

# Discovery, The Student Journal of Dale Bumpers College of Agricultural, Food and Life Sciences

---

Volume 7

Article 11

---

Fall 2006

## Water quality issues in the Illinois River watershed: A proposal for new voluntary incentives

Tory B. Hodges  
*University of Arkansas, Fayetteville*

Jennie S. Popp  
*University of Arkansas, Fayetteville*

Follow this and additional works at: <https://scholarworks.uark.edu/discoverymag>



Part of the [Fresh Water Studies Commons](#), and the [Water Resource Management Commons](#)

---

### Recommended Citation

Hodges, T. B., & Popp, J. S. (2006). Water quality issues in the Illinois River watershed: A proposal for new voluntary incentives. *Discovery, The Student Journal of Dale Bumpers College of Agricultural, Food and Life Sciences*, 7(1), 47-50. Retrieved from <https://scholarworks.uark.edu/discoverymag/vol7/iss1/11>

This Article is brought to you for free and open access by ScholarWorks@UARK. It has been accepted for inclusion in *Discovery, The Student Journal of Dale Bumpers College of Agricultural, Food and Life Sciences* by an authorized editor of ScholarWorks@UARK. For more information, please contact [scholar@uark.edu](mailto:scholar@uark.edu), [uarepos@uark.edu](mailto:uarepos@uark.edu).

# Water quality issues in the Illinois River watershed: A proposal for new voluntary incentives

---

*Tory B. Hodges<sup>\*</sup> and Jennie S. Popp<sup>†</sup>*

## **ABSTRACT**

Concerns about water quality degradation exist in Northwest Arkansas. The purpose of this study was to analyze the potential usefulness of U.S. conservation programs in addressing water quality concerns on farms in the Illinois River watershed as well as greater Washington County, Arkansas. It was hypothesized that neither the Environmental Quality Incentives Program (EQIP) nor the Conservation Security Program (CSP) in their current forms effectively assists farmers in meeting water-quality management goals. That hypothesis was tested by 1) examining agricultural characteristics of the watershed, 2) actual adoption of EQIP and CSP in Washington County and Arkansas, and, 3) identifying factors that influence program adoption. Results show that based on watershed and farmer characteristics, neither program can meet water quality goals for the region. EQIP adoption is hindered by high rejection rates of applications and farmer dissatisfaction with the program. CSP adoption is unlikely because it does not consider watersheds with degraded water quality and allowable best management practices (BMPs) do not include those related to waste management – precisely the practices most often used by these watershed farmers. Suggestions are offered to modify both EQIP and CSP and use them as a two-part plan to better serve the needs of farmers and improve both adoption rates of BMPs by farmers and water quality in the region.

<sup>\*</sup> Tory B. Hodges is a 2006 graduate with a degree in agribusiness

<sup>†</sup> Jennie S. Popp, faculty sponsor, is an associate professor in the Department of Agricultural Economics and Agribusiness

## **MEET THE STUDENT-AUTHOR**



*Tory B. Hodges*

I graduated from Alpena High School, Alpena, Ark., in 2002 and enrolled at the University of Arkansas in the fall as an agribusiness major. While studying abroad as a UA junior at Oxford University, I researched the Common Agriculture Policy and farm conservation programs specific to England. As a senior I worked with Dr. Jennie Popp in the Department of Agricultural Economics and Agribusiness (AEAB) to explore similar conservation programs in the United States. I was awarded a Student Undergraduate Research Award in 2006 and presented my research at the National Conference for Undergraduate Research at the University of North Carolina in Asheville, N.C.

For four years, I have been actively involved in the AEAB Department; in 2005-2006 I served as president of the Agribusiness Club and was honored with the Outstanding Senior Award from the department and with the college's John W. White Undergraduate Award. I am graduating summa cum laude in May 2006 and will be attending Vanderbilt Law School in the fall as a Harold Sterling Vanderbilt Scholar.

