Section 319 Agricultural Nonpoint Source Success Stories

Watershed Academy Webcast
Thursday, June 14, 2012
1:00–3:00 PM Eastern

Instructors:
Lynda Hall, Chief, Nonpoint Source Control Branch, US EPA
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Webcast Logistics

To Ask a Question – Type your question in the "Questions" tool box on the right side of your screen and click "Send."

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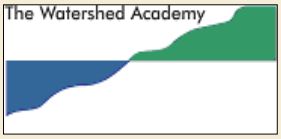
Topics for Today's Webcast

- Brief overview of the Section 319 Nonpoint Source Program, agricultural nonpoint source problems, and Section 319 Nonpoint Source Success Stories website

- Case Studies
  - Oklahoma – Bull Creek
  - Virginia – Muddy Creek
  - Wisconsin – Bass Lake



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Nonpoint Source Success Stories: Linking 319 Projects with Water Quality Improvement

Lynda Hall, Chief
Nonpoint Source Control Branch
U.S. Environmental Protection Agency

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National Scope of Nitrogen and Phosphorus Pollution

- More than 15,000 nutrient-related impaired waters
  - ~ 101,000 miles of rivers and streams impaired by nutrients
  - ~ 3.5 million acres of lakes and reservoirs impaired by nutrients
- More than 8,000 nutrient-related TMDLs completed to date
- Approximately half of assessed streams have medium to high levels of nitrogen and phosphorus
- More than 40% of lakes have medium to high levels of nitrogen and phosphorus
- 78% of continental U.S. coastal waters exhibit eutrophication
- 168 Hypoxic Zones in U.S. Waters
- Current nutrient control efforts hard fought, but collectively inadequate at state and national level

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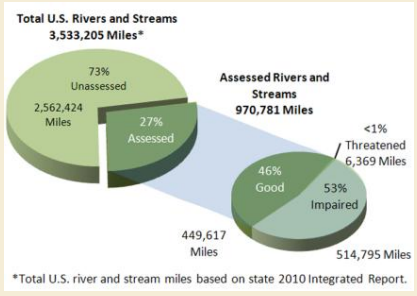
Agricultural NPS is a Leading Source of Water Quality Impairment



- Number one source for rivers and streams
  - 123,620 miles, 24% of impaired miles
- Number three source for lakes, ponds, and reservoirs
  - 1,821,113 acres, 14% of impaired acres
- Number nine source for estuaries
  - 3,027 square miles, 14% of impaired area

(Source: Draft CWA 305(b) National Water Quality Inventory: Report to Congress, 2010 Reporting Cycle)

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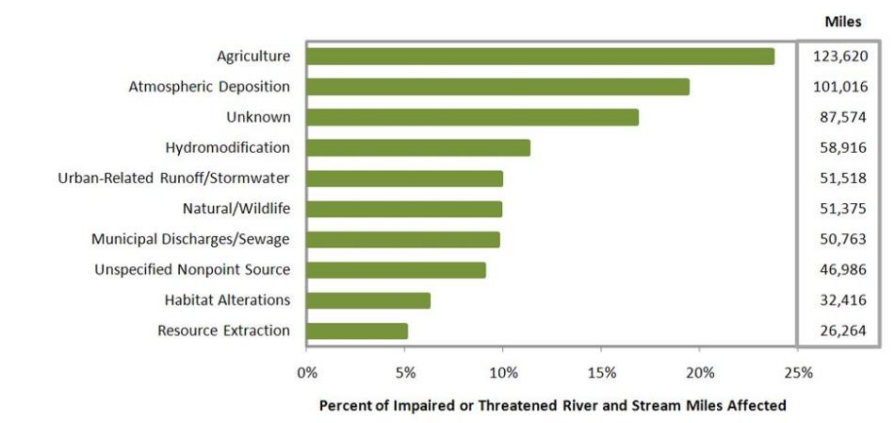
National Summary: Source and Causes of Impairments



(Source: Draft CWA 305(b) National Water Quality Inventory: Report to Congress, 2010 Reporting Cycle)

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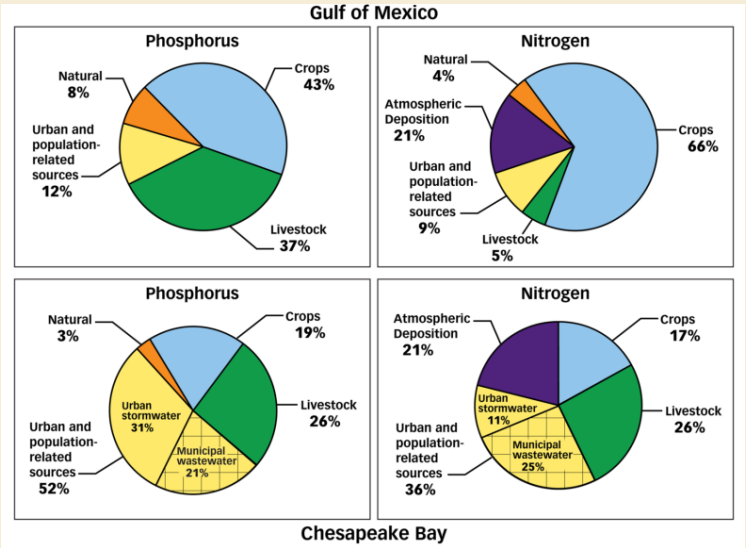
Relative Contribution of Nutrients



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Agriculture and the Clean Water Act

- Point Sources are defined by the CWA as conveyances that discharge: pipe, ditch, channel, conduit, well, container, rolling stock, etc. (NPDES)
  - Concentrated animal feeding operations (CAFOs) are the only agricultural point sources; Federal regulations in place since 2003
  - CAFO regulation covers operations that discharge:
    - Large CAFO: operations has at least 1,000 cattle, dairy heifers, cow/calf pairs, or veal calves
    - Medium CAFO: from 300 to 999 cattle, dairy heifers, cow/calf pairs, or veal calves and meets discharge criteria
    - 0.4% of all farms have a NPDES permit
  - Agriculture stormwater discharge and irrigation return flows are specifically exempted from the point source definition
- Nonpoint Sources (§319)
  - Everything in agriculture except for CAFOs

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Goals of CWA 319 Program

- Nonpoint Source Program (§319)
  - Grants to states/tribes for technical and financial assistance, education, training, technology transfer, demonstration projects, and monitoring
  - Many projects focus on agriculture, especially nutrient and pathogen reductions, often coordinated with USDA conservation programs
- Improve and maintain water quality by addressing NPS pollution sources
  - One success measure: waters with improving quality or that now meet state water quality standards
  - 368 success stories to date
- How: staffing support at state and local levels, planning, technical assistance, on-the-ground BMPs, monitoring, building partnerships

