

# Appendix C





# Section 319 Success Stories Volume III:

The Successful Implementation of the Clean Water Act's  
Section 319 Nonpoint Source Pollution Program





**Section 319 Success Stories Volume III:  
The Successful Implementation  
of the Clean Water Act's Section 319 Nonpoint Source Pollution Program**

---

For copies of this document, contact:

National Service Center for Environmental Publications

Phone: 1-800-490-9198

Fax: 513-489-8695

web: [www.epa.gov/ncepihom](http://www.epa.gov/ncepihom)

or visit the web at:

[www.epa.gov/owow/nps](http://www.epa.gov/owow/nps)



United States Environmental Protection Agency

Office of Water

4503F

Washington, DC 20460

EPA 841-S-01-001

February 2002

---

# **Section 319 Success Stories**

## **Volume III:**

### **The Successful Implementation of the Clean Water Act's Section 319 Nonpoint Source Pollution Program**

United States Environmental Protection Agency  
Office of Water  
Washington, DC



# Contents

<b>Section 319 Success Stories:</b> The Successful Implementation of the Clean Water Act's Section 319 Nonpoint Source Pollution Program	1
<b>ALABAMA</b>	
<b>Flint Creek Watershed Project:</b> Multiagency Effort Results in Water Quality Improvements	7
<b>Tuscumbia-Fort Payne Aquifer Protection Program:</b> Multiagency, Cooperative Approach Protects Aquifer	8
<b>ALASKA</b>	
<b>Restoration Work on the Kenai:</b> Section 319 Funds Are Key to Youth Restoration Corps's Success	10
<b>Road and Stream Crossing Project in Tongass National Forest:</b> New Data Help Identify Needed Fish Habitat Restoration	11
<b>AMERICAN SAMOA</b>	
<b>Nu'uuli Pala Lagoon Restoration Project:</b> Efforts Spread to Other Island Villages	12
<b>ARIZONA</b>	
<b>Restoration in Nutrioso Creek:</b> Successful Results Beginning to Show	13
<b>Sediment Reduction at Hackberry Ranch:</b> Reduction of 4 Tons Per Acre Realized	16
<b>ARKANSAS</b>	
<b>Buffalo National River Watershed Partnerships:</b> Partners Improve Swine Waste Management	17
<b>A Community Approach to Managing Manure in the Buffalo River Watershed:</b> Local Watershed Assistance Program Helps Dairy Farmers	19
<b>CALIFORNIA</b>	
<b>Grassland Bypass Project:</b> Economic Incentives Program Helps to Improve Water Quality	21
<b>Turning History Around:</b> Stream Restoration Reclaims a Meadow While Helping to Control Floods	23
<b>COLORADO</b>	
<b>Mining Remediation in the Chalk Creek Watershed:</b> Project Demonstrates Exciting Possibilities	25
<b>Rio Blanco Restoration:</b> Adopted Rocks and Homemade Jelly Help Fund Demonstration Project	27
<b>CONNECTICUT</b>	
<b>Center Springs Pond Restoration Project:</b> Skaters and Fish Return to Pond	29
<b>Lake Waramaug Watershed Agricultural Waste Management System:</b> One Farm Can Make a Difference	31
<b>DELAWARE</b>	
<b>Partners Upgrade Septic Systems in Coverdale Crossroads:</b> Quality of Life Improved for Residents	33

## Contents (cont.)

### DISTRICT OF COLUMBIA

- Marsh Restoration and Island Enhancement Projects at Kingman Lake:** 34  
Tidal Wetland Habitats Re-created
- The Watts Branch Initiative:** 36  
Community Involvement Key to Success

### FLORIDA

- Blackwater River Restoration:** 37  
Project Demonstrates Mechanics of Erosion and Effectiveness of BMPs
- Brevard County's Urban Storm Water Retrofitting Projects:** 38  
Lessons Learned About Design, Location, and Monitoring

### GEORGIA

- Broad River Streambank Stabilization Project:** 40  
Tree Revetments Rescue Eroding Banks
- North Griffin Storm Water Detention Pond Project:** 41  
Constructed Wetland System Protects Water, Wins Award

### GUAM

- Ugum Watershed Project:** 42  
Students Plant Acacia Seedlings to Help Restore Watershed

### HAWAII

- He'eia Coastal Restoration Project:** 43  
Thousands of Volunteers Replace Alien Plants with Native Species
- Integration of Aquaculture with Taro Production:** 44  
Nonpoint Source Pollutants Reduced in Demonstration Project

### IDAHO

- Conservation in Hatwai Creek:** 45  
Partners Work Together on Four Successful Projects
- Restoring the Paradise Creek Watershed:** 47  
Phased Approach Implemented to Address Pollution and Flooding
- Streambank Stabilization in the Thomas Fork Watershed:** 49  
Photo Monitoring Sells Landowners on Bank Stabilization