I would like to thank Dr. Jennie Popp for her guidance in my research project. Also, I would like to acknowledge Dr. Martin Redfern and Dr. Duane Wolf for their active participation on my research committee.

## **INTRODUCTION**

The Illinois River begins in Washington County, Arkansas, and flows east into Oklahoma. Oklahoma received approval from the Environmental Protection Agency (EPA) to set a 0.037 mg/L limit on the amount of phosphorus (P) in the river as it crosses the Oklahoma border. This effort has farmers, legislators, and community leaders at odds. Phosphorus is found in high concentrations in animal waste, such as poultry litter. Litter is used as fertilizer on pastureland and if applied in excess amounts, litter can run off the land and into Illinois River and its tributaries. This could reduce water quality and negatively impact the water recreation industry in Oklahoma. The poultry and cattle industries also play a crucial role in the area's economy. Therefore, means are needed to sustain water quality without reducing the economic vitality of the region.

Washington County has 2,800 farms (USDA, NASS, 2004). Beef cattle production dominates the agricultural activities within the county and the watershed. Half of the county's farms include roughly 20 ha of hay production. Broiler production makes up roughly 10% of farms

in Washington County (USDA NASS, 2004) but roughly 20% of farms in the Illinois River watershed (J. Gunsaulis, personal communication). A typical broiler producer has four houses and raises five flocks of birds (or 110,000 birds) that generate 218 metric tons of litter per year (S. Watkins, personal communication). Many of the poultry and cattle producers apply litter to their land. Some have also adopted Best Management Practices (BMPs) to address water quality issues including building stacking sheds, applying alum, constructing ponds and water facilities, composting, using buffer strips, and pasture and hayland improvements. However, BMPs can be costly and often require technical expertise to use effectively.

Traditionally, U.S. conservation efforts have targeted the reduction of existing resource quality problems. The Environmental Quality Incentives Program, or EQIP, provides farmers with cost share and technical assistance to adopt BMPs. An EQIP contract, which can last up to 20 years, can provide a BMP cost share of 50 to 100%; however, that payment comes as a reimbursement after BMPs are in place (USDA NRCS, 2006a, 2006b).

A newer approach to water quality preservation in the

U.S. is environmental incentives programs that offer payments to landowners who take specific steps to improve resource quality. The Conservation Security Program (CSP) financially rewards land managers for high stewardship levels. Producers qualify for one of three tiers, determined by how well they address resource concerns on their land (USDA, NRCS, 2005). They receive a base payment (or rental rate) and cost share for select BMPs. While CSP is available nationwide, sign-up is only offered in watersheds that meet specific criteria. Qualifying farmers in seven Arkansas watersheds are eligible for CSP payments in 2006 (D. Mobley, personal communication).

Previous research by Hodges (forthcoming) has examined rationale for such environmental programs. Others have examined program efficiencies and policy development. While EQIP and CSP offer incentives to farmers, they also have components that can limit farmer access to or interest in the programs (Hodges, 2006; Giannakas and Kaplan, 2005; Smith and Weinberg, 2004; Wu and Babcock, 1996). The purpose of this paper is to examine actual and potential adoption of EQIP and CSP in the Illinois River watershed and greater Washington County and to propose alternatives to better facilitate the meeting of water quality goals in the region.

## **MATERIALS AND METHODS**

The analysis took place in three parts. First, information on BMPs and farmer participation in EQIP was gathered from Moore and Edwards (2005), United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS) (2006a, 20006b, and 2006c) and USDA NRCS and University of Arkansas personnel. Second, CSP criteria (USDA NRCS, 2002, 2004, 2005) were applied to Washington County to determine if the Illinois River Watershed is likely to be recommended for the CSP program. Finally, those results were used to develop recommendations for better conservation and incentive program implementation and adoption.