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Section 319 Funding

- 319 Appropriation:
  - 2001-04: $237 – 238M
  - 2005-10: $199-207M
  - 2011: $175M
  - 2012: $165M
- States implement nonpoint source programs
  - Receive 319 funds via allocation formula
  - Pursuant to EPA guidelines
  - Add 40% non-federal match and often other state funds
- ***Base funds***: state/local staff, project coordination, outreach, technical assistance, etc.
- ***Incremental funds***: develop, implement, and monitor watershed projects

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319 and USDA Conservation Programs…

- Are complementary and work well together
  - Shared goals
  - Rely on voluntary actions by landowners
  - Fueled by partnerships at the local level
- Have active and ongoing collaboration in about half of states
- Provide great opportunity to enhance coordinated implementation of our programs to:
  - Better serve watershed partnerships
  - Produce better conservation and water quality outcomes
- Deliver powerful results when they work together
  - Nearly 30% of 319 successes involved collaboration with USDA programs

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Watershed Based Plans – a Cornerstone of 319

- Before a state implements a 319 funded project it should have a watershed-based plan (WBP)
- WBPs outline:
  - Pollutant loads and sources
  - Practices needed to reduce loads and 'critical areas' where practices will be most effective
  - Monitoring to gauge water quality results
- WBP = roadmap for project implementation most likely to deliver water quality results

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Nonpoint Source Success Stories

- A measure of program progress: number of NPS-impaired waterbodies that are partially or fully restored
  - Current Tally: 368
- Tracked on a segment (waterbody) basis
- States report on this measure through EPA's NPS Success Stories Website at **epa.gov/nps/success**

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What Qualifies as a Nonpoint Source Success Story?

Waterbody identified as impaired by the state

- States "list" impaired waters under CWA Section 303(d) every two years – those that don't meet water quality standards
- Success story waters must be listed in 1998/2000 listing cycle or later

- Water quality has improved due to NPS control or restoration efforts, and improvements documented
  - Projects often funded through CWA section 319 and/or other funds targeted at NPS pollution control

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Common Attributes of NPS Success Stories

- Practices target specific nonpoint sources
- Watershed planning; TMDL(s) developed
- Section 319 funds support planning and/or implementation
- Multiple project partners involved (local, state, federal)
- Concerted effort over several years
- WQ monitoring data showing improvement

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NPS Success Story Options

- Type 1: Fully or Partially Restored Waters
- Type 2: Waters Showing Measurable Progress
- Type 3: Waters Showing Ecological Restoration

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NPS Success Story Website
epa.gov/nps/success

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Fact Sheet Developed for Web Posting

Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY
Pennsylvania

Adding Lime to Acidic Lake Restores Fishery

Waterbody Improved

Atmospheric deposition of sulfur dioxide and nitrogen oxide particles created low pH conditions in Pennsylvania's Lake Jean. As a result, the Pennsylvania Department of Environmental Protection (PA DEP) added the lake to the 1996 Clean Water Act (CWA) section 303(d) list of impaired waters for failing to support its aquatic life designated use. Semiannual liming of the lake has neutralized the lake's acidity. Lake Jean now meets the pH water quality standard and supports a healthy and diverse fish population, prompting PA DEP to remove the lake's aquatic life support impairment from the state's impaired waters list in 2010. (The lake is still listed as impaired because of mercury from atmospheric deposition.)

Problem

Lake Jean lies in northeastern Pennsylvania, on the border of Luzerne and Sullivan counties, within Ricketts Glen State Park (Figure 1). The lake covers approximately 245 acres and is relatively shallow, with an average depth of 5.9 feet. Kitchen Creek, also called Ganoga Tributary, flows from Ganoga Lake and feeds the western end of Lake Jean (Figure 2).

Coal-burning power plants, automobile exhaust and other emission sources in the Ohio River Valley contribute sulfur dioxide and nitrogen oxide gases to the air. As the gases are carried in atmospheric winds over the eastern United States, they combine with oxygen and water vapor in the air to form sulfuric and nitric acids. The acids gradually fall to the earth as wet or dry deposition. The soils and rocks in Lake Jean's watershed do not offer much buffering capacity to neutralize acid inputs.

Over time, atmospheric deposition caused a decline in Lake Jean's pH levels, which led to a loss of desirable fish species. Monitoring data for Lake Jean showed that the average pH in the summer of 1991 was 5.9—below the state standard, which requires a minimum pH of 6.0 for aquatic life use support. As a result, PA DEP placed the lake on Pennsylvania's 1996 CWA section 303(d) list of impaired waters for not supporting its aquatic life designated use because of low pH. The lake is also listed as impaired by mercury from atmospheric deposition.

A Diagnostic Feasibility Study of Lake Jean was completed in the mid-1990s using CWA section 314 funds provided by EPA as part of the Clean

Photo courtesy of Dave Mantz, PA DEP

Figure 1. A boat launch at Lake Jean.

Figure 2. Ganoga Lake and Lake Jean in Pennsylvania's Fishing Creek watershed.

Lakes Program. In addition, PA DEP completed a total maximum daily load for Lake Jean in 2004. Rainfall monitoring data collected by the National Atmospheric Deposition Program indicated that the average rainfall in the area in 2002 had a pH of approximately 4.4.

The lake's acidic condition negatively affected the fish community. Studies documented low fish species diversity, and population and fish health were in poor condition as well. In addition, a nuisance aquatic plant plagued Lake Jean before lake restoration efforts. Bladderwort, an acid-tolerant floating-stem plant, dominated the lake's surface to the point that PA DCNR personnel needed to rake it from the beach daily.

Project Highlights

In 1995 the Pennsylvania Department of Conservation and Natural Resources (PA DCNR) began adding lime (using ground agricultural limestone) to the lake and Ganoga Tributary, and continues to do so semiannually (spring and fall). An average total of approximately 19 tons of lime has been applied to the lake annually, except in 2001 and 2003 when less lime was needed because of lake drawdown and good water quality.

Results

Applying the recommended amount of lime over the years has raised the lake's pH and improved water quality and habitat conditions for aquatic life. Samples taken during a PA DEP study of the lake in 2007 found that the pH levels at various locations and depths throughout the lake ranged from 6.6 to 7.4, meeting the state's water quality criteria for pH (6.0 to 8.0).

Pennsylvania Fish and Boat Commission (PA F&BC) studies documented increasing fish populations, a greater diversity of species, and an overall improvement in fish health soon after lime was applied to the lake. Monitoring showed that the relative weights of several fish species (pumpkinseed, bluegill, largemouth bass, black crappie and yellow perch) increased between 1997 and 2007. The diversity of fish collected increased from 7 species in 1997 to 12 species in 2007 (Figure 3). In addition, PA F&BC lake assessments in 2003 and 2007 found a drastic

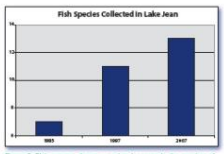

Figure 3. Fish surveys documented an increase in the number of fish species present in Lake Jean since 1995.

reduction of bladderwort due to the rise in pH. Less acidic conditions facilitated the growth of acid-intolerant plant species, which out-competed bladderwort, resulting in a more diverse plant community.

