

Survey of Northwest Arkansas Producers

Knowledge and Adoption of Conservation Practices to Address Water Quality Issues in a Nutrient-Rich Watershed

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Introduction

The Arkansas Discovery Farm Program is an effort by the University of Arkansas System, Division of Agriculture to work closely with farmers to document conservation practice (CP) effectiveness, to disseminate important information and knowledge, and to receive feedback and understand perceptions. There are currently thirteen Arkansas Discovery Farms in the state, and each is a fully operational, stand-alone farm. While this program allows an in-depth understanding of farmer knowledge and awareness, university-partnered research isn't feasible for every farm in the State. This is particularly important in the Upper Illinois River Watershed (UIRW), which is that portion of the larger Illinois River Watershed (IRW), which is in Arkansas. Both the UIRW and IRW are nutrient rich (Slaton et al., 2004) and is the subject of ongoing litigation between down-river water users in Oklahoma and poultry integrators in the

UIRW (Cooke et al., 2011; Meo et al., 2002; Sharpley et al., 2012; U.S. Districts Court for the Northern District of Oklahoma, 2005).

An alternative method to understand farmer perceptions is through producer surveys. These surveys may not provide the in-depth information gained through consistent direct contact, but can lead to a broad understanding of perceptions representative of most farmers in the study area. In 2006, a sub-watershed of the UIRW was surveyed as part of a United States Department of Agriculture (USDA) funded Conservation Effects Assessment Program (CEAP). This smaller watershed, known as the Lincoln Lake Watershed, lies entirely in Northwest Arkansas, and is similar to the larger UIRW in which it sits. The survey in this area attempted to better understand perceptions of water quality and conservation practices (CPs) (Hoag et al 2012, Popp et al 2007). The result of that survey led to an effective education program, increased the number of farms with nutrient management plans, and increased the overall adoption of CPs (Hoag et al, 2012).

This study is an expansion of the Lincoln Lake CEAP producer survey, extending the reach to Arkansan farmers operating within the UIRW. The results of the survey will help policy makers better understand farmer perception of water quality issues and CPs, and may be used to develop educational programs and more effective policy aimed at reducing water quality degradation.

Materials & Methods

A survey for agricultural producers was developed, modeled after the 2006 CEAP project survey. The survey was developed following widely accepted methods (Dillman et al., 2008; Salant and Dillman, 1994). Once a draft of the survey was completed, focus groups consisting of agricultural producers from surrounding watersheds were conducted to pretest and clarify survey questions.

The final survey, conducted during a series of producer meetings and mail outs in 2013-2014, sought to better understand watershed producers' perceptions of watershed water quality and CP adoption (See Appendix A for survey). The survey contained 37 questions primarily related to; 1) characteristics of the farm and farmer, 2) perceptions of water quality issues in the UIRW, and 3) adoption and opinions of CPs.

Summary statistics were generated for all 179 variables. Survey responses were categorized three different ways, by; 1) county of farm operation, 2) type of farm operation, and 3) opinion on existence of water quality issues. Statistical tests were conducted to determine whether differences existed within these categories regarding; 1) perceptions of responsibilities in water quality issues, 2) perceptions and adoptions of CPs, and 3) sources of agricultural conservation information.

Results

Farmer Characteristics

A total of 582 usable surveys were collected from producers operating in the UIRW sections of Benton and Washington Counties (Table 1). Responses were nearly equally distributed by county, with 311 (53%) from Washington, and 271 (47%) from Benton counties. Most respondents (480, or 82%) owned the land they were operating on, while 242 (42%) were operating on rented land. The sum of these three categories exceeds 100% due to multiple owner/operator structures per operation. A slight majority of respondents (313, or 55%) claimed their agricultural operation was their primary job. Finally, the average years of operation per farm is approximately 15 years, while the average acres owned was 77 and the average acres rented was 35.

Table 1. Selected demographics of survey respondents.

Demographic	Number of Responses ^a
County of Operation	
Benton	271
Washington	311
Total	582
Farm Ownership	
Number of farms owned	480
Number of farms operated on rented land	242
Number of farms leased out to others	41
Farm Employment	
Agricultural operation is primary job	313
Agricultural operation is not primary job	261
Average years owned and operated a farm	
	15
Average acres owned	
	77
Average acres rented	
	35

^a Of the 582 respondents total. Last three vales are averages across all responses, not number of responses.

Table 2. Farm demographics by State County.

	Number of Responses/Farms					
	Survey			NASS		
	Benton	Washington	Combined	Benton	Washington	Combined
Farms	271	311	582	2157	2502	4659
Average acres owned (#)	89.12	66.74		141	125	
Farm Size						
1 - 9 acres	16	67	83	162	180	342
10 - 49 acres	96	89	185	769	900	1669
50 - 179 acres	116	131	247	787	935	1722
180 - 499 acres	41	24	65	328	384	712
500 - 999 acres	0	0	0	67	83	150
1000 acres or more	0	0	0	44	20	64
Principle Operator						
Farming as primary job	145	168	313	1030	1058	2088
Other as primary job	123	138	261	1127	1444	2571
Type of Production						
Beef	198	209	407	1546	1651	3197
Broilers + other poultry	101	102	203	393	429	822
Dairy	0	3	3	17	14	31
Swine	2	0	2	25	56	81

	Number of Responses/Farms					
	Survey			NASS		
	Benton	Washington	Combined	Benton	Washington	Combined
Other livestock	11	18	29	NA	NA	NA
Hay	157	188	345	1173	1372	2545
Pasture	196	231	427	1691	1937	3628
Tree farming/logging	5	8	13	NA	NA	NA
Vegetable production	2	9	11	27	54	81
Fruit production	4	6	10	8	32	40
Other agriculture	5	2	7	NA	NA	NA

Farm size was categorized by acre class, for acres owned in the watershed. Acres rented or leased were not factored into this category, to avoid double counting of land. The average farm size for Benton and Washington Counties was 89 and 67 acres, respectively. The most common acreage class for both counties was 50 – 179 acres, accounting for 42% of farms in each county. Washington County had a slightly higher proportion of small, 1 – 9 acre farms (21.5% vs only 5.9% in Benton County).

Table 3. Respondent demographics: Survey vs 2012 NASS survey.