## **RESULTS AND DISCUSSION**

### *Cost considerations of BMPs*

The mentioned common BMPs are eligible for cost share through EQIP. Most practices are eligible for 50% cost share; waste storage facilities and amendment alum receive 75 and 100%, respectively. However, the total cost to establish these practices can be expensive. For example, it costs approximately \$392.20 per typical 1,486 m<sup>2</sup> broiler house to purchase and spread 725.8 kg of alum; total costs exceed \$1,500 annually if a farmer has four

houses. Watering facilities may cost \$800 for a freeze proof tank but up to \$3,000 for a typical pond. An appropriate litter stacking shed may cost \$11,400 but a farmer with four houses may need two, for a total cost of \$22,800. EQIP could substantially reduce the net cost—cost after cost share—to the farmer for these practices.

### *Evaluation of EQIP*

Surprisingly, very few EQIP contracts exist in the watershed and across the state. In 2003 only 4,606 (10%) farmers in the state made applications to EQIP. Of those only 570 farmers (just 1% of state farmers) secured contracts. Only 4% of (108) Washington County farmers applied for and only seven farmers secured a contract. By 2005, the number of approved contracts doubled in Washington County to 14 and average total contract value had increased to \$43,380. Similar gains were found statewide. However, this still represents a small percentage of farmers in Arkansas EQIP.

In Arkansas, EQIP has stalled for two reasons. First, application rejection rates are very high; second, very few farmers have applied. The official reason cited for high rejection rates is that applicants generally failed to meet high-or medium- priority criteria, criteria that are set at the state level. Additionally, these criteria generally require adoption of a larger mix of BMPs than farmers have proposed.

Farmers have offered the following reasons for their lack of participation in the program. First, EQIP requires the adoption of too many costly practices. Second, in Arkansas, the reimbursement process has been slow for many. Third, some farmers find it difficult or costly to meet BMP guidelines provided in the NRCS technical guide. Fourth, EQIP contracts require maintenance of the practice for its “life” that could span 10 to 20 years. Farmers who wish to terminate their contract earlier could risk financial penalties. Farmers have also expressed confusion over the ever-changing focus of the program (new priority areas can be set each year). Finally, farmers rarely reapply if ever denied a contract. These reasons suggest that participation in EQIP in the watershed and the county will remain low and therefore, EQIP is not an effective means to seriously address water quality concerns in the region.

### *Evaluation of CSP*

CSP is not likely to be implemented in the Illinois River watershed. Two sets of criteria are used to determine watershed eligibility for CSP. The first relates to technical resources and abilities of local NRCS staff to manage a program. The other is related to high-priority resource issues and good land stewardship in the region. While the Washington County NRCS office likely meets the technical requirements, the watershed itself fails the test of consistent and good land stewardship. Because

this watershed includes impaired waterways, it would receive very low scores in the CSP prioritization process.

Even if the program was implemented, it would still be very difficult for many farmers in the Illinois River watershed to benefit from participation. While there is a long list of approved conservation practices under CSP (USDA NRCS, 2002), none of them include the common waste disposal/control practices (alum, stacking sheds, or composting) adopted in the region.

#### *Suggested alternatives for improving water quality*

The following suggestions are proposed for improving BMP adoption in the watershed. First, the current EQIP program could be enhanced to increase farmer participation. By cutting the length of most EQIP contracts to five years, producers may be more motivated to enter into an agreement. Increases in cost-share rates to 75% for most practices and improved efficiency in payments may render BMPs economically viable for more producers.

Second, modifying CSP to be compatible with EQIP could be beneficial to long-term success in the Illinois River watershed. Currently, CSP only targets pristine watersheds. If adopted in conjunction with EQIP, annual funding could be directed toward regions with high participation in the five-year EQIP agreements and with the greatest resource improvements made in that five-year period. Furthermore, funding would be available for all BMPs including those pertaining to waste management.