The pH in Lake Jean now meets water quality criteria and supports the aquatic life use. As a result, PA DEP removed Lake Jean's aquatic life support impairment from the state's list of impaired waters in 2010. Lake Jean remains on the impaired waters list because of elevated levels of mercury in fish tissue.

Partners and Funding

Since completion of the diagnostic study in the mid-1990s, state agencies (PA DCNR, PA F&BC, PA DEP) and the Fishing Creek Sportsmen Association have collaborated on efforts to create a more viable fishery. The PA DCNR, with assistance from the Fishing Creek Sportsmen Association, has been responsible for providing funding and applying lime to the lake. The PA DEP and PA F&BC have studied and sampled the aquatic vegetation and fish populations. Approximately $12,000 has been spent to add lime to Lake Jean and its main tributary since 1996. The most recent addition of lime to the Lake was April 2009. PA DCNR continues to add lime to the lake on an as-needed basis.

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-11-001K
February 2011

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Questions?

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The Oklahoma Conservation Partnership: Solving Water Quality Problems One Watershed at a Time

Shanon Phillips

Oklahoma Conservation Commission

Oklahoma's Keys to Success

1. Nonpoint Source Water Quality Monitoring
   - Approx. $1.1 million/year

2. Strong, Effective Partnerships
   - Conservation Districts
   - USDA
   - Oklahoma Conservation Commission
   - EPA
   - Landowners
3. Locally-led, voluntary cost-share programs to install Conservation Practices

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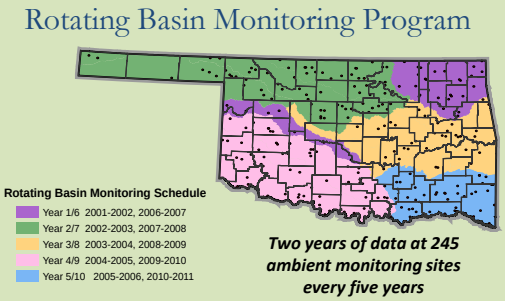
Part 1: Nonpoint Source Monitoring Program

- Monitors 245 3 – 5 order streams across the state
- Monitors upstream of permitted discharges, reservoirs, confluences, etc. to focus on NPS
- Focus on pollutants for which the state has quantitative water quality standards, also includes nutrients
- Funded primarily with EPA 319



Two years of data at 245 ambient monitoring sites every five years

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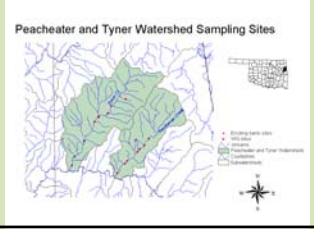
Part 1: Nonpoint Source Monitoring Program – continued

- In NPS Priority Watersheds (319 project areas), a paired watershed monitoring program monitors load reduction of critical parameters
- This monitoring has shown up to 60 – 70% reductions **in-stream** nutrient loading within 4 – 7 years of beginning implementation



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Part 2: Strong, Effective Partnerships

- Conservation Districts provide the locally-led link to landowners
- USDA funds installation of conservation practices, but also provides training and oversight for state-funded conservation plan-writers, as well as technical assistance for state funded conservation programs
- Oklahoma Conservation Commission is the state natural resources conservation agency as well as the state lead for 319 which it uses to conduct water quality monitoring, education, and BMP installation
- Landowners voluntarily adopt and maintain conservation practices and fund between 10 – 100% of the actual cost of installation and maintenance
- EPA funds the 319 program and has facilitated OK's unique approach to that program

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Part 3: Locally-Led, **Voluntary** Cost-Share Programs to Install Conservation Practices

- USDA Programs
- State-funded Locally-led Cost-Share
- EPA funded Conservation Practices (319)
- Landowner-funded Conservation Practices

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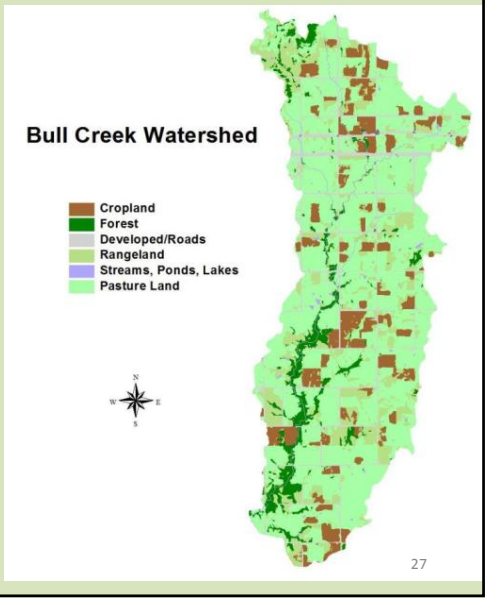
Bull Creek – NE OK

- 31,175 acre watershed
- 17 mile creek
- Wagoner, Mayes, and Rogers Counties in NE OK
- Landuse primarily pasture land
- Wheat, corn, and cattle production
- Listed on OK's 2002 303(d) list for turbidity, fecal bacteria, and dissolved oxygen



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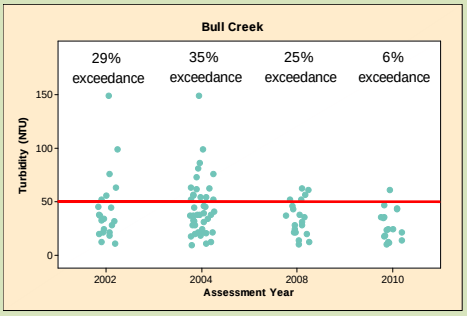
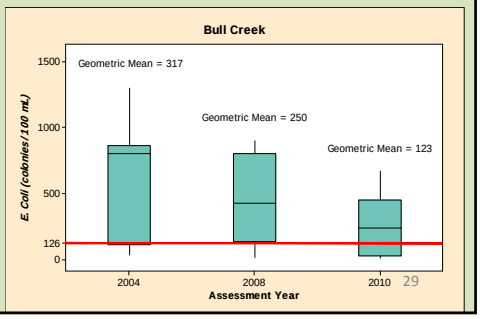
Bull Creek

- Conservation Practice funding
  - EQIP and CSP invested approx. $277,936
  - Conservation Districts provided approx. $14,085 and landowners $16,528 through the state cost-share program
- Practices installed included:
  - Pasture and rangeland planting on 169 acres
  - **Brush management on 908 acres**
  - **Pest management on 3,431 acres**
  - Forage harvest management on 281 acres
  - **Prescribed grazing on 7,436 acres**
  - **4,171 feet cross-fencing**
  - 10 ponds
  - **Conservation crop rotation on 216 acres**
  - **Conservation tillage on 948 acres**
  - **Nutrient management plans on 417 acres**
  - **12,550 feet of terraces**