	Percent of responses (% of category)				p-value
	Survey		NASS Census 2012		
	Benton	Washington	Benton	Washington	
Farm Size:					
1 - 9 acres	6	22	8	7	0.0494
10 - 49 acres	35	29	36	36	0.5195
50 - 179 acres	43	42	36	37	0.9004
180 - 499 acres	15	8	15	15	0.2300
500 - 999 acres	0	0	3	3	NA
1000 acres or more	0	0	2	1	NA
Principle Operator:					
Farming as primary job	54	54	48	42	0.6587
Other as primary job	45	44	52	58	0.6679
Type of production:					
Pasture Production	72	74	78	77	0.8643
Beef	73	67	72	66	0.9965
Hay Production	58	60	54	55	0.8976
Broilers + other poultry	37	33	18	17	0.8706
Vegetable production	1	3	1	2	0.6318
Swine	1	0	1	2	0.3027
Dairy	0	1	1	1	0.3555

Fruit production	1	2	0	1	0.6460
Other livestock	4	6	NA	NA	NA
Tree farming/logging	2	3	NA	NA	NA
Other agriculture	2	1	NA	NA	NA

Beef, poultry, and hay/pasture producers were the dominant respondents. Across both counties, 73% of producers engaged in pasture production, 70% in beef production, 59% in hay production, and 35% in broiler or other poultry production. The production types sum to greater than 100% due to involvement in multiple production categories.

Characteristics of respondent farms were compared to 2012 NASS Census of Agriculture Data to determine if respondents were representative of farmers in those counties. While these farmers represent only 13 % of farmers in the counties, Table 3 shows that in general, respondent farms were representative of farms in the two counties with respect to principle operator, type of operation and farm size (with the exception of the 1-9 acre size that had had proportionately more responses in Washington County).

General Survey Results

Overall, survey respondents were aware of water quality issues within the UIRW and best management practices (Table 4). Eighty-four percent of respondents believed water quality issues existed in UIRW, and 96% were influenced by water quality concerns in using CPs on their farm. A large majority (90%) had a nutrient management plan on file with USDA Natural Resources Conservation Service (NRCS) and 96% of respondents had CPs implemented on land they owned or operated within the last three years. The Oklahoma-Arkansas lawsuits have influenced 69% of farmers in their farm management decisions.

Table 4. General perceptions and actions of respondents in the UIRW.

Opinion/Action	Percent of responses (%) ^a		Responses missing ^b
	Yes	No	
Do you believe that water quality issues - related to excess nutrients and/or sediments - exist in the watershed?	84	16	0
Do quality concerns in these water bodies influence the use of CPs on your farm?	96	4	94
Do you have a nutrient management plan/farm plan on file with USDA-NRCS or your local Conservation District office?	90	10	0
Did you or someone else adopt any best management practice within the last three years to reduce sediment and/or nutrient loss?	96	4	0
Have you participated in the EQIP program in the last three years?	8	92	0
Have the Oklahoma-Arkansas lawsuits influenced your farm management?	69	31	0

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Respondents were asked which groups/activities contributed to water quality issues in the watershed. Those who responded believed that all six activities listed in the survey (Table 5) contributed to water quality issues in the watershed. The leading contributors were city sewer systems (97%), industry (85%), and agricultural producers (83%) (Table 4). Agricultural producers, however, were most often thought of contributing small amounts to water quality problems. When asked which groups were responsible for cleanup, responses mirrored those for who were responsible.

Table 5. Perceptions on parties responsible for water quality problems and cleanup.

Group	Percent of responses (%) ^a			Responses missing ^b
	None	Small	Large	
Agricultural Producers	17	70	13	95
City Sewer System	2	50	47	97
Households	23	62	14	95
Industry	14	56	29	102
New Construction (road, housing, and commercial)	24	56	20	98
Outdoor Recreation	53	41	6	95
Others	96	4	0	95

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Producers in the UIRW turned to a variety of agencies for conservation information (Table 6). Extension (64%), NRCS (56%), and other farmers (52%) were the most frequently used, while paid consultants (4%), the EPA (4%), and the FSA (1%) were the least.

Producers were influenced by a variety of forces in their decision to adopt CPs (Table 6). The most common reason for CP adoption was personal belief that the practice was effective at reducing nutrient and sediment loss (79%); government/university/extension recommendation (59%) followed. No more than 26% of respondents were influenced by other reasons, including cost considerations (26%) or public perception of the farmer (23%).

Belief in CP effectiveness was a large influencer for their adoption in the UIRW, and perceptions of CP effectiveness varied across practices (Table 7). Soil testing (82%), basing fertilizer application on soil test results (82%), and controlled grazing (76%) were most often perceived as effective, while cattle track stabilization (40%), manure composting (36%), and waste treatment lagoons (11%) were least often cited

as effective. For most practices, a respondent was more likely to state he/she was unsure of the effectiveness of the practice than to state the practice was ineffective.

Respondents were asked which CPs they have adopted within the last three years. Ninety-five percent of respondents had adopted soil testing, followed by the use of a nutrient management plan (93%), and basing fertilizer application on soil test results (81%). Of producers who used a nutrient management plan (NMP), 48% said adopting an NMP lead to increased recordkeeping challenges. Other than this, difficulties encountered were low. Stream bank stabilization (2%), cattle track stabilization (2%), and waste treatment lagoons (0%) were the least often adopted CPs.

Table 6. Producer responses contributing to Conservation Practice adoption.

	Percent of responses (%) ^a		Responses missing ^b
	Yes	No	
Groups/Agencies Producers Turn to for Conservation Practice information			
Extension	64	36	0
NRCS	56	44	30
Other Farmers	52	48	0
UA Researchers	26	74	0
Other	11	89	32
Conservation District	8	92	0
Paid Consultants	4	96	18
EPA Agency	4	96	0
FSA	1	99	0
Reasons for adopting Conservation Practices			
Integrator requires or requests use of the practice	83	17	396
I think practices such as these are effective in reducing sediment/nutrient loss	79	21	24
Government/university/extension has recommended use of this practice	56	44	24
Cost share practice is readily available	26	74	22

	Percent of responses (%) ^a		Responses missing ^b
	Yes	No	
Practices improve profitability of farm	25	75	23
Practices improve perception of others that I am a food steward of the land	23	77	23
I want to be an early adopter – I anticipate environmental regulation	11	89	37
Other reasons	0	100	23
Difficulties encountered by having a Nutrient Management Plan			
Increased record keeping	48	52	68
Increased need for commercial fertilizer	31	69	68
Decreased hay yields or pasture production	27	73	68
Decreased litter application rates	27	73	62
Decreased flexibility in management	18	82	62
Decreased profitability	7	93	62

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 7. Conservation practices: adoption and perceived effectiveness.