### ILLINOIS

- Lake Pittsfield Project:** 50  
Ninety Percent Reduction in Sediment Loading Achieved
- Restoration of the Flint Creek Watershed:** 52  
Restoration Partnership Completes Multiple Projects

### INDIANA

- Blue River Riparian Reforestation:** 53  
The Nature Conservancy Gets Landowners Involved
- Little Pine Creek and Indian Watersheds:** 55  
Constructed Wetland System Averts Agricultural Nonpoint Source Pollution

### IOWA

- Bigalk Creek Watershed Project:** 56  
Rainbow Trout Population Rebounds
- The Lake Fisher Water Quality Project:** 57  
Chipped Tires Help Protect Public Water Supply
- Pine Creek Water Quality Project:** 59  
Life Expectancy of Pine Lakes Extended

## Contents (cont.)

### KANSAS

- Braeburn Golf Course Project:** 60  
Nitrates Reduced by More Than 80 Percent
- On-site Sewage Disposal on Difficult Sites:** 62  
Special Conditions Demand Alternative Response

### KENTUCKY

- Elkhorn Creek BMP Demonstration Project:** 63  
Farmers See Water Supply Alternatives in Action

### LOUISIANA

- Bayou Plaquemine Brule:** 64  
Louisiana Applies Satellite Imagery to Watershed Planning and Management
- Flat River and Red Chute Bayou Watersheds:** 66  
BMPs Reduce Soil Loss

### MAINE

- Highland Lake Watershed Project:** 67  
Hotspots Model Links Land Use and Water Quality
- Silver Spring Brook Watershed Demonstration Project:** 69  
Landowners' Cooperation Plus Town's Commitment Equals Success

### MARYLAND

- Evaluating the Effectiveness of Maryland's Forestry BMPs:** 71  
Paired Watershed Study Tests BMP Performance

### MASSACHUSETTS

- Broad Marsh River Storm Water Remediation Project:** 72  
Infiltration Structures Reduce Pollutants, Save Shellfish Beds
- Lake Tashmoo Storm Water Remediation Project:** 74  
First Flush Leaching Basins More Effective Than Expected

### MICHIGAN

- Innovative Farmers of Michigan:** 76  
Blending Farm Profitability and Water Quality Protection
- Little Rabbit River Watershed Project:** 78  
One-to-One Approach Wins Landowners' Support

### MINNESOTA

- North St. Paul Urban Ecology Center:** 80  
Wetland Improvements Needed to Control Storm Water
- Prior Lake/Spring Lake Improvement Project:** 81  
Long-Term Implementation Strategy Off to a Good Start

### MISSISSIPPI

- Muddy Creek Watershed Demonstration Project:** 83  
BMPs Retain 3,500 Tons of Soil per Year
- Roebuck Lake Demonstration Project:** 84  
Slotted-Board Risers Installed to Save Topsoil and Improve Water Quality

### MISSOURI

- Mississippi Delta Irrigation Water Management Project:** 85  
Irrigation Efficiency Improved
- Upper Niangua Grazing Demonstration Project:** 87  
Counties Unite to Start Demonstration Farms

## Contents (cont.)

### MONTANA

- Careless Creek Watershed Project:** 90  
Sediment Delivery Reduced by 25 Percent
- Restoration in Muddy Creek:** 92  
Will a Name Change Be Needed?

### NEBRASKA

- Walnut Creek Lake Project:** 94  
Partnership Drives Watershed Protection
- Wellhead Protection in Guide Rock:** 95  
Village Closes Abandoned Wells to Protect Water Supply

### NEVADA

- Martin Slough Water Quality Enhancement Project:** 97  
Water Quality Improves in the Upper Carson River Basin
- Middle Carson River Restoration Project:** 98  
Bioengineering Used to Restore Unstable Banks

### NEW HAMPSHIRE

- Chocorua Lake Project:** 100  
BMPs Reduce Phosphorus by 82 Percent
- Lake Opechee Watershed Project:** 101  
City-State Partnership Takes on Multiple Pollutants

### NEW JERSEY

- Restoration of Strawbridge Lake:** 103  
Volunteers Assist in Stabilizing Shoreline and Constructing Wetlands
- The Stony Brook-Millstone Watershed Restoration Project:** 104  
Streamwatch Volunteers Monitor Success of Restoration Efforts

### NEW MEXICO

- Lower Bitter Creek Restoration Project:** 105  
Sediment Loads Reduced by Implementing BMPs
- Valle Grande Grass Bank Water Quality Improvement Project:** 107  
Success Breeds More Success