Water Quality Results

- EPA 319-funded water quality monitoring has documented significant improvements in turbidity and E. coli bacteria
- Bull Creek was delisted from OK's 303(d) list for turbidity and *E. coli* in 2010 and remains off in 2012.
- http://water.epa.gov/polwaste/nps/success319/ok_bullcreek.cfm





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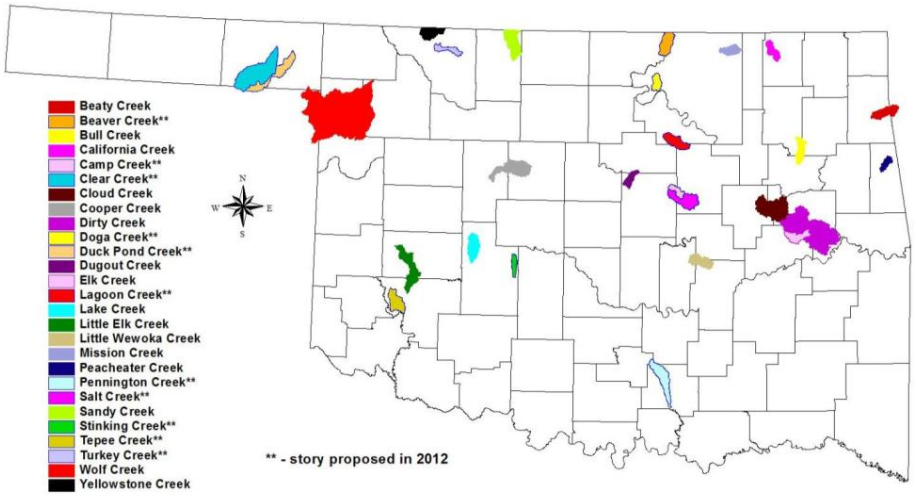
Oklahoma Success Stories



16 OK success stories are currently published at http://water.epa.gov/polwaste/nps/success319/
We have identified an additional 11 stories we will submit to EPA in June 2012.

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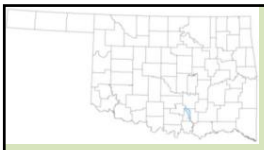
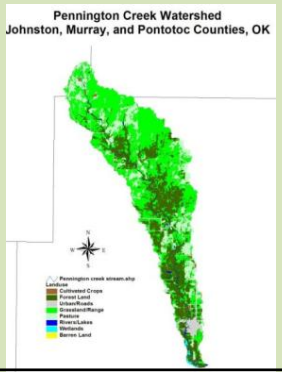


Pennington Creek – OK

- 64,001 acre watershed
- 37 mile creek
- Johnston, Murray, and Pontotoc Counties in southern OK
- Landuse primarily range land and forest
- Cattle, Hogs, and Hay production
- Listed on OK's 2004 303(d) list for *Enterococcus*
- ***Proposed 2012 OK Success Story***



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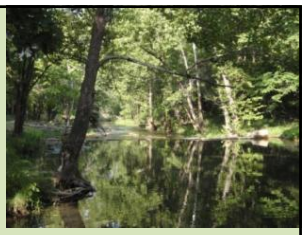
Pennington Creek



- Conservation Practice funding
  - EQIP and CSP invested approx. $75,000
  - Conservation Districts provided approx. $3,500 through the state cost-share program
- Practices installed included:
  - **15,948 linear feet fencing**
  - 2 ponds
  - 2 alternative water supplies
  - **1,018 acres prescribed grazing**
  - **1,773 acres nutrient management planning**
  - 219 acres of rotation of supplemental feeding areas
  - 1 heavy use area
  - 64 acres pasture planting
  - 2.6 acres critical area planting
  - 1,510 acres integrated pest management
  - 925 acres prescribed burning
  - 105 acres brush management

Pennington Creek Blue Thumb Volunteer Monitoring / NPS WQ Education Program




- Pennington Creek is monitored by a Blue Thumb (BT) Group at several sites
- The mayor of Tishomingo is a BT volunteer
- BT program also involves Chickasaw Nation and Tishomingo National Wildlife Refuge

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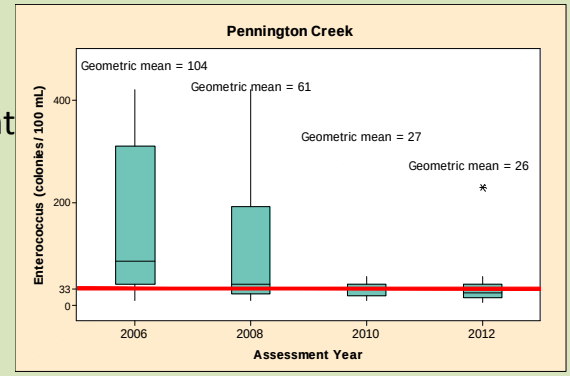
Water Quality Results

- EPA 319-funded water quality monitoring has documented significant improvements in *Enterococcus* bacteria
- Pennington Creek is recommended for delisting from OK's 2012 303(d) list for *Enterococcus* and is now a category I stream



A stream is considered impaired due to *Enterococcus* if the geometric mean exceeds 33 colonies/100 mL based on at least 10 samples collected during the recreation season (May 1-Sept. 30) over no more than five years. Boxplots indicate the interquartile range (25^{th}-75^{th} percentile) and median of the data for assessment years 2006 through 2012.

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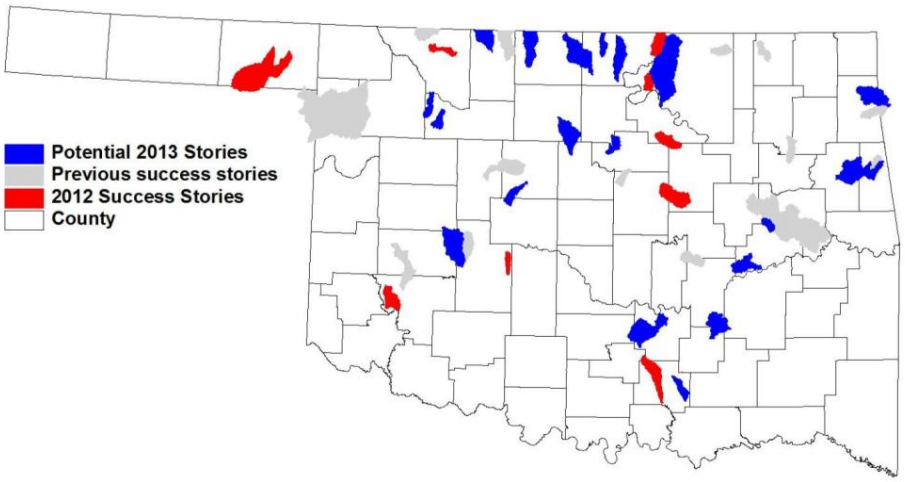
Ones to Watch:
Potential OK NPS Success Stories for 2013



The statewide NPS monitoring program allows OK to constantly be on the lookout for NPS Success Stories. The 22 potential 2013 stories are watersheds where there have been NPS related de-listings plus either 319 projects and/or USDA programs, but where we want at least one more year's worth of data to be sure the delistings are permanent. These 22 should provide at least 10 2013 NPS Success stories for OK.