Conservation Practices	CPs Adopted			Perceived Effectiveness of CPs			
	Percent of responses (%) ^a		Responses missing ^b	Percent of responses (%) ^a			Responses missing ^b
	Yes	No		Effective	Not Effective	Not Sure	
Soil testing	95	5	22	82	10	7	43
Use of a nutrient management plan or a farm plan	93	7	22	58	20	22	130
Basing fertilizer application on soil test results	81	19	32	82	10	8	45
Pasture grass management	54	46	22	74	10	16	96
Controlled Grazing	33	67	23	76	10	13	78
Filter strips/riparian buffer	21	79	23	59	20	20	119
Use of manure instead of commercial fertilizer	18	82	39	41	36	23	135
Litter storage shed	16	84	22	56	26	19	109
Stream fencing	7	93	22	41	23	36	210
Manure composting	7	93	22	36	40	25	143
Prescribed grazing	6	94	23	53	19	28	162
Use of legumes to reduce nitrogen applications	5	95	22	46	23	32	186
Stream bank stabilization	2	98	24	51	20	28	165
Cattle track stabilization/improvement	2	98	24	40	31	29	168
Waste treatment lagoon	0	100	22	11	24	65	379

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Differences by County

Survey respondents were split by county, to determine if differences of opinions existed across counties regarding responses to questions included in Tables 4 through 7. Full results of tests conducted by county are found in the Appendix B1, Tables 8 through 12. Statistical tests revealed that compared to Benton County, producers in Washington County were significantly more likely to:

- adopt CPs ($p=0.0490$),
- participate in the EQIP program ($p=0.0001$), though overall participation in EQIP was low: 6 total producers in Benton County, and 42 total in Washington County,
- turn to extension ($p=0.0380$) and the NRCS ($p=0.0044$) for conservation information,
- cite cost sharing availability as a reason for adopting CPs ($p=0.0010$), and
- think 11 of 15 CPs were effective at reducing nutrient/sediment runoff: basing fertilizer application on soil test results ($p=0.0013$), pasture grass management ($p=0.0011$), filter strips/riparian buffer ($p=0.0013$), prescribed grazing ($p=0.0001$), use of a nutrient management plan ($p=0.0408$), stream bank stabilization ($p=0.0001$), stream fencing ($p=0.0005$), use of legumes to reduce nitrogen applications ($p=0.025$), cattle track stabilization ($p=0.0001$), manure composting ($p=0.0107$), and waste treatment lagoons ($p=0.0096$).

Statistical tests revealed that compared to Washington County, producers in Benton County were significantly more likely to:

- assign large blame to agricultural producers ($p=0.0495$) and industry ($p=0.0018$), and assign no blame to new construction (0.0067),
- have farm management influenced by the Oklahoma-Arkansas lawsuits ($p=0.0070$), and
- use manure instead of commercial fertilizer ($p=0.0336$).

Differences by Producer Groups

Respondents engaged in one or more of 12 different production activities (Table 2). However, the majority (94%) of respondents were engaged in some level of beef and/or poultry production. Statistical tests were conducted to determine if significant differences in responses to questions in Tables 3 through 7, existed across respondents who were engaged in “neither beef nor poultry,” “poultry only,” “beef only,” or “both beef and poultry.” Full results of tests conducted by production type are found in the Appendix B2 Tables 13 through 18.

Statistical tests revealed that compared to others not engaged at all in poultry, poultry producers (“poultry only” and “both beef and poultry”) were significantly more likely to:

- believe that water quality issues existed ($p=0.0039$),
- assign no blame to agricultural producers ($p=0.0006$),
- be influenced by their own perceptions of CP effectiveness ($p=0.0079$), and
- think (and have less uncertainty that) 8 of 15 CPs are effective at reducing nutrient/sediment runoff: controlled grazing ($p=0.0222$), pasture grass management ($p=0.0066$), basing fertilizer application on soil test results ($p=0.0121$), litter storage shed ($p=0.0190$), use of a nutrient management plan ($p=0.0013$), filter strips/riparian buffers ($p=0.0001$), use of manure instead of commercial fertilizer ($p=0.0002$), and waste treatment lagoons ($p=0.0016$). It is interesting to note that several of these practices are not directly relevant to poultry production.

Beef producers (“beef only” or “both beef and poultry”) were, compared to others not engaged in any kind of beef production, significantly more likely to:

- be influenced by government/university/extension recommendations ($p=0.0001$), and
- encounter problems with decreased litter application rates as a result of using a nutrient management plan ($p=0.0148$).

There were several significant differences among adoption rates of CPs between producer groups (Appendix B2 Table 16); however, these differences were likely due to the relevance of particular practices to the production type. For example, poultry producers were significantly more likely to adopt litter storage sheds ($p=0.0001$), and beef producers were more likely to adopt controlled grazing ($p=0.0001$).

Differences by Belief in Water Quality Issues

Responses to the survey were finally segregated by respondents who believed water quality issues exist in the watershed, and those who don’t. Full results of tests conducted by belief in existing water quality issues are found in the Appendix B3, Tables 19 through 22. Compared to those who did not believe water quality issues existed, statistical tests revealed producers who believe water quality issues exist were significantly more likely to:

- file a nutrient management plan ($p=0.0001$),
- adopt CPs ($p=0.0002$),
- turn to the NRCS for best practice information ($p=0.0069$),

- be influenced by government/university/extension recommendations ($p=0.0232$), cost share availability ($p=0.0069$), profitability considerations ($p=0.0035$), and perceptions others hold about the farmer ($p=0.0030$) when choosing to adopt CPs,
- believe 12 of 15 CPs were effective at reducing nutrient/sediment runoff: basing fertilizer application on soil test results ($p=0.0073$), controlled grazing ($p=0.0001$), pasture grass management ($p=0.0102$), use of a nutrient management plan or a farm plan ($p=0.0001$), prescribed grazing ($p=0.0001$), stream bank stabilization ($p=0.0002$), stream fencing ($p=0.0001$), cattle track stabilization/improvement ($p=0.0008$), use of manure instead of commercial fertilizer ($p=0.0031$), manure composting ($p=0.0001$), and waste treatment lagoon ($p=0.0379$), and
- adopt 4 of 15 CPs: soil testing ($p=0.0001$), use of a nutrient management plan ($p=0.0001$), basing fertilizer application rates of soil test results ($p=0.0399$), filter strips/riparian buffers ($p=0.0091$), and litter storage sheds ($p=0.0082$).

Discussion

Overall, survey results suggest that in the UIRW, producers are aware of water quality issues and best management practices. However, differences in actions and beliefs varied by the location (county) of the operation, by the operation (commodity) type and by perception of water quality in the watershed.

Different producer types and producers in different counties displayed various levels of knowledge about the 15 listed CPs and turned to different sources to get their information regarding CPs. Ultimately, awareness of water quality issues in the watershed more often resulted in increased adoption rates and greater belief in the effectiveness of CPs. Regardless of production type or location, the awareness of water quality issues can be the limiting factor for producers to adopt CPs. Increasing awareness and knowledge in the watershed will require a collaborative approach across government, researchers, extension to reach all producer types across both counties.

Focusing educational/outreach efforts on demonstrating the existence of water quality issues may prove to be the most effective tool in increasing the adoption rates of CPs in the UIRW, and improving water quality for downstream stakeholders in Oklahoma.

This survey has allowed a greater understanding of farmer perceptions on water quality and conservation management and use in the UIRW. This understanding can lead to more proactive policy making, as runoff from agricultural lands in Arkansas has been identified as a major contributor of nutrients that are degrading the quality and use of receiving waters, such as Tenkiller, Eucha, and

Spavinaw Lakes in Oklahoma. If policy makers can better understand the gaps in farmer knowledge, as well as motivation factors and current actions, new policies can be tailored to address shortcomings of conservation acceptance in the UIRW. These differences, if addressed, could lead to a greater awareness of water quality and adoption of CPs in the region, which could enhance the likelihood, magnitude, and rate of water quality remediation.