### NEW YORK

- Keuka Lake Watershed:** 109  
Grape Growers Implement Soil Conservation Practices
- Wappingers Creek Watershed:** 110  
AEM Program Plays a Vital Role

### NORTH CAROLINA

- Edenton Storm Water Wetland Project:** 111  
Wetland Systems Reduce Nitrogen Concentrations
- Goose Creek Urban Stream Rehabilitation Project:** 113  
Ecosystem Protection Practices Installed in Low-Income Neighborhood

### NORTH DAKOTA

- Cottonwood Creek Watershed:** 114  
Project Is a Success in the Works
- Red River Basin Riparian Project:** 117  
Turtle River Site Passes the Test



## Contents (cont.)

### OHIO

- Stillwater River Watershed Protection Project:** 119  
High Local Interest Helps Launch Watershed Project
- Toussaint River Incentive Improvement Program:** 120  
Buffer Project Becomes a Model of Conservation Partnership

### OKLAHOMA

- Acid Mine Drainage Treatment Wetlands:** 122  
A Sustainable Solution for Abandoned Mine Problems
- Poteau River Comprehensive Watershed Management Program:** 124  
Local Involvement Ensures Program Sustainability
- The Spring Creek Project:** 126  
Streambanks Stabilized Through Stream Restoration

### OREGON

- Dawson Wetland Restoration Project:** 128  
Landowners and Wetlands Both Win
- South Myrtle Creek Ditch Project:** 129  
Removal of Dam Benefits Aquatic Life
- Wet Meadow Restoration in the Upper Grande Ronde Basin:** 131  
Channel Restoration Brings Cooler Waters

### PENNSYLVANIA

- Narrows Bioengineering Project:** 132  
Cold-Water Fishery Restored Through Bioengineering
- Villanova's Storm Water Wetland Retrofit:** 133  
BMP Treats Runoff and Provides Research Site

### PUERTO RICO

- Coastal Nonpoint Source Controls:** 135  
Executive Order Adopts Section 6217(g) Management Measures as Official Policy

### RHODE ISLAND

- Curran Brook Sedimentation Pond:** 136  
Multiple Partners Construct Storm Water Control System
- Galilee Salt Marsh Restoration:** 137  
Undersized Culverts Replaced with Self-Regulating Gates

### SOUTH CAROLINA

- Constructed Wetlands for Failing Septic Tanks:** 139  
New Technologies Solve an Old Problem
- Stevens Creek Watershed Project:** 140  
Demonstration Sites Show Reductions in Fecal Coliform Bacteria

### SOUTH DAKOTA

- Big Stone Lake Restoration Project:** 141  
Better Water Quality Improves Fisheries, Recreation
- Management-Intensive Grazing Project:** 143  
Rotational Grazing Reduces Erosion, Increases Profits

### TENNESSEE

- Ghost River Land Acquisition Project:** 144  
River Protected by Restoring Forested Wetlands
- Using Constructed Wetlands to Clean Up Pesticides:** 146  
Container Nurseries Will Benefit from Successful Pilot-Scale Study

## Contents (cont.)

### TEXAS

- Atrazine Problems in the Lake Aquilla and Marlin City Lake System:** 147  
Farmers Take a Proactive Stance
- On-Farm Composting of Dairy Cattle Solid Waste:** 148  
Protecting Water Quality While Producing a Salable Product

### UTAH

- Little Bear River Project:** 149  
Voluntary Approaches Yield Success
- Success in the Chalk Creek Watershed:** 151  
Reduced Phosphorus, Enhanced Habitat Result

### VERMONT

- Flow Restoration Below Hydroelectric Facilities:** 153  
Relicensing Offers Opportunity to Increase Stream Flows
- Lake Champlain Basin Watershed Project:** 154  
Significant Pollutant Reductions Achieved

### VIRGINIA

- Cabin Branch Mine Orphaned Land Project:** 156  
Flora and Fauna Benefit from Mine Reclamation
- Toncræ Mine Orphaned Land Project:** 158  
Mine Site Reclamation Increases Species Diversity

### VIRGIN ISLANDS

- Virgin Islands Partnership:** 160  
Alternative Treatment Systems Prevent Contamination of Coastal Waters

### WASHINGTON

- Best Management Practices on Model Horse Farms:** 161  
Farm Plan Management Reduces Nutrients and Sediment
- A Moo-ving Approach to Dairy Waste Management:** 162  
Fecal Coliform Pollution Reduced in Whatcom County
- Sediment Reduction in Yakima River Basin:** 164  
People Become Stewards of Their Own Watershed

### WEST VIRGINIA

- The North Fork Project:** 165  
Farmers' Cooperation Leads to Proposed Delisting of Degraded River