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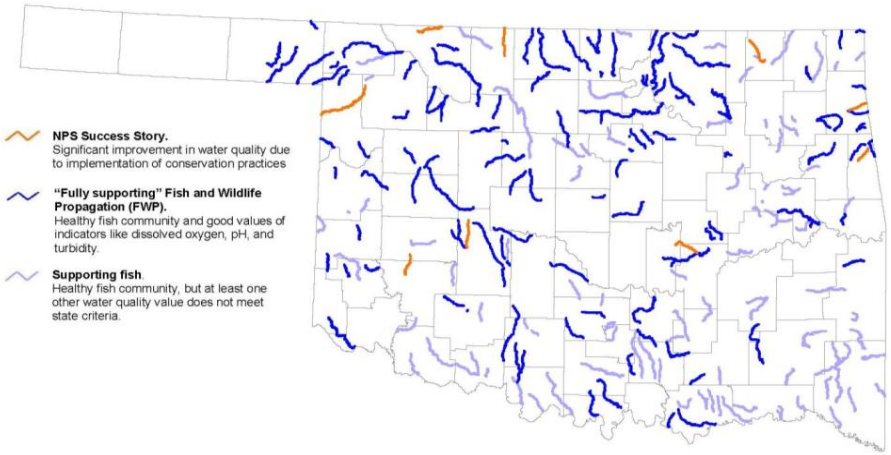
Conservation Programs Work
Streams With Good Things to Say



Fish and Wildlife Beneficial Use Support is a significant part of the Clean Water Act goals. Streams that are meeting this use are also indicative of places, in intensive Ag states like OK, where we can measure other benefits of conservation programs. Not all these streams are fully supporting all uses, but this flyer produced in 2010 shows that about 44% of our monitored streams fully support fish and wildlife use and 68% have healthy fish communities.

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Success Stories Lead to Program Results

- New Partners / Improved Support from Existing Partners
  - Improved integration with USDA
  - Better support from Farm Groups such as Farm Bureau, Cattlemen's Association, etc.
  - Association of Conservation Districts has become a TREMENDOUS Supporter
- New Funding
  - Because of this success, beginning in 2012, the legislature will fund approximately half of the NPS monitoring program ($500,000)
- New Programs
  - Carbon Sequestration

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Questions??

- Shanon Phillips, Water Quality Division Director, Oklahoma Conservation Commission
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Conservation and Community in Muddy Creek and Lower Dry River:

Landowner stewardship leads to water quality improvements

Nesha McRae
VA Department of Conservation & Recreation

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What Happened in Muddy Creek and Lower Dry River?

- Started with:
  - Highly degraded streams
  - One of the most agriculturally productive watersheds in VA
  - Large Mennonite community
- Worked through targeted TMDL process
- Built trust and local buy-in
- Encouraged innovation and flexibility
- Demonstrated measurable water quality improvements…*still not quite there*

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Easy Enough?

- Takes time
- Takes patience
- Takes money
- Takes engagement
- Takes encouragement

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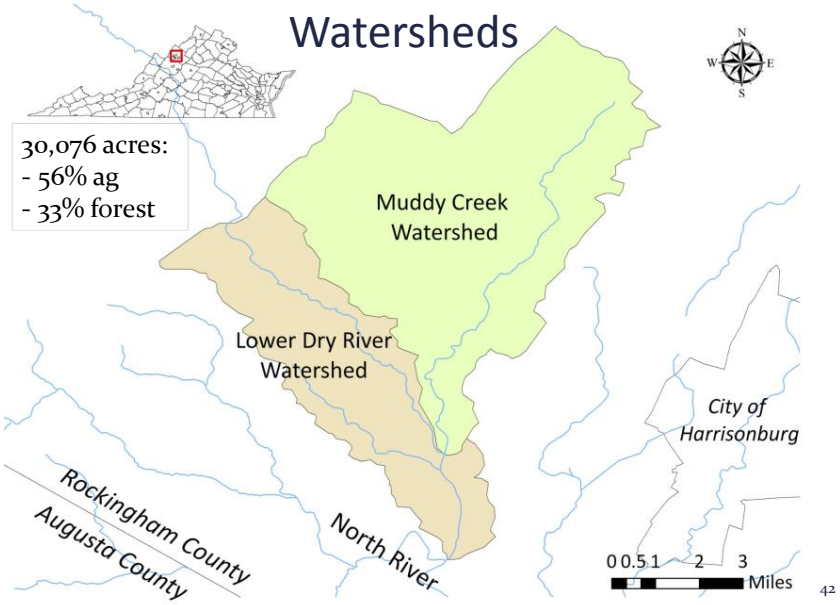
Muddy Creek and Lower Dry River Watersheds



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Rockingham County, Virginia

- #1 in VA in value of sales for:
  - Total value of ag crops sold
  - Poultry & eggs (5th nationally)
  - Cattle and calves
  - Milk and dairy products
  - Corn for silage, hay and other crops
- Average farm size = 118 ac.
- Chesapeake Bay Foundation Report (2004)
  - Animal operations have more excess manure than any county in the nation

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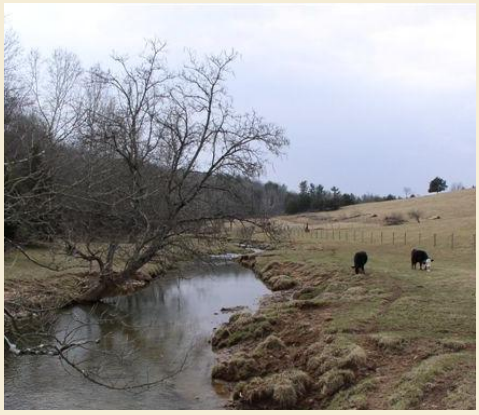
TMDL Studies: 2000-2001

- Impairments
  - Bacteria
  - Nitrate
  - Biological
- Livestock in the streams
  - 86% of NPS bacteria load in Muddy Creek
- Significant pollutant reductions from ag land
- Eliminate all failing septic systems and straight pipes



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TMDL Implementation Plan:

The North River Watershed, 2001

- Required in VA (WQMIRA)
- Developed by DCR
- Strong public participation
  - Public meetings, focus groups, steering committee
  - 1,100 hours
- Quantified BMPs and costs
  - BMPs: $11M
  - Technical assistance: $1M
- 10-yr timeline, 2-yr milestones

TMDL Implementation Plan available at:
www.deq.state.va.us/Portals/0/DEQ/Water/TMDL/ImplementationPlans/nriverip.pdf

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BMP Implementation Goals

- Livestock exclusion
  - Muddy Creek: 99% → 44 miles
  - Lower Dry: 84% → 20 miles
- 35 loafing lot management systems
- 21 manure storage facilities (poultry and dairy)
- 5,154 acres cover crops/yr in Muddy Creek
- Correct 6 straight pipes and 19 failing septic systems in Muddy Creek

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Implementing the Plan

- 2001-2008
- Partnership with Shenandoah Valley SWCD, NRCS, and DEQ
- EPA 319 funds
  - 2 full time staff
  - BMP cost share
    - $512,750 for ag BMPs
    - $71,250 for residential BMPs
- $349K in state cost share funds
- Total BMP costs: $2.77M

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What We Learned from Muddy Creek

- Building trust takes time
- Personality matters
- Community matters
- Need for flexibility
- Need for feedback
- Accounting for voluntary BMPs

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Voluntary BMP Survey

- Conducted by Shenandoah Valley SWCD
- 70 survey responses (20% response rate)

BMP	Extent Installed
Stream fencing	8.3 miles
Manure storage facilities	51 facilities
Tree planting	5 acres
Dairy loafing lot management	184 acres
Stream crossings	19 crossings
Grassed waterways	6,829 feet

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What Else Was Accomplished?

Practice	Extent Installed	Units
Livestock exclusion with 35 foot buffers	3.36	Miles
Reforestation of erodible crop & pasture	1.5	Acres
Permanent vegetative cover on cropland	6	Acres
Continuous no-till	172	Acres
Cover crops	3,074	Acres
Nutrient management planning	6,000*	Acres
Animal waste control facility	24	Facilities
Loafing lot management system	10	Systems
Composting facility	7	Facilities

**estimated (VADCR Nutrient Management Staff)*

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Demonstrating Flexibility and Innovation:
Flexible Fencing

- Shenandoah RC&D Adaptive Fencing: 2007
- Chesapeake Bay Funders Network (private funds)
- 3-yr project: Rockingham & Augusta Counties
- 17 producers participating
- Nearly 1,000 head of livestock excluded
- Federal and state programs followed with 10-ft setback practices
- Program extended for 3 more years

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Demonstrating Flexibility and Innovation:
Nutrient Management

- Pre-sidedress nitrogen test
  - 200 acres in Muddy Creek
  - 2001-2006: testing on >25,000 ac in the northern Shenandoah Valley → estimated savings of 245,000 lbs N
- Corn stalk nitrogen testing in the Valley
- VA Tech NFWF Grant (2006)
  - Muddy Creek, Lower Dry and Cooks Creek
  - Innovative approaches to utilization of organic resources

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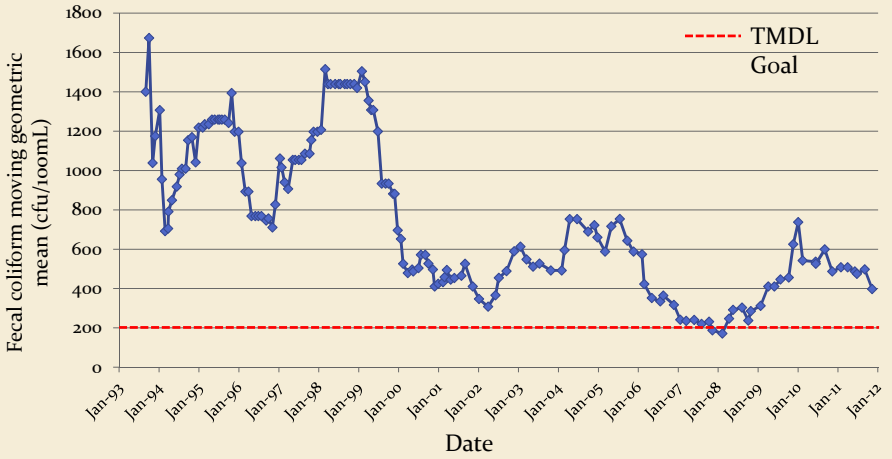
Fecal Coliform Bacteria Monitoring:

Lower Dry River

53

Fecal Coliform Bacteria Monitoring:

Muddy Creek



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Fecal Coliform Bacteria Monitoring:

North River

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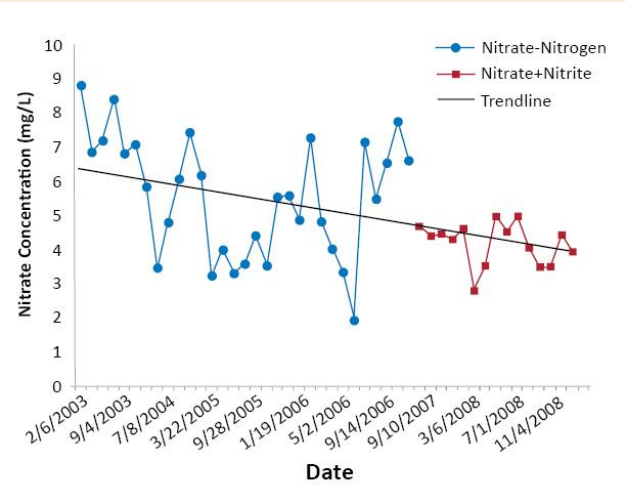
Nitrogen Monitoring:

Muddy Creek, de-listed-2010



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Questions?

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Bass Lake Restoration
A Gem Rebuffed

37 acres and 62 feet deep averaging 40 feet deep located in Marinette County Wisconsin

Greg Sevener, Wisconsin Department of Natural Resources

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What Caused the Tarnishing of this Little Gem?

- Two dairy farms expanded in the watershed during the mid 70's along with cropping changes on sloping cropland which resulted in excessive nutrients in runoff into Bass Lake.
- Phosphorus was being washed into a small channelized tributary which flowed through a wetland and directly into Bass Lake from the watershed.
- The natural cedar covered wetland which is nature's sponge to filter and hold contaminants from entering Bass Lake became saturated with phosphorus and nitrogen becoming a source of nutrient surging.
- Excessive phosphorus, both from the watershed external loadings and the increased internal loadings saturating the bottom and circulating into the water column, were quickly tarnishing the gem's ecosystem.