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Appendix A

SURVEY OF AGRICULTURAL BEST MANAGEMENT PRACTICES

INSTRUCTIONS

Thank you for participating in our survey. The purpose of this survey is to better understand producers' perceptions and use of agricultural conservation practices (CPs) in Arkansas watersheds. **CPs are defined here as farm management practices that are applied to reduce nutrient and sediment runoff from agricultural operations.** Results will be used to help inform university research and conservation programs only and individual responses will not be released. If you own, lease or lease out agricultural land complete this survey (see map on back). Please do not put your name on this survey.

SECTION 1: YOUR OPERATION

1. In what Arkansas watershed is your agricultural operation? _____
 - a. Please also list the county where your operation is? _____

2. Do you own, operate or lease out the farm? (Please check **all** that apply.)
 I own and operate my own farm
 I operate on land that I rent from someone else
 I lease out my land to another farmer
 No (Please return this survey to the registration desk.)

3. Is your agricultural operation your primary job?
 Yes
 No

4. Do you hold a second job at least 21 hours a week which is not related to your agricultural job?
 Yes
 No

5. Does your spouse/domestic partner hold a second job at least 21 hours a week that is not related to your agricultural operation?
 Yes
 No
 I do not have a spouse/domestic partner

6. How many years have you owned or operated a farm in the Watershed? _____ years

7. How many acres in the Watershed did you own in 2012? _____ acres

8. How many acres in the Watershed did you rent in 2012? _____ acres

9. What types of activities did you/someone else engage in on your agricultural land in 2012?
(Please check all that apply.)

	Activity		Number
<input type="checkbox"/>	Broiler houses	Number of houses	<input type="checkbox"/>
<input type="checkbox"/>	Other poultry (Please list.)	Number of houses	<input type="checkbox"/>
<input type="checkbox"/>	Beef cattle	Number of head	<input type="checkbox"/>
<input type="checkbox"/>	Dairy	Number of head	<input type="checkbox"/>
<input type="checkbox"/>	Swine	Number of head	<input type="checkbox"/>
<input type="checkbox"/>	Other livestock (Please list.)	Number of head	<input type="checkbox"/>
<input type="checkbox"/>	Hay production	Number of acres	<input type="checkbox"/>
<input type="checkbox"/>	Pasture production	Number of acres	<input type="checkbox"/>
<input type="checkbox"/>	Tree farming/logging	Number of acres	<input type="checkbox"/>
<input type="checkbox"/>	Vegetable production (Please list.)	Number of acres	<input type="checkbox"/>
<input type="checkbox"/>	Fruit production (Please list.)	Number of acres	<input type="checkbox"/>
<input type="checkbox"/>	Other agriculture (Please list.)	Number of acres	<input type="checkbox"/>

10. Do you plan to sell your farmland within the next five years?

Yes. If so, to whom?

Another farmer

A developer

Other (Please explain.) _____

Don't know

No

Not sure

I do not own land

SECTION 2: WATER QUALITY IN THE WATERSHED

1. Do you believe that water quality issues – related to excess nutrients and/or sediments – exist in the watershed?

No (Please skip to question 6.)

Yes

2. Do quality concerns in these water bodies influence the use of CPs on your farm?

No (Skip to question 4.)

___ Yes

3. Which water bodies (can be river branches, streams and/or lakes) most influence your use conservation CPs (Please list up to three.)

Water body name Is the quality issue nutrients, sediments or both?

_____	_____
_____	_____
_____	_____

4. By how much do you think each of these groups contributes to water quality problems within the watershed?

	None	A Little	A Lot
Agricultural producers	_____	_____	_____
City sewer system	_____	_____	_____
Households	_____	_____	_____
Industry	_____	_____	_____
New construction (road, housing, and commercial projects)	_____	_____	_____
Outdoor recreation	_____	_____	_____
Others (Please list.)	_____	_____	_____

5. By how much should each of the groups listed below be responsible to clean up the problems?

	None	A Little	A Lot
Agricultural producers	_____	_____	_____
City sewer system	_____	_____	_____
Households	_____	_____	_____
Industry	_____	_____	_____
New construction (road, housing, and commercial projects)	_____	_____	_____
Outdoor recreation	_____	_____	_____
Others (please list)	_____	_____	_____

6. Do you have a nutrient management plan/farm plan on file with USDA-NRCS or your local Conservation District office?

_____ No (Please skip to question 9.)

 _____ Yes (Please continue with question 7.)

7. Do you keep records in conjunction with your nutrient management plan?

No **If no, what barriers or obstacles keep you from keeping records?** (Please check all that apply.)

- I don't know what records to keep
 I don't have the time
 I don't have a record keeping system
 I don't see a need to keep records / I am not interested in keeping records

Yes **If yes, have you found your nutrient management plan to be helpful to the following:**

- Meeting environmental regulations
 Meeting environmental goals
 Meeting production goals
 Increasing income

8. What difficulties have you encountered by having a nutrient management plan? (Please check all that apply.)

- Decreased litter application rates
 Decreased profitability
 Decreased flexibility in management
 Increased need for commercial fertilizer
 Decreased hay yields or pasture production
 Increased record keeping

9. Are you a certified private nutrient applicator?

- No
 Yes

10. Have you heard about the Arkansas Discovery Farm Program?

- No (Please skip to Section 3.)
 Yes

11. Do you think the Discovery Farm program will effectively help farmers and agriculture address environmental concerns or public perception?

- No
 Yes (Please skip to Section 3.)

12. Please list up to three things you think could improve the effectiveness of the Discovery Farm Program.

SECTION 3: CPS TO ADDRESS WATER QUALITY

In this survey:

Sediment loss is defined as "the movement of soil and nutrients in runoff from your land to nearby streams and their downstream reservoirs."

Nutrient loss is defined as "the movement of nutrients in runoff from your land to nearby streams and their downstream reservoirs."

1. **Who do you turn to for conservation and best practice information?** (Please check all that apply.)

- Conservation District NRCS
 FSA EPA Agency
 UA researchers Extension
 Other farmers Paid consultants
 Other (please explain) _____

2. **Who do you think best understands YOUR farm pressures and concerns?** (Please check one.)