### WISCONSIN

- Otter Creek Project:** 168  
319 National Monitoring Program Goals Met
- Success in Spring Creek Watershed:** 169  
Natural Reproduction of Trout Confirms Water Quality Improvement

### WYOMING

- Jackson Hole Rodeo Grounds Snow Storage Site:** 170  
Filtration System Reduces Urban Storm Water Runoff
- Muddy Creek Coordinated Resource Management Project:** 172  
Cattle Ranches and Trout Streams Can Coexist

## Contents (cont.)

### INFORMATION AND EDUCATION PROGRAMS

<b>Ranch Water Quality Planning:</b> Voluntary Rangeland Management Eases Impacts on California Watersheds	175
<b>Colorado Water Protection Project:</b> League of Women Voters Guides Extensive Urban NPS Campaign	176
<b>Nonpoint Education for Municipal Officials (NEMO):</b> Successful Connecticut Project Used as Model Nationwide	177
<b>Florida Yards &amp; Neighborhoods Program:</b> More Than 1.2 Million People Reached	179
<b>The Salt Creek Wilderness:</b> Illinois Zoo Offers Interactive Environmental Learning Experience	180
<b>North Dakota Eco-Ed Camps:</b> Thousands of Students Have Fun While Learning	182
<b>University of Rhode Island Onsite Wastewater Training Center:</b> Pioneering Agency Teaches, Demonstrates Innovative Systems	183
<b>Water Action Volunteers:</b> WAV and Its Partners Make a Difference in Wisconsin	184
<b>Stream Monitoring Network with Wyoming Schools:</b> Trained Teams Initiate, Expand School Monitoring Programs	185

### INNOVATIVE STATE PROGRAMS

<b>California's BIOS Program:</b> Growers Adopt Whole-System Management Approach to Reduce Pesticide Use	187
<b>Maui County Erosion and Sediment Control Training Project:</b> Workshops Explain Ordinance, Teach BMP Installation	189
<b>Idaho's Dairy Pollution Prevention Initiative:</b> Unique Program Eliminates Direct Dairy Discharges	191
<b>Creating a Storm Water Utility in Chicopee, Massachusetts:</b> Project Praised as Outstanding Planning Project	193
<b>New York's Agricultural Environmental Management Program:</b> Incentive-based Program Helps Farmers Meet Tough Standards	195
<b>South Carolina Forestry BMP Compliance Program:</b> Proactive Strategy Raises BMP Compliance Rate	197
<b>Statewide Clean Marina Programs:</b> BMPs, Recognition, and Outreach Help Protect Coastal Resources	198

## Contents (cont.)

### STATE FUNDING PROGRAMS

California's Water Bond Program	201
California's Loan Programs	202
Florida Forever Program	202
Georgia's Greenspace Program	203
Iowa's Water Quality Initiative	203
Maine's Funding Programs	205
Clean Michigan Initiative	206
Minnesota's Clean Water Partnership Program	206
Reinvest in Minnesota (RIM) Program	207
New Hampshire's Water Supply Land Conservation Grant Program	208
New Jersey's Funding Programs	208
New York's Clean Water/Clean Air Bond Act	209
North Carolina's Clean Water Management Trust Fund	209
Clean Ohio Fund	210
Oregon's Watershed Restoration Grants	210
Pennsylvania's Growing Greener Program	211
Vermont's Funding Programs	212
Virginia's Water Quality Improvement Act	213
Washington's Water Quality Funding Programs	214
Wisconsin's Grant Programs for Runoff Management	214
State Conservation Reserve Enhancement Programs	215
Clean Water State Revolving Fund Programs	215

### TRIBAL SECTION 319 PROJECTS

<b>Restoring Watersheds by Decommissioning Forest Roads:</b>	217
Karuk Tribe and Forest Service Form Successful Partnership	
<b>Winchester Lake Watershed Project:</b>	219
Local Partners Join in Implementing TMDL Plan	
<b>Water Quality Best Management Practices Plan:</b>	220
Choctaw Tribe Addresses Soil Erosion	
<b>Restoring Little Porcupine Creek:</b>	221
Alternative Water Sources and Grazing Rotation Help to Restore Stream	
<b>Streambank Restoration at Bradley and Standingdeer Campgrounds:</b>	221
An Innovative Solution Solves a Common Problem	