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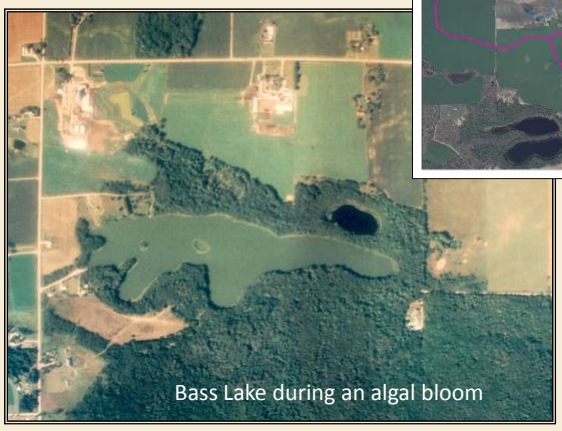
- Bass Lake Watershed includes 451 acres
- 83% is cropland with two active dairy farms



Bass Lake during an algal bloom

Water quality deteriorated rapidly in the 70's from ag source phosphorus causing severe algae blooms. Wild fluctuations in dissolved oxygen, fish kills and the lake was declared dead by major state newspapers.

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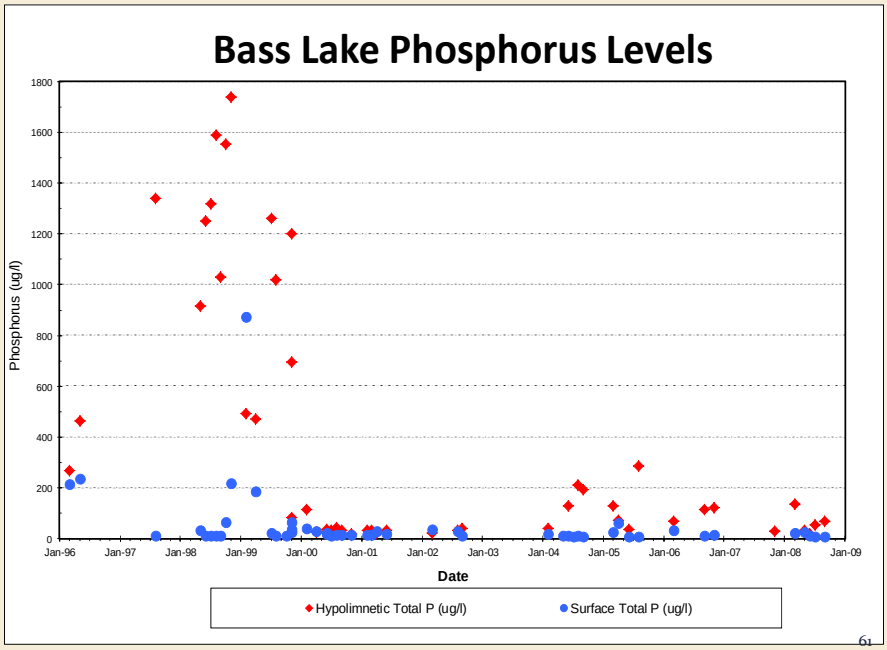

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A v-notch weir was installed into the inlet to monitor flow and nutrients flowing into Bass Lake.

62

Monitoring of the inlet tributary was necessary to track actual success in decreasing external loadings.

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One farm barnyard prior to redesign:

64

Typical BMPs Were Installed on Both Dairy Operations

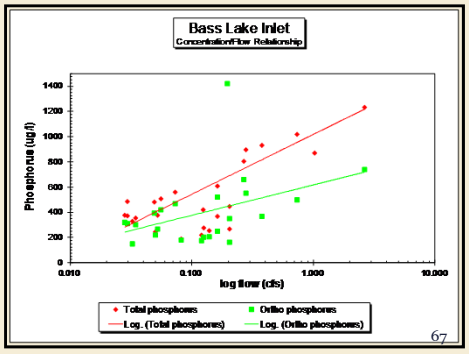
Feedlot upgrades, grass waterways, reduced tillage, manure storage, and cropland management were installed.

65

Feedlot runoff was reduced BUT was still not resulting in adequate reductions of phosphorus.

66

Phosphorus levels were still elevated!



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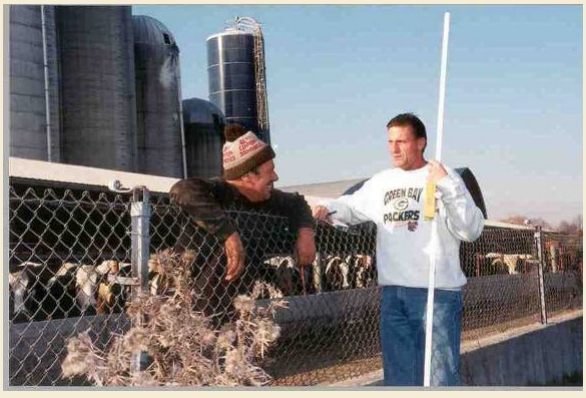
Marinette County created a great relationship with the cooperative farmers and farmers made major life changes in their farming operations.



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One farm completely enclosed the feedlot in freestall and created more manure storage for the enclosed design.

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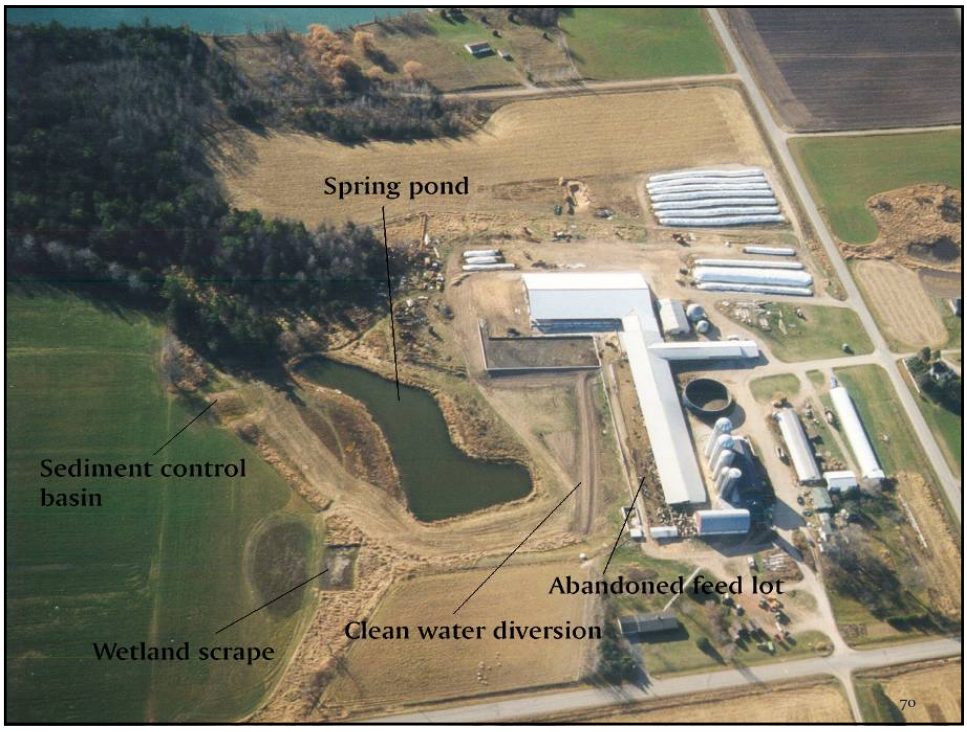