- Conservation District NRCS
 FSA EPA Agency
 UA researchers Extension
 Other farmers Paid consultants
 Other (please explain) _____

3. **Did you or someone else adopt any best management practices within the last three years to reduce sediment and/or nutrient loss on land you owned, you rented and/or leased out?**

- No (Please skip to question 8.)
 I don't know (Please skip to question 8.)
 Yes

4. What best management practices were adopted within the last three years? (Please check all that apply.)

Practice	<i>Adopted this practice on land that I</i>			Did not adopt
	own(ed)	rent(ed)	lease(d) out	
Controlled grazing	_____	_____	_____	_____
Filter strips/Riparian buffer	_____	_____	_____	_____
Prescribed grazing	_____	_____	_____	_____
Pasture grass management (planting both warm and cool season grasses for year round growth)	_____	_____	_____	_____
Stream bank stabilization	_____	_____	_____	_____
Cattle track stabilization/improvement	_____	_____	_____	_____
Stream fencing (to limit access)	_____	_____	_____	_____
Basing fertilizer application on soil test results	_____	_____	_____	_____
Litter storage shed	_____	_____	_____	_____
Manure composting	_____	_____	_____	_____
Soil testing	_____	_____	_____	_____
Use of legumes to reduce nitrogen applications	_____	_____	_____	_____
Use of a nutrient management plan or a farm plan	_____	_____	_____	_____
Use of manure instead of commercial fertilizer	_____	_____	_____	_____
Waste treatment lagoon	_____	_____	_____	_____
Others (please list below)	_____	_____	_____	_____

5. For each of the listed reasons, please indicate whether it influenced you or someone else to adopt practices to control sediment and/or nutrient loss on the land you owned or rented?

	Yes	No
Cost share for practice is readily available (example: EQIP).	_____	_____
Government/university/extension has recommended use of this practice.	_____	_____
I think practices such as these are effective in reducing sediment/nutrient loss.	_____	_____
I want to be an early adopter – I anticipate environmental regulations.	_____	_____
Integrator requires or requests use of the practice.	_____	_____
Practices improve profitability of farm.	_____	_____
Practices improve perceptions of others that I am a good steward of the land.	_____	_____
Other reasons _____	_____	_____

6. For each of the listed reasons, please indicate whether it made it difficult or impossible for you or someone else to adopt practices to reduce sediment and or nutrient loss on land you owned or rented?

	Yes	No
By adopting these practices, others will consider me a polluter.	_____	_____
Practice is not sustainable (example, cannot fertilize in buffer strips)	_____	_____
I am not concerned about sediment loss from my operation.	_____	_____
I am not concerned about nutrient loss from my operation.	_____	_____
The practice interferes with regular farm operations.	_____	_____
I am opening myself up to further environmental regulation.	_____	_____
I lack knowledge regarding these practices.	_____	_____
I lack the equipment to adopt these practices.	_____	_____
I have tried practices and they were ineffective.	_____	_____
Nobody else is doing it, why should I?	_____	_____
The practice is too expensive.	_____	_____
EQIP does not fit my needs.	_____	_____
The practice takes too much time to implement.	_____	_____
Other reasons (please list) _____	_____	_____

7. Please indicate whether or not you believe this practice is effective at reducing sediment and/or nutrient loss from agricultural land.

	Yes	No	Not Sure
Controlled grazing	_____	_____	_____
Filter strips/Riparian buffer	_____	_____	_____
Prescribed grazing	_____	_____	_____
Pasture grass management (planting both warm and cool season grasses for year round growth)	_____	_____	_____
Stream bank stabilization	_____	_____	_____
Cattle track stabilization/improvement	_____	_____	_____
Stream fencing (to limit access)	_____	_____	_____
Basing fertilizer application on soil test results	_____	_____	_____
Litter storage shed	_____	_____	_____
Manure composting	_____	_____	_____
Soil testing	_____	_____	_____
Use of legumes to reduce nitrogen applications	_____	_____	_____
Using a comprehensive nutrient management (or farm) plan	_____	_____	_____
Using manure instead of commercial fertilizer	_____	_____	_____
Waste treatment lagoon	_____	_____	_____

8. Have you participated in the EQIP program in the last three years?

- _____ Yes
- _____ No

19. Regardless of whether or not you adopted any of these practices, what 3 practices do you think work best to control sediment and/or nutrient loss from an agricultural operation? (Please list practice and indicate with an X in the boxes if you feel it can reduce sediment loss, nutrient loss or both).

Practice	Reduces Sediment Loss	Reduces Nutrient Loss

SECTION 4: FARM MANAGEMENT CHANGES AND NEEDS

1. Have the Oklahoma-Arkansas lawsuits influenced your farm management?

Yes
 No

2. If yes, did the lawsuits influence you in any of the following ways?

	Yes	No
I changed the commodity mix on my farm.	_____	_____
I reduced the size of my operation.	_____	_____
I increased the size of my operation.	_____	_____
I use less litter on farm / sell more litter	_____	_____
I adopted new conservation CPs.	_____	_____
I expanded the use of conservation CPs already on my farm.	_____	_____
Other reasons (please list) _____	_____	_____

3. Please list the top three challenges to the continuation of your operation over the next three years.

Challenge 1: _____

Challenge 2: _____

Challenge 3: _____

4. How can the agricultural industry, research and outreach community best help you overcome those challenges?

4. Finally, if not already addressed in question 4 above, please share with us below any suggestions you have for how to:
- a. Improve adoption of conservation practices

 - b. Make conservation programs more user-friendly

 - c. Remove current barriers to adoption

Thank you for participating in this survey!

Should you have any further questions, or if you would like to receive a copy of the results when released, please send an email with your name and contact information to Jennie Popp at jhpopp@uark.edu. Please use the space below to share with us any additional comments.

Appendix B1

Differences by County

Table 8. Differences by county: General perceptions and actions of respondents in the UIRW.

Perception/Action	Percent of responses (%) ^a				P - value	Responses missing ^b
	Washington		Benton			
	Yes	No	Yes	No		
Do you believe that water quality issues – related to excess nutrients and/or sediments – exist in the watershed?	84	16	83	17	0.8217	0
Do quality concerns in these water bodies influence the use of CPs on your farm?	97	3	95	5	0.2547	94
Do you have a nutrient management plan/farm plan on file with USDA-NRCS or your local Conservation District office?	92	8	87	13	0.0568	0
Have you heard about the Arkansas Discovery Farm Program?	97	3	97	3	1.0000	0
Do you think the Discovery Farm program will effectively help farmers and agriculture address environmental concerns or public perception?	98	2	96	4	0.1448	20
Did you or someone else adopt any best management practices within the last three years to reduce sediment and/or nutrient loss on land you owned, you rented and/or leased out?	98	2	94	6	0.0490	0
Have you participated in the EQIP program in the last three years?	14	87	2	98	0.0001	0
Have the Oklahoma-Arkansas lawsuits influenced your farm management?	64	36	75	25	0.0070	0

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 9. Differences by county: Perceptions on parties responsible for water quality problems and cleanup.