Glossary	G-1
----------	-----

Appendix	A-1
Success Story Index and Sources	



<p><b>Contact:</b>  <b>Sandi Formica</b>  Environmental Preservation Division  Arkansas Department of Environmental Quality  501-682-0020  formica@adeq.state.ar.us</p>	<p><b>Primary Sources of Pollution:</b></p> <ul style="list-style-type: none"> <li>▪ agriculture (confined animal operations)</li> </ul>	<p><b>Primary NPS Pollutants:</b></p> <ul style="list-style-type: none"> <li>▪ nitrogen</li> <li>▪ phosphorus</li> <li>▪ fecal coliform bacteria</li> </ul>	<p><b>Project Activities:</b></p> <ul style="list-style-type: none"> <li>▪ revised storm water diversions and waste collection systems</li> <li>▪ revised operational practices (changes in phosphorus application practices and on-site storage capacity)</li> </ul>	<p><b>Results:</b></p> <ul style="list-style-type: none"> <li>▪ 90 percent decrease in nutrient concentrations</li> </ul>
---	--	---	---	---

## Buffalo National River Watershed Partnerships: Partners Improve Swine Waste Management

Buffalo River Watershed, Arkansas

The Buffalo River watershed in north-central Arkansas covers 860,000 acres. From the headwaters in the Boston Mountains, the Buffalo River flows unobstructed for 150 miles eastward to the confluence with the White River. Because of the unique scenic and scientific features associated with the free-flowing river, Congress established the Buffalo National River Watershed in 1972 to preserve this national treasure for future generations. The federal and state governments own 40 percent of the watershed, primarily in the headwaters and along a narrow riparian corridor of the river. About 60 percent of the basin is privately owned, including most of the larger tributaries.

The Arkansas Department of Environmental Quality (ADEQ) has designated the Buffalo River an Extraordinary Resource Water and a Natural and Scenic Waterway, the highest water quality designation given by the state. Although the water quality in the Buffalo River at present is very good, several tributaries have been affected or threatened by agricultural activities. In 1992 there were 39 confined animal operations within the watershed, including 12 swine farrowing operations, one broiler operation, and 26 dairy facilities. All of the swine operations and 10 of the dairy facilities had Liquid Animal Waste Management Systems (LAWMS). At that time, the ADEQ Water Division received notice of intent from a

watershed farmer to construct a 540-sow/pig farrowing operation adjacent to National Park property and less than a mile from the river. Manure land application sites for the proposed swine facility were as close as ¼ mile to the river. All of the existing watershed swine operations were located on the southern edge of the drainage basin in an area underlain by sandstone and shale. If the proposed swine facility was built, it would be the first swine operation located in such close proximity to the river and within a karst terrain.

Both citizens and resource agencies expressed concern over the construction and operation of a confined swine facility so close to the river. Personnel from the ADEQ Water and Environmental Preservation Divisions performed an investigation of confined animal operations within the watershed, visiting and evaluating 16 swine and dairy operations. Results of the watershed investigation showed that most LAWMS were not being operated and maintained in a manner that would eliminate or minimize the amount of waste leaving the farms. Subsequently, the ADEQ secured grant money to further study the problems revealed during the watershed investigation.

### Project goals and methodology

The Buffalo River Swine Waste Demonstration Project was initiated in 1995 with the primary goal

of protecting the high-quality water in the Buffalo National River watershed by working with the local farmers and government agencies to identify and address the problems associated with the LAWMS. This 5-year, 319-funded project evaluated existing swine liquid waste management practices and demonstrated the benefits of new or improved best management practices (BMPs) in protecting water quality. The project objectives included evaluating the effectiveness of existing LAWMS BMPs (including design, training, and management aspects) by monitoring water quality and waste management practices at cooperating farms, improving existing BMPs or implementing new BMPs, and evaluating changes in the water quality and the operation of the LAWMS as a result of improved or new BMPs implemented at cooperating farms.

Other project goals included demonstrating to farmers and various government agencies the effectiveness of proper waste management at confined animal operations in protecting water quality. Nutrient loads in surface water were estimated before and after BMP implementation. Storm water runoff studies also were conducted to document nutrient loss from manure land application sites. In addition, waste management practices were documented before and after BMP implementation through frequent site visits and farm management surveys.

### **Waste management and water quality improvements**

New or modified BMPs were implemented at the six cooperating farms based on site-specific problems and included the following:

- Storm water diversions were improved or installed.
- All-weather access to LAWMS was improved or installed.

- Storage capacity for liquid waste was increased.
- Waste collection systems were repaired.

New or modified BMPs associated with operational practices were also implemented and included decreasing fresh water usage; performing routine manure solids removal; and improving overall farm nutrient management by using a waste pumping service for solids handling, properly sampling manure holding structures to determine nutrient content, reducing phosphorus application rates, and increasing available acres for land application. In addition, 91 percent of the watershed's farmers had accumulated solids removed from the LAWMS, reestablishing the maximum available manure storage capacity at their facilities.