This two-part program could offer producers significant benefits. By implementing CSP in watersheds that have effectively utilized EQIP to make environmental improvements, farmers could be eligible for one-time cost-share payments during the EQIP contract period as well as annual rental payments after the five years, once the EQIP contract period is over and their CSP contracts have been secured. Ideally, farmers would continually improve land stewardship by participating in EQIP then moving through the three tiers of CSP until watershed degradation has been effectively eliminated. Combined with a well-funded EQIP program, incentives similar to CSP could have a tremendous impact on the water quality and environmental practices of producers in Northwest Arkansas.

### **ACKNOWLEDGMENTS**

Financial support for this project was provided by a State Undergraduate Research Fellowship (SURF) and a Dale Bumpers College of Agricultural, Food and Life Sciences Undergraduate Research grant. The authors

wish to thank Mr. Kenneth Lee, Mr. Dennis Mobley, and Ms. Rhonda Foster of USDA NRCS and Dr. H.L. Goodwin and Dr. Susan Watkins of the University of Arkansas for their help and support with the overall undergraduate research project, of which this paper represents one part.

### **LITERATURE CITED**

- Giannakas, K. and J. D. Kaplan 2005. Policy design and conservation compliance on highly erodible lands. *Land Econ.* 81: 20-33.
- Hodges, Tory. In Press. Environmental pollution and agricultural incentives in US and EU Programs Proceedings of the 2006 National Conference for Undergraduate Research. UNC: Asheville.
- Moore, P. and D. Edwards. 2005. Long-term effects of poultry litter, alum-treated litter, and ammonium nitrate on aluminum availability in soils. *J Environ Qual.* 34: 2104-2111.
- Smith, K. and M. Weinberg. 2004. Measuring the success of conservation programs *Amber Waves.* 2: 14-21.
- Wu, J. and B. A. Babcock. 1996. Contract design for the purchase of environmental goods from agriculture *Amer. J. of Agric. Econ.* 78: 935-945.
- USDA, NASS. 2004. 2002 National Census of Agriculture. Data and Statistics: Washington County, Arkansas. [http://www.nass.usda.gov/Data\\_and\\_Statistics/Quick\\_Stats/](http://www.nass.usda.gov/Data_and_Statistics/Quick_Stats/) Accessed 18 Apr. 2006
- USDA NRCS. 2006a. Environmental Quality Incentives Program. Programs. <<http://www.ar.nrcs.usda.gov/Programs/eqip/>> Accessed 12 Apr. 2006.
- USDA NRCS. 2006b. Environmental Quality Incentives Program. Programs. <<http://www.nrcs.usda.gov/Programs/eqip/>> Accessed 6 Apr. 2006.
- USDA NRCS 2006c. Arkansas Program Statistics. <[http://www.ar.nrcs.usda.gov/foia\\_requests.html](http://www.ar.nrcs.usda.gov/foia_requests.html)> Accessed 6 Apr. 2006.
- USDA NRCS. 2005. Conservation Security Program: Fact Sheet. NRCS: Farm Bill 2002 <[http://www.nrcs.usda.gov/programs/csp/pdf\\_files/csp\\_fs3\\_05.pdf](http://www.nrcs.usda.gov/programs/csp/pdf_files/csp_fs3_05.pdf)> Accessed 11 Nov. 2005.
- USDA NRCS. 2004. Conservation Security Program: Key Points. NRCS: Farm Bill 2002. <[http://www.nrcs.usda.gov/programs/csp/pdf\\_files/CSP\\_Watershed\\_KyPt.pdf](http://www.nrcs.usda.gov/programs/csp/pdf_files/CSP_Watershed_KyPt.pdf)> Accessed 11 Nov. 2005.
- USDA NRCS. 2002. Legislation Enabling the Establishment of CSP. <[http://www.nrcs.usda.gov/programs/csp/CSP\\_LEG.pdf](http://www.nrcs.usda.gov/programs/csp/CSP_LEG.pdf)>. Accessed 20 Apr. 2006.