Group	Percent of responses (%) ^a						P - value	Responses missing ^b
	Washington			Benton				
	None	Small	Large	None	Small	Large		
Agricultural Producers	19	71	10	14	69	17	0.0495	95
City Sewer System	2	48	50	3	53	44	0.4722	97
Households	23	60	17	24	65	11	0.1652	95
Industry	12	64	24	17	48	35	0.0018	102
New Construction	19	63	19	29	49	21	0.0067	98
Outdoor Recreation	50	45	6	56	37	7	0.2235	95
Others	97	3	0	94	6	0	0.1798	95

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 10. Differences by County: Producer responses contributing to Conservation Practice adoption.

	Percent of responses (%) ^a				P - value	Responses missing ^b
	Washington		Benton			
	Yes	No	Yes	No		
Groups and Agencies producers turn to for Conservation Practice information						
Extension	68	32	59	41	0.0380	0
NRCS	62	38	49	51	0.0044	30
Other Farmers	51	49	52	48	0.8680	0
UA Researchers	25	75	26	74	0.9244	0
Conservation District	9	91	7	93	0.4555	0
Other	7	93	15	85	0.0021	32
Paid Consultants	2	98	5	95	0.0718	18
EPA Agency	1	99	6	94	0.0014	0
FSA	0	100	1	99	0.1004	0
Reasons for adopting Conservation Practices						
Integrator requires or requests use of the practice	88	12	78	22	0.0812	396
I think practices such as these are effective in reducing sediment/nutrient loss	78	22	80	20	0.5348	24
Government/university/extension has recommended use of this practice	54	46	58	42	0.3463	24
Cost share practice is readily available	32	68	20	80	0.001	22

	Percent of responses (%) ^a				P - value	Responses missing ^b
	Washington		Benton			
	Yes	No	Yes	No		
Practices improve profitability of farm	22	78	27	73	0.1695	23
Practices improve perception of others that I am a food steward of the land	20	80	26	74	0.1075	23
I want to be an early adopter – I anticipate environmental regulation	11	89	11	89	0.8919	27
Other reasons	0	100	0	100	NA	23
Difficulties encountered by having a Nutrient Management Plan						
Increased record keeping	54	46	40	60	0.0019	68
Increased need for commercial fertilizer	30	70	33	67	0.3895	68
Decreased litter application rates	26	74	28	72	0.6901	62
Decreased hay yields or pasture production	24	76	30	70	0.1329	68
Decreased flexibility in management	19	81	17	83	0.6468	62
Decreased profitability	8	92	6	94	0.5009	62

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 11. Differences by County: Conservation practice adoption.

Conservation Practices	Percent of responses (%) ^a				P - value	Responses missing ^b
	Washington		Benton			
	Yes	No	Yes	No		
Soil testing	96	4	93	7	0.0588	22
Use of a nutrient management plan or a farm plan	94	6	92	8	0.4025	22
Basing fertilizer application on soil test results	81	19	82	18	0.741	32
Pasture grass management	55	45	53	47	0.7343	22
Controlled Grazing	34	66	33	67	0.787	23
Filter strips/riparian buffer	19	81	24	76	0.148	23
Litter storage shed	18	82	13	88	0.0623	22
Use of manure instead of commercial fertilizer	15	85	22	78	0.0336	39
Manure composting	8	92	5	95	0.3939	22
Stream fencing	6	94	8	92	0.5076	22
Prescribed grazing	6	94	6	94	1	23
Use of legumes to reduce nitrogen applications	5	95	5	95	1	22
Stream bank stabilization	3	97	1	99	0.0744	24
Cattle track stabilization/improvement	2	98	2	98	1	24
Waste treatment lagoon	0	100	0	100	NA	22
Others	0	100	0	100	NA	22

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 12. Differences by County: Perceived Effectiveness of Conservation Practices.

Conservation Practices	Percent of responses (%) ^a						P - value
	Washington			Benton			
	Effective	Not Effective	Not Sure	Effective	Not Effective	Not Sure	
Basing fertilizer application on soil test results	87	9	4	77	11	12	0.0013
Soil testing	84	8	8	80	14	7	0.0581
Controlled Grazing	80	9	11	72	11	17	0.0565
Pasture grass management	77	12	12	70	7	22	0.0011
Filter strips/riparian buffer	66	18	16	52	23	25	0.0013
Prescribed grazing	63	13	24	42	25	32	0.0001
Use of a nutrient management plan or a farm plan	60	16	24	55	24	20	0.0408
Stream bank stabilization	59	19	21	42	21	37	0.0001
Litter storage shed	54	24	22	57	27	16	0.1728
Stream fencing	48	22	30	33	24	43	0.0005
Use of legumes to reduce nitrogen applications	48	25	27	42	20	38	0.0225
Cattle track stabilization/improvement	47	29	24	33	33	34	0.0001
Use of manure instead of commercial fertilizer	44	33	22	37	39	24	0.1817
Manure composting	36	35	29	35	45	20	0.0107
Waste treatment lagoon	11	29	60	10	19	71	0.0096

^a Row may not sum to 100% due to rounding.

Appendix B2

Differences by Producer Types

Table 13. Differences by producer group: General perceptions and actions of respondents in the UIRW.

Perceptions/Actions	Percent responses (%) by producer group ^a								P - value	Responses missing ^b
	Neither Beef nor Poultry		Poultry Only		Beef Only		Both Beef and Poultry			
	Yes	No	Yes	No	Yes	No	Yes	No		
Is your agricultural operation your primary job?	50	50	67	33	50	50	71	29	0.0008	8
Do you believe water quality issues exist in the watershed?	81	19	94	6	81	19	93	7	0.0039	0
Do quality concerns influence the use of CPs on your farm?	88	12	100	0	97	3	100	0	0.0001	94
Do you have a nutrient management plan/farm plan on file with USDA-NRCS or your local Conservation District office?	84	16	94	6	91	9	91	9	0.0984	0
Have you heard about the Arkansas Discovery Farm Program?	94	6	98	2	98	2	97	3	0.0536	0

Perceptions/Actions	Percent responses (%) by producer group ^a								P - value	Responses missing ^b
	Neither Beef nor Poultry		Poultry Only		Beef Only		Both Beef and Poultry			
	Yes	No	Yes	No	Yes	No	Yes	No		
Do you think the Discovery Farm program will effectively help farmers and agriculture address environmental concerns or public perception?	97	3	96	4	97	3	98	2	0.9315	20
Did you or someone else adopt any best management practices within the last three years to reduce sediment and/or nutrient loss on land you owned, you rented and/or leased out?	94	6	98	2	97	3	93	7	0.1729	0
Have you participated in the EQIP program in the last three years?	10	90	10	94	6	94	13	87	0.0845	0
Have the Arkansas-Oklahoma lawsuits influenced your farm management?	72	28	63	37	67	33	74	26	0.4474	0

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 14. Differences by producer group: Perceptions on parties responsible for water quality problems and cleanup.