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A freestall here…

A manure storage there…

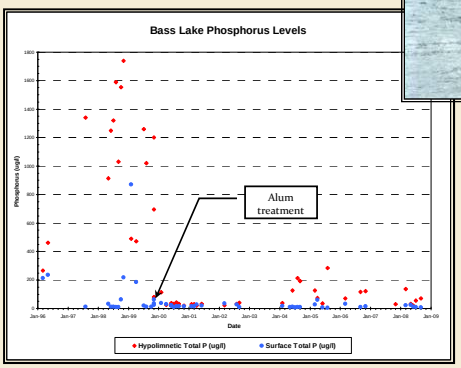
A farm abandonment…

And a sprinkling of clean water practices …

Followed by even more monitoring…

The lake was finally ready for an alum treatment in 1999

61,000 gallons of alum were applied in Oct. 1999.



In 2006, the DNR contracted with the LWCD to monitor phosphorus loading and track lake water quality to verify project success.

Bass Lake was removed from the 303(d) list of impaired waters in 2010.

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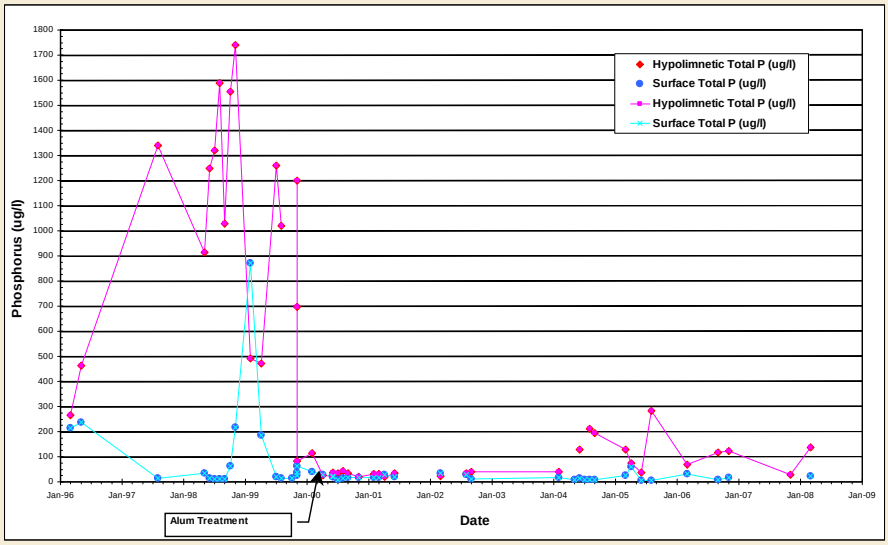
Water Column Phosphorus Prior and Post Alum Treatment



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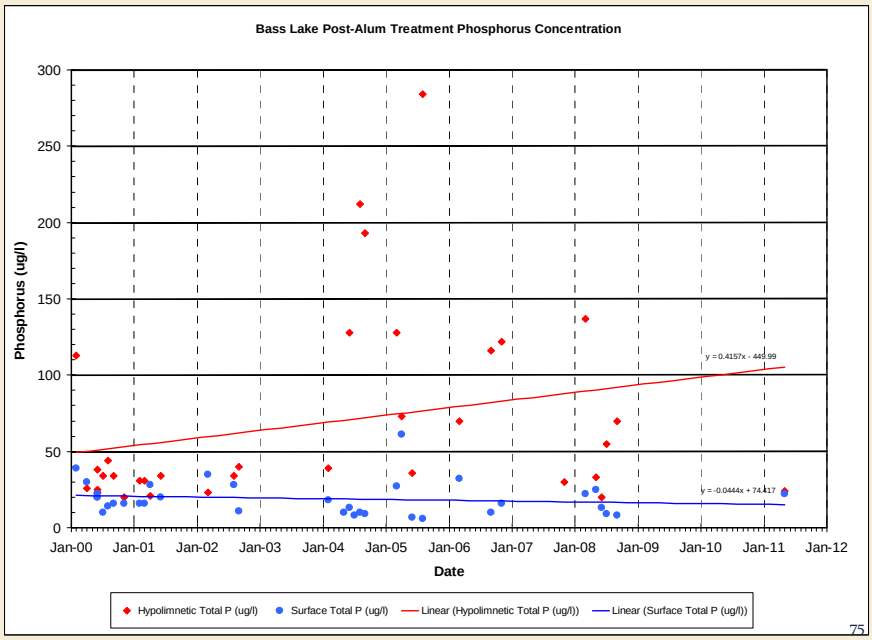

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Agencies and Farmers Worked Together for a Solution

- Initial funding made available in 1984
- Watershed plan developed cooperatively with WI DNR and Marinette Co. LWCD
- Marinette Co. LWCD worked with farmers to implement BMPs
- Marinette Co. LWCD took lead on assessing the impacts to water quality with WI DNR
- Success in this project involved adaptive management
- Success involved obtaining money from various sources (i.e. 319, farmer and county cost share, stewardship and lake program)
- Success involved patience and reaching out of the box for solutions
- Success involved technical WI DNR and County cooperation and looking beyond the normal standard design of practices

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The Cost of Success

Bass Lake Project Costs by Year 1986 to 2000

Costs by Category

Year	NPS	LAG	County*	DNR Lakes	DATCP	Landowner	Stewardship Fund**	
1986	$17,500.00					$10,956.28		
1987						$7,162.00		
1988	$42,273.00	$5,759.37				$14,147.70		
1989	$11,477.00	$3,134.93				$1,583.57		
1990		$2,461.90						
1991								
1992								
1993								
1994								
1995	$34,742.52	$11,670.00				$14,311.10		
1996								
1997								
1998			$968.40					
1999			$22,271.03			$111,794.00	$195,000.00	
2000	$150,000.00			$35,919.94	$816.00			
TOTALS	$255,992.52	$23,026.20	$23,239.43	$35,919.94	$816.00	$159,954.65	$195,000.00	$693,948.74

* Note: County costs include matching funds as well as unreimbursed staff salary and fringe

** Note: Funds came from NPS ($95,000) and Lakes (Fish Manangement) ($100,000)

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Photos Courtesy of Marinette County Land and Water Conservation Office

Questions?

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Next Watershed Academy Webcast

July 10, 2012 Webcast:

USDA's National Water Quality Initiative

Registration will be posted at
www.epa.gov/watershedwebcasts

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Participation Certificate

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You can type in each of the attendee's names and print the certificates.

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