As a result of the new or modified BMPs, substantial improvements were documented in waste management practices. Free-board problems associated with waste storage ponds were reduced by 66 percent at cooperating farms. Overall, farmers began to manage the manure generated at their facilities for its fertilizer value, which reduced the time and expense associated with the LAWMS. Using water quality monitoring data collected on a stream (less than 1 square mile drainage area) adjacent to a poorly operated swine facility, preliminary estimates indicated that 3,000 pounds of total nitrogen and 400 pounds of total phosphorus were lost to the stream on an annual basis. Following BMP implementation, preliminary estimates indicated that nutrient loads in the stream were decreased by approximately 90 percent.

### **Partnerships to solve complex problems**

This project involved building working relationships with watershed swine farmers, the swine industry, local Natural Resources Conservation Service staff, the Newton County Conservation

District, and the Environmental Preservation, Water, and Technical Services Divisions of ADEQ to improve LAWMS operation and swine manure management. All of the partners in the project cooperated to evaluate the data generated on LAWMS and to develop BMPs. New or improved BMPs were installed by extending cost-share programs and working one-on-one with individual farmers to ensure that all aspects of the waste system were understood. Emphasis was placed on finding economical solutions to waste management problems. Other groups, such as the Arkansas Soil and Water Conservation Commission, the Arkansas Pork Producers, and the University of Arkansas, contributed a considerable amount of

time, resources, and technical expertise to help make this project a success.

Swine farmers in the Buffalo River watershed have successfully changed their waste management practices and are using the fertilizer benefit of the manure generated at their facilities while minimizing their impact on the environment. Information gained from this project has been presented at farmer training meetings and has helped swine producers statewide to improve their manure management practices. All of the partners participating in the project received an EPA Region 6 Partnerships for Environmental Excellence Award in 1998. The award acknowledged the contribution of each partner in cooperating to solve complex environmental problems.

[www.state.ar.us/aswcc/NPS\\_Webpage/Mgmt.html](http://www.state.ar.us/aswcc/NPS_Webpage/Mgmt.html)

**ARKANSAS**

<p><b>Contact:</b>  <b>Sandi Formica</b>          Environmental Preservation Division          Arkansas Department of Environmental Quality          501-682-0020  <a href="mailto:formica@adeq.state.ar.us">formica@adeq.state.ar.us</a></p>	<p><b>Primary Sources of Pollution:</b></p> <ul style="list-style-type: none"> <li>▪ agriculture (dairy waste)</li> </ul>	<p><b>Primary NPS Pollutants:</b></p> <ul style="list-style-type: none"> <li>▪ nutrients</li> <li>▪ bacteria</li> </ul>	<p><b>Project Activities:</b></p> <ul style="list-style-type: none"> <li>▪ dairy manure management practices</li> <li>▪ manure clean-out service</li> <li>▪ comprehensive nutrient management planning</li> </ul>	<p><b>Results:</b></p> <ul style="list-style-type: none"> <li>▪ comprehensive local watershed assistance program</li> </ul>
---	---	---	---	---

## A Community Approach to Managing Manure in the Buffalo River Watershed: Local Watershed Assistance Program Helps Dairy Farmers

Buffalo River Watershed, Arkansas

The Environmental Preservation Division of the Arkansas Department of Environmental Quality (ADEQ) was awarded a section 319 grant in 1997 to evaluate the effectiveness of “dairy manure management alternatives,” designed for facilities with 100 cows or fewer, in minimizing nutrient and bacteria loads leaving farm sites. The dairy 319 project worked with dairy farmers and government agencies in the Buffalo River watershed,

as well as with state and federal agencies, to develop and implement solutions to better manage manure in the watershed.

From the beginning of the dairy 319 project, the ADEQ project staff sought out cooperation with other agencies, the dairy cooperative, and dairy farmers in the Buffalo River watershed by forming a task force with representatives from all interested parties. Key relationships were devel-

oped between the ADEQ project staff and the Conservation District Boards, Natural Resources Conservation Service staff, and the dairy farmers in the watershed.

Most of the dairy farm owners in the Buffalo River watershed volunteered to participate in the dairy 319 project. The Buffalo Conservation District staff contacted farmers and requested individual meetings with them at their farms. During these meetings, the project staff explained the project to the farmers and requested their participation on a voluntary basis. In exchange for participation in the study, farmers hoped that the project would result in developing better information regarding the operation of manure management systems or finding a source of funding for improving their manure management systems.

### **Dairy operations and manure management**

In 1994 there were 27 dairy facilities operating in the Buffalo River watershed. Recent financial difficulties have taken their toll on Arkansas dairy farmers, and today only 18 dairy facilities still operate in the watershed. Finding economic solutions to improve manure management at these small dairy facilities continues to be a challenge.