Group	Percent of responses (%) by producer group ^a												P - value	Responses missing ^b
	Neither Poultry nor beef			Poultry			Beef			Both Poultry and Beef				
	None	Small	Large	None	Small	Large	None	Small	Large	None	Small	Large		
Agricultural producers	19	65	16	40	52	8	13	74	13	13	74	13	0.0006	95
City sewer system	6	57	37	2	52	46	1	50	49	4	40	56	0.0232	97
Households	17	71	12	23	71	6	23	58	19	31	61	8	0.0229	95
Industry	24	53	22	13	65	23	10	57	33	16	53	31	0.0205	102
New construction	19	56	25	35	48	17	19	60	21	35	52	13	0.0128	98
Outdoor recreation	51	41	8	52	48	0	54	38	8	52	47	1	0.0927	95
Others	97	3	0	90	10	0	97	3	0	93	7	0	0.0504	95

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 15. Differences by producer group: Producer responses contributing to conservation adoption.

	Percent of responses (%) ^a								P - value	Responses missing ^b
	Neither Poultry nor Beef		Poultry Only		Beef Only		Poultry and Beef			
	Yes	No	Yes	No	Yes	No	Yes	No		
Groups/Agencies										
Extension	62	38	63	37	64	36	66	34	0.9437	0
NRCS	50	50	63	37	56	44	59	41	0.3840	30
Other Farmers	35	65	59	41	61	39	36	64	0.0001	0
UA Researchers	27	73	14	86	26	74	29	71	0.2272	0
Other	8	92	10	90	13	87	6	94	0.1772	32
Conservation District	6	94	2	98	10	90	11	89	0.1346	0
Paid Consultants	2	98	2	98	3	97	12	88	0.0005	18
EPA Agency	2	98	8	92	3	97	8	92	0.0237	0
FSA	0	100	0	100	0	100	3	100	0.0010	0
Difficulties encountered in having a Nutrient Management Plan										
Increased record keeping	46	54	60	40	46	54	50	50	0.2634	68
Increased need for commercial fertilizer	33	67	31	69	34	66	21	79	0.1565	68

	Percent of responses (%) ^a								P - value	Responses missing ^b
	Neither Poultry nor Beef		Poultry Only		Beef Only		Poultry and Beef			
	Yes	No	Yes	No	Yes	No	Yes	No		
Decreased hay yields or pasture production	27	73	21	79	29	71	21	79	0.3566	68
Decreased flexibility in management	20	80	19	81	18	82	13	87	0.6505	62
Decreased litter application rates	18	82	17	83	28	72	36	64	0.0148	62
Decreased profitability	7	93	4	96	8	92	7	93	0.8023	62

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 16. Differences by producer group: Conservation Practices adopted within the last three years.

Conservation Practice	Percent responses (%) by producer group ^a								P - value	Responses missing ^b
	Neither Poultry nor Beef		Poultry Only		Beef Only		Both Poultry and Beef			
	Yes	No	Yes	No	Yes	No	Yes	No		
Soil testing	89	11	98	2	95	5	98	2	0.0137	22
Use of a nutrient management plan	89	11	96	4	93	7	98	2	0.0816	22
Basing fertilizer application on soil test results	75	25	84	16	82	18	88	12	0.1065	32
Pasture grass management	34	66	48	52	62	38	55	45	0.0001	22
Controlled grazing	10	90	2	98	43	57	48	52	0.0001	23
Use of manure instead of commercial fertilizer	9	91	2	98	24	76	20	80	0.0001	39
Prescribed grazing	3	97	2	98	8	92	5	95	0.1780	23
Litter storage shed	3	97	70	30	2	98	51	49	0.0001	22
Filter strips/riparian buffer	0	100	0	100	29	71	36	64	0.0001	23
Stream bank stabilization	0	100	0	100	4	96	0	100	0.0177	24
Cattle track stabilization/improvement	0	100	0	100	3	97	2	98	0.1784	24
Stream fencing	0	100	0	100	11	89	7	93	0.0003	22

Conservation Practice	Percent responses (%) by producer group ^a								P - value	Responses missing ^b
	Neither Poultry nor Beef		Poultry Only		Beef Only		Both Poultry and Beef			
	Yes	No	Yes	No	Yes	No	Yes	No		
Manure composting	0	100	0	100	9	91	9	91	0.0008	22
Use of legumes to reduce nitrogen applications	0	100	0	100	8	92	4	96	0.0015	22
Waste treatment lagoon	0	100	0	100	0	100	0	100	NA	22
Others	0	100	0	100	0	100	0	100	NA	22

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 17. Differences by producer group: Reasons for adopting Conservation Practices.

Reason	Percent responses (%), by producer group ^a								P - value	Responses missing ^b
	Neither Poultry nor Beef		Poultry Only		Beef Only		Both Poultry and Beef			
	Yes	No	Yes	No	Yes	No	Yes	No		
Integrator requires or requests use of the practice	90	10	90	10	81	19	76	24	0.1477	396
I think practices such as these are effective in reducing sediment/nutrient loss	72	28	80	20	77	23	92	8	0.0079	24
Government/university/extension has recommended use of this practice	35	65	34	66	63	37	74	26	0.0001	24
Practices improve perceptions of others that I am a good steward of the land	23	77	24	76	20	80	33	67	0.1060	23
Practices improve profitability of farm	22	78	40	60	23	77	25	75	0.0691	23
Cost share for practice is readily available	21	79	44	56	24	76	31	69	0.0092	22
I want to be an early adopter – I anticipate environmental regulations	8	92	12	88	11	89	15	85	0.4064	27
Other reasons	0	100	0	100	0	100	0	100	NA	23

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 18. Differences by producer group: Perceived effectiveness of Conservation Practices.

Conservation Practices	Percent responses (%) by producer group ^a												P - value
	Neither Poultry nor Beef			Poultry Only			Beef Only			Both Poultry and Beef			
	Effective	Not effective	Not Sure	Effective	Not effective	Not Sure	Effective	Not effective	Not Sure	Effective	Not effective	Not Sure	
Soil testing	84	7	9	88	4	8	79	13	8	87	9	4	0.2152
Controlled Grazing	73	6	22	86	6	8	76	12	12	77	12	11	0.0222
Pasture grass management	71	6	23	80	4	16	71	14	15	82	3	14	0.0066
Basing fertilizer application on soil test results	71	15	14	84	12	4	85	9	6	87	5	8	0.0121
Litter storage shed	52	25	23	69	22	10	51	28	21	68	22	10	0.0190
Use of a nutrient management plan or a farm plan	48	23	30	69	8	24	56	24	20	71	10	19	0.0013
Prescribed grazing	47	15	39	53	16	31	57	21	22	51	20	30	0.0457
Filter strips/riparian buffer	41	30	29	73	12	16	61	18	21	70	19	11	0.0001
Use of legumes to reduce nitrogen applications	40	27	33	57	20	24	46	21	33	45	23	32	0.4656
Stream bank stabilization	39	26	35	67	12	22	53	21	25	53	14	33	0.0105

Conservation Practices	Percent responses (%) by producer group ^a												P - value
	Neither Poultry nor Beef			Poultry Only			Beef Only			Both Poultry and Beef			
	Effective	Not effective	Not Sure	Effective	Not effective	Not Sure	Effective	Not effective	Not Sure	Effective	Not effective	Not Sure	
Use of manure instead of commercial fertilizer	36	30	34	49	41	10	37	40	23	57	27	15	0.0002
Cattle track stabilization/improvement	34	33	33	51	25	24	40	34	27	45	21	34	0.1058
Stream fencing	34	23	43	45	31	24	42	23	34	46	14	40	0.0792
Manure composting	32	43	25	33	43	24	36	40	24	42	31	27	0.6562
Waste treatment lagoon	6	20	74	16	12	73	9	28	63	20	23	57	0.0016

^a Row may not sum to 100% due to rounding.

