization was unsuccessful for several reasons including a lack of landowner understanding of what proper stream bank stabilization entails, high out-of-pocket costs, loss risks, and aesthetic issues. Many landowners expressed interest in stabilizing their stream banks, but hesitated to invest even when we offered 75% cost share with the demonstration project. Most landowners erroneously believe that stream bank armoring (with cheap broken concrete from demolition sites) is what they need to

install on their property, and they reject grading, shaping, shrub and tree planting, and rip rap placement as corrective measures. Landowners balked at participating when told of the high costs of installing proper stabilization projects.

We estimated the demonstration project's average cost to be $. This would require a landowner investment of at least $. Only one landowner seriously expressed interest, but he died before we could complete the survey and design. Other landowners were concerned that there was too much risk from potentially damaging floods. The conservation district owned two demonstration projects in the White River Watershed that were lost in a 100 year flood on April 26, 2004. This $65,000 investment was a total loss, and the landowner's land was terribly damaged by the greatly damaged flow deflectors. This information was made know to potential Ballard Creek landowners and resulted in a complete loss of interest.

One other project impediment involved aesthetics. Many stream banks in the tributaries of the Illinois River are vertical and high (15 feet or greater). One stabilization method requires the grading and shaping of stream bank to gentle angles that are more or less level with the high water mark. Shaping often results in relatively wide stream bank areas, and this proved to be very unpopular with landowners who seem convinced that they would be losing more stream bank (and mature trees) this way.

V. TECHNICAL TRANSFER

Benefits of Roadside Hydromulching: The district's roadside hydromulching project proved to be very cost effective, and we are recommending it as an option for other watershed project managers. Within Ballard Creek Watershed, the installation of 728 ac of filter strip, 22 acres of pasture planting, and 8 waste storage facilities yielded load reductions of 594 lb P and 36 Tons of Sediment. The installation of only 3.26 acres of Critical Area Planting along roadside ditch areas yielded load reductions of 4,412 lb P and 4,412 Tons of Sediment. Considering the costs and the extent of the need to establish roadside plantings, the hydromulcher appears to be a very good option. Those wishing to establish roadside plantings must consider the drawbacks including start up and maintenance costs, and the labor and vehicles required to put in relatively small planting areas. We recommend partnering with city, county, or state road departments to house the equipment and supplies and to provide personnel and vehicles as needed. Partnering with a road department is very important as roadside preparation (grading) is usually required. We found that grass and legume establishment was retarded in shady areas. It is apparent that severely eroding roadside that are also heavily shaded should be denuded of canopy and shaped to achieve maximum benefit of the critical area planting.

Attributing Changes in Soil Test Phosphorus (STP) to Installed BMPs: We planned to demonstrate that STP concentrations would be reduced following phosphorus mining on fields where intensive grazing and nutrient management were optimized, but we were unsuccessful in establishing any sites due to lack of landowner participation.

While we planned to use STP data to recalculate P-Indexes, we have reexamined information that suggests small STP values may not be accurate enough to use for this purpose. The Washington county Conservation District has data showing that a single, very uniform bermudagrass field had a soil test phosphorus range of 123 lb P/ac with a standard deviation of 38.7 lb P/ac (N=180, 8 d.f.). We can compare these data with U of A, Cooperative Extension Service data from a study of phosphorus mining in the Lower Little River. In this study, CES reported standard deviations of 138 lb P/ac and 135 lb P/ac on two test sites (Tyler, et al.). In the Ballard Creek project, if we could have actually affected an 18 lb/ac/year reduction in STP (in practice, a very large change), it would still be less than the known standard deviation of our experimental field. We would also be taking risks in relying on recalculated P-Index data when using STP values that are relatively small and that have unknown error. We believe that more data are needed to establish the error inherent in soil sampling, and, because of this, we suggest that other nutrient management planners exercise caution in relying on subtle annual STP changes that may appear with repeated soil sampling.

VI. EPA Feedback Loop

We have no suggestions for EPA to improve the NPS process regarding this project.

VII. CONCLUSIONS

Overall, this Ballard creek BMP Implementation project was successful in reducing the risks of NPS pollution from nitrogen, phosphorus, and sediment in both the Ballard Creek and other sub watersheds of the Illinois River, Washington County, Arkansas. The NPS load reductions within the Illinois River were 8,460 lb phosphorus/year, 28,731 lb nitrogen/year, and 7,552 Tons sediment/year.

Within Ballard Creek sub watershed we were goaled for a phosphorus load reduction of 3,960 lb/year and we achieved an estimated reduction of 5,803 lb phosphorus/year (32% greater than anticipated). We also estimated load reductions of 17,728 lb nitrogen/year, and 4,886 Tons sediment/year.

These reductions in load are sustainable and should result in ambient stream concentrations reducing as long as the BMPs are maintained. To ensure the benefits of BMP implementation are sustained, the WCCD will continue to plan and update existing plans within Ballard Creek and the entire Illinois River Watershed. We will also continue to educate landowners about the efficacy of installing and maintaining BMPs.

To ensure continued success in reducing NPS pollution in the watershed, the district has developed its Water Quality Technician program, which will provide state and local funds for continued NMP planning well into the future. This program will provide follow up planning for landowners throughout the Illinois River Watershed, providing technical assistance, and information as needed. We will also update each nutrient management plan at least every three years or as requested by landowners. The district also

expanded its information and education program and will continue to work with local groups such as the Hmong Grower's Group, Western Washington County Watershed Group, University of Arkansas faculty, University of Arkansas Cooperative Extension Service, and Washington County Road Department to provide technical information and funding for educational programs.