After an exhaustive investigation into the manure management practices of the dairy industry in the Buffalo River watershed, it became apparent that the 18 watershed farmers did not have the specialized equipment required to handle the different waste streams generated from the confinement of the cows at their farms. Although several individual problems were identified, such as ineffective fertilizer utilization and improper land application practices that increase the potential for contaminants to be transported in storm runoff, all of these problems originate from the lack of adequate manure handling equipment in the watershed. Therefore, the funding set aside for implementing

best management practices (BMPs) in the watershed as part of the dairy 319 project was focused on solving identified manure handling problems.

### **Local watershed assistance program**

To help accomplish the dairy 319 project goal of improving dairy manure management, partnerships were formed among the ADEQ, local NRCS, and the Buffalo Conservation District to develop a local watershed assistance program (LWAP). The program is administered through the Buffalo Conservation District office. It has been designed to provide a low-cost, effective solution to the manure handling problems identified throughout the watershed. In addition, the program will enable farmers to receive the maximum fertilizer benefits of their dairy manure while minimizing farm impacts on the environment. The LWAP includes the development of a local clean-out service, long-term clean-out scheduling, initial cost-share assistance, and comprehensive nutrient management planning.

As part of the LWAP, the Buffalo Conservation District provides a manure clean-out service for dairy farmers and an operator to maintain and operate the equipment. Easily transportable equipment for manure removal, including a side-discharge manure spreader, submersible pump, and pit agitator, will be purchased as part of the LWAP. This service provides dairy farmers in the Buffalo River watershed with a method to handle dairy manure without having to purchase and maintain specialized and seldom-used equipment. Additionally, by providing an operator, the program allows the dairy farmer more time to spend on milk production and other farm management responsibilities.

With the hope of increasing participation, up to 75 percent of the cost-share money will initially be available for watershed dairy farmers who use the program's manure handling service. To be



eligible for the program, the farmer is required to develop a long-term clean-out schedule for the dairy facility. ADEQ and NRCS staff will assist participating dairy facilities with the development of the 12-month clean-out schedules. This will ensure that solids are removed within the designed storage time for each manure management system.

Meetings were held to present the results of the dairy 319 project and introduce the LWAP,

and they were attended by most of the dairy farmers in the watershed. Farmers in the Buffalo River watershed understand the importance of preserving water quality and were receptive to the LWAP. They realize that the program can help them economically manage and utilize dairy manure while protecting water quality in the watershed in which they live.

[www.coastal.ca.gov/nps/npsndx.html](http://www.coastal.ca.gov/nps/npsndx.html)

## CALIFORNIA

### Contacts:

**Joe McGahan**  
Drainage Coordinator for the  
Grassland Area Farmers  
559-582-9237  
jmcgahan@summerseng.com

**Joe Karkoski**  
Central Valley Regional Water  
Quality Control Board  
916-255-3368

### Primary Sources of Pollution:

- agricultural drainage

### Primary NPS Pollutants:

- selenium

### Project Activities:

- establishing selenium discharge caps
- instituting tradable loads program

### Results:

- reductions in selenium load discharges

## Grassland Bypass Project: Economic Incentives Program Helps to Improve Water Quality

Grassland Drainage Area, California

Agricultural runoff is one of the primary sources of discharge to rivers and streams that do not meet water quality standards, affecting 70 percent of these impaired waters. This problem is particularly challenging in the western United States, where roughly 50 million acres of land are devoted to irrigated agriculture and where agricultural drainage and runoff provide a significant proportion of river flows during dry seasons.

The Grassland Drainage Area is an agricultural region on the west side of California's San Joaquin Valley. The agricultural land there is productive, but the soil contains a high level of selenium, a naturally occurring trace element. Selenium accumulates in the agricultural drainage water that collects in the tiles installed to drain excess water from the fields. In 1983 this problem received national attention when deaths and de-

formities in wildlife at the Kesterson Reservoir were attributed to selenium-contaminated drainage from outside the Grassland Drainage Area. In the early 1990s, selenium-laden drainage from the Grassland Drainage Area was still being discharged into other federal and state wildlife refuges, threatening important ecosystems and associated fish and wildlife.

### An innovative tradable loads program

The Grassland Bypass Project is an innovative program designed to improve water quality in the channels used to deliver water to wetland areas. In 1996 several irrigation and drainage districts formed the "Grassland Area Farmers," a regional drainage entity that includes some 97,000 acres of irrigated farmland.