Appendix B3

Differences by Belief in Water Quality Issues

Table 19. Differences by belief in water quality issues: General perceptions and actions of respondents in the UIRW.

Perception/Action	Percent of responses (%) ^a				P - value	Responses Missing ^b
	Water quality issues exist		Water quality issues do NOT exist			
	Yes	No	Yes	No		
Do quality concerns in these water bodies influence the use of CPs on your farm?	4	96	0	0	NA	94
Do you have a nutrient management plan/farm plan on file with USDA-NRCS or your local Conservation District office?	94	6	68	32	0.0001	0
Have you heard about the Arkansas Discovery Farm Program?	99	1	89	11	0.0001	0
Do you think the Discovery Farm program will effectively help farmers and agriculture address environmental concerns or public perception?	97	3	96	4	0.7293	20
Did you or someone else adopt any best management practices within the last three years to reduce sediment and/or nutrient loss on land you owned, you rented and/or leased out?	98	2	88	12	0.0002	0

Perception/Action	Percent of responses (%) ^a				P - value	Responses Missing ^b
	Water quality issues exist		Water quality issues do NOT exist			
	Yes	No	Yes	No		
Have you participated in the EQIP program in the last three years?	9	91	4	96	0.1525	0
Have the Oklahoma-Arkansas lawsuits influenced your farm management?	67	33	77	23	0.0886	0

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 20. Differences by belief in water quality: Producer responses contributing to Conservation Practice adoption.

	Percent of responses (%) ^a				P - value	Responses missing ^b
	Water quality issues exist		Water quality issues do NOT exist			
	Yes	No	Yes	No		
Groups/Agencies producers turn to for Conservation Practices information						
Extension	64	36	66	34	0.7253	0
NRCS	58	42	41	59	0.0069	30
Other Farmers	51	49	52	48	0.9108	0
UA Researchers	25	75	29	71	0.4415	0
Other	11	89	8	92	0.5470	32
Conservation District	9	91	4	96	0.1535	0
Paid Consultants	4	96	3	98	0.7535	18
EPA Agency	4	96	2	98	0.5534	0
FSA	1	99	0	100	1.0000	0
Reasons for adopting Conservation Practices						
Integrator requires or requests use of the practice	82	18	94	6	0.3142	396
I think practices such as these are effective in reducing sediment/nutrient loss	80	20	71	29	0.0807	24
Government/university/extension has recommended use of this practice	58	42	45	55	0.0232	24
Cost share practice is readily available	28	72	14	86	0.0069	22
Practices improve profitability of farm	27	73	12	88	0.0035	23

	Percent of responses (%) ^a				P - value	Responses missing ^b
	Water quality issues exist		Water quality issues do NOT exist			
	Yes	No	Yes	No		
Practices improve perception of others that I am a food steward of the land	25	75	11	89	0.0030	23
I want to be an early adopter – I anticipate environmental regulation	11	89	9	91	0.5667	27
Other reasons	0	100	0	100	NA	23
Difficulties encountered by having Nutrient Management Plan						
Increased record keeping	49	51	40	61	0.1680	68
Increased need for commercial fertilizer	33	67	17	83	0.0110	68
Decreased litter application rates	29	71	11	89	0.0022	62
Decreased hay yields or pasture production	26	74	31	69	0.5313	68
Decreased flexibility in management	18	82	17	83	1.0000	62
Decreased profitability	8	92	0	100	0.0090	62

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 21. Differences by belief in water quality issues: Conservation Practices adopted within the last three years.

Conservation Practices	Percent of responses (%) ^a				P - value	Responses missing ^b
	Water quality issues exist		Water quality issues do NOT exist			
	Yes	No	Yes	No		
Soil testing	97	3	81	19	0.0001	22
Use of a nutrient management plan or a farm plan	96	4	77	23	0.0001	22
Basing fertilizer application on soil test results	83	17	73	27	0.0399	32
Pasture grass management	56	44	45	55	0.0735	22
Controlled Grazing	33	67	33	67	1.0000	23
Filter strips/riparian buffer	23	77	11	89	0.0091	23
Use of manure instead of commercial fertilizer	18	82	17	83	0.8771	39
Litter storage shed	17	83	6	94	0.0082	22
Stream fencing	8	92	4	96	0.2465	22
Manure composting	7	93	4	96	0.3376	22
Prescribed grazing	6	94	4	96	0.4531	23
Use of legumes to reduce nitrogen applications	5	95	5	95	1.0000	22
Stream bank stabilization	3	97	0	100	0.2300	24
Cattle track stabilization/improvement	2	98	0	100	0.3816	24
Waste treatment lagoon	0	100	0	100	NA	22
Others	0	100	0	100	NA	22

^a Row may not sum to 100% due to rounding.

^b Of the 582 respondents, this many did not answer this question.

Table 22. Differences by belief in water quality issues: perceived effectiveness of Conservation Practices.

Conservation Practices	Percent of responses (%) ^a						P - value
	Water quality issues exist			Water quality issues do NOT exist			
	Effective	Not Effective	Not Sure	Effective	Not Effective	Not Sure	
Basing fertilizer application on soil test results	84	10	6	73	11	16	0.0073
Soil testing	82	11	7	84	5	11	0.1026
Controlled Grazing	80	9	11	59	16	26	0.0001
Pasture grass management	76	9	15	62	12	27	0.0102
Use of a nutrient management plan or a farm plan	62	18	20	37	31	32	0.0001
Filter strips/riparian buffer	61	19	20	51	24	24	0.1821
Prescribed grazing	59	17	24	23	27	50	0.0001
Litter storage shed	57	26	18	50	27	23	0.3647
Stream bank stabilization	55	20	25	33	23	44	0.0002
Use of legumes to reduce nitrogen applications	46	22	32	41	24	34	0.6857
Stream fencing	45	23	32	21	22	56	0.0001
Cattle track stabilization/improvement	43	29	28	23	41	35	0.0008
Use of manure instead of commercial fertilizer	43	36	21	28	37	35	0.0031
Manure composting	39	36	24	18	55	27	0.0001
Waste treatment lagoon	12	25	63	4	21	74	0.0379

^a Row may not sum to 100% due to rounding.