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Appendix A
Education and Technology Transfer

Illinois River Watershed
Ballard Creek BMP Implementation Project
02-500

Cost Share Money Available in Illinois River

The Washington County Conservation District (WCCD) is conducting a conservation program **throughout the Illinois River Watershed in Washington County**. This program includes cost-share money that is currently available at the rate of 40% (landowner pays 60% of costs) for practices that promote soil and water conservation, and address non point-source pollution reduction. These practices include items such as interior fencing (both standard barbed wire and permanent and temporary electric), pasture planting, watering systems, stacking sheds, etc.

NOTE: All contracted practices must be completed by June 1, 2005.

Streambank Demonstrations

The district is also reimbursing people for installing practices that control streambank erosion. These practices include land grading and shaping, rip-rap installation, installing revetments, and tree and shrub establishment. Since these practices are usually very expensive, the district is offering 75% cost share if the practices can be used as a demonstration for other landowners.

Demonstration projects, while under sole control of the landowner, are occasionally used by the conservation district to show other people what is involved in installing them. The demonstration sites will only be needed a few times for demonstration until the project ends in 2005.

If you are interested in discussing this project further, please call Casey Dunigan at 479-442-4160 ext. 101.

The Tri-County Conservation District Newsletter July/August 2002

The Tri-County Conservation District Newsletter September / October 2002

The Tri-County Conservation District Newsletter January / February 2003

Arkansas Waterdrop – Fall 2003

The Tri-County Conservation District Newsletter September / October 2003

The Tri-County Conservation District Newsletter November / December 2003

The Tri-County Conservation District Newsletter January / February 2004

The Tri-County Conservation District Newsletter May / June 2004

The Tri-County Conservation District Newsletter July / August 2004

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The Tri-County Conservation District Newsletter January / February 2005

The Tri-County Conservation District Newsletter March / April 2005

The Tri-County Conservation District Newsletter May / June 2005

Business Plan
Western Washington County Watershed Alliance

Watershed Alliance Business Plan

Organization:

Western Washington County Watershed Alliance

Who We Serve:

The Western Washington County Watershed alliance will serve the residents, stakeholders, and property owners who are located throughout the Illinois River Watershed, in Washington County Arkansas.

Area We Serve:
While the alliance will represent the whole Illinois River, it will specifically focus on Ballard Creek, a sub-basin of this watershed located near Lincoln, Arkansas.

Mission Statement:

The Western Washington County Watershed Alliance is dedicated to improving the water quality in the Ballard Creek and Illinois River watersheds in Washington County by directing the monitoring of surface water for the purpose of developing a Total Maximum Daily Load (TMDL) estimate, educating the county residents concerning water quality issues such as point source and non-point source pollution abatement, and working to prevent roadside erosion and litter.

Critical Resource Issues:

Education of urban and suburban residents concerning issues as they relate to all sources of NPS pollution
Degraded quality of surface and subsurface waters and their impact on potable, agricultural, and wildlife water uses.
Animal agriculture's impact on water quality
Grass production for cattle consumption
Loss of agricultural land to urban encroachment
Urban/suburban NPS pollutants

Statements of Intent (outcomes) for each critical resource issue:
Reduce NPS pollutants, particularly phosphorus, by increasing the availability of stacking sheds to all property owners utilizing poultry litter as a nutrient in soil augmentation, not just poultry farmers.

Develop incentives for the use of properly balanced nutrients for grass production.

- In urban yards to reduce the over-application of phosphorus
- Increase grass production by application of nitrogen to maximize grass growth and phosphorus uptake for cattle consumption outside the watersheds designated as nutrient surplus zones.

Increase the use of alum in poultry litter to bind phosphorus through the use of cost share and cost reduction programs by utilizing federal, state, local, and private funding

We will cooperate with the University of Arkansas in water quality monitoring and development of TMDL(s) for the Illinois River, Washington County, Arkansas by providing them with local partners and property owners with which to coordinate their activities..

We will provide education to non-farm related citizens concerning non point source pollution issues by targeting new property owners in the watersheds with educational material and regular informational meetings.

Priority Actions for the next 12 months:

Petition the NRCS and ASWCC to revise rules governing the use of cost share funds in the construction of stacking sheds so that cattle and row crop farmers can utilize cost share to build stacking sheds to utilize poultry litter as a soil nutrient

Cooperate with city and county governments to implement soil testing in urban/suburban development areas to reduce over application of phosphorus

Submit workplan proposals to the Washington County Conservation District, NRCS and ASWCC for a cost share program to share the costs of nitrogen to be applied for grass production in fields high in phosphorus that lie outside watersheds declared nutrient surplus zones (not sure about this sentence since it is the alliance that is writing these words)

Hold public meetings to involve more of the public in the watershed alliance

Include representatives of the University of Arkansas in steering committee

Annual Budget Needs:

Income	**Expenses**	
Contribution	3 meetings	$1500
Local Donations		

Master Schedule

Hold 3 steering committee meetings between July 2004 and July 2005
Next meeting September 14, 2004

Partners Needed

University of Arkansas
University of Arkansas Cooperative Extension Service
City governments throughout the Illinois River Watershed

APPENDIX B
Hydromulching: Roadside Erosion Control

Figure 1. Ballard Creek Hydromulched Site CR 76.

Figure 2. Ballard Creek Hydromulched Site CR 3622

Figure 3. Ballard Creek Hydromulching Site Cr 15.

Figure 4. Elkhorn, Hydromulching site. Illinois River, Other Subwatershed.

Figure 5. Harmon, Illinois River Hydromulching Site.

Figure 6. Hickory Creek, Illinois River Hydromulching Site. Note that this photograph shows the actual hydromulch after it was applied.