# Appendix

## Success Story Index and Sources

State	Success Story	Page	Source
Alabama	<b>Flint Creek Watershed Project: Multiagency Effort Results in Water Quality Improvements</b>	7	Submitted by Norm Blakely, Alabama Department of Environmental Management.
Alabama	<b>Tuscumbia-Fort Payne Aquifer Protection Program: Multiagency, Cooperative Approach Protects Aquifer</b>	8	Information for this success story was gleaned from "A Multi-Agency Cooperative Approach to Aquifer Protection: Program Completion," by Enid Probst, Ph.D., Alabama Department of Environmental Management. Submitted by Norm Blakey, Alabama Department of Environmental Management.
Alaska	<b>Restoration Work on the Kenai: Section 319 Funds Are Key to Youth Restoration Corps' Success</b>	10	Submitted by Kent Patrick-Riley, Alaska Department of Environmental Conservation.
Alaska	<b>Road and Stream Crossing Project in Tongass National Forest: New Data Help Identify Needed Fish Habitat Restoration</b>	11	Information for this success story was gleaned from Tongass Road Condition Survey Report (Technical Report No. 00-7) by Linda Shea Flanders and Jim Cariello, Alaska Department of Fish and Game, Habitat and Restoration Division, June 2000. Submitted by Kent Patrick-Riley, Alaska Department of Environmental Conservation.
American Samoa	<b>Nu'uuli Pala Lagoon Restoration Project: Efforts Spread to Other Island Villages</b>	12	Submitted by Carl Goldstein, EPA Region 9.
Arizona	<b>Restoration in Nutrioso Creek: Successful Results Beginning to Show</b>	13	Information for this success story was gleaned from Nutrioso Creek Turbidity TMDL, Arizona Department of Environmental Quality (July 2000), and James Crosswhite, EC Bar Ranch web site at <a href="http://www.ecbarranch.com">www.ecbarranch.com</a> . Submitted by Ephraim Leon-Guerrero, EPA Region 9.
Arizona	<b>Sediment Reduction at Hackberry Ranch: Reduction of 4 Tons Per Acre Realized</b>	16	Submitted by Kris Randall, Arizona Department of Environmental Quality.
Arkansas	<b>Buffalo National River Watershed Partnerships: Partners Improve Swine Waste Management</b>	17	Submitted by Sandi Formica, Arkansas Department of Environmental Quality. Project summary authors also include John Giese, Tim Kresse, Tony Morris, Matt Van Eps, and McRee Anderson of ADEQ and Dr. Tommy Daniel of the University of Arkansas.

## Appendix (cont.)

State	Success Story	Page	Source
Arkansas	<b>A Community Approach to Managing Manure in the Buffalo River Watershed: Local Watershed Assistance Program Helps Dairy Farmers</b>	19	Submitted by Sandi Formica, Arkansas Department of Environmental Quality. Information for this success story was gleaned from Proceedings of Dairy Manure Systems, Equipment and Technology: A Conference for Producers and Their Advisors, by Sandi J. Formica, McRee Anderson, Matthew Van Eps, Tony Morris, and Puneet Srivastava; Rochester, New York, March 20–22, 2001.
California	<b>Grassland Bypass Project: Economic Incentives Program Helps to Improve Water Quality</b>	21	Information for this success story was gleaned from Grassland Bypass “Project Description and Update.” Submitted by Katherine Domeny, California Environmental Protection Agency, and Joe McGahan, Drainage Coordinator for the Grassland Area Farmers.
California	<b>Turning History Around: Stream Restoration Reclaims a Meadow While Helping to Control Floods</b>	23	Submitted by Katherine Domeny, California State Water Resources Control Board.
Colorado	<b>Mining Remediation in the Chalk Creek Watershed: Project Demonstrates Exciting Possibilities</b>	25	Submitted by Laurie Fisher, Colorado Department of Public Health and Environment.
Colorado	<b>Rio Blanco Restoration: Adopted Rocks and Homemade Jelly Help Fund Demonstration Project</b>	27	Submitted by Laurie Fisher, Colorado Department of Public Health and Environment.
Connecticut	<b>Center Springs Pond Restoration Project: Skaters and Fish Return to Pond</b>	29	Submitted by Mel Cote, EPA Region 1.
Connecticut	<b>Lake Waramaug Watershed Agricultural Waste Management System: One Farm Can Make a Difference</b>	31	Submitted by Mel Cote, EPA Region 1.
Delaware	<b>Partners Upgrade Septic Systems in Coverdale Crossroads: Quality of Life Improved for Residents</b>	33	Information for this success story was gleaned from Delaware’s Nonpoint Source Program Annual Report (January 1, 1999, to December 31, 1999).
District of Columbia	<b>Marsh Restoration and Island Enhancement Projects at Kingman Lake: Tidal Wetland Habitats Re-created</b>	34	Submitted by Sheila Besse, D.C. Department of Health.
District of Columbia	<b>The Watts Branch Initiative: Community Involvement Key to Success</b>	36	Submitted by Sheila Besse, D.C. Department of Health.