

Spavinaw Creek / Beaty Creek Watershed Implementation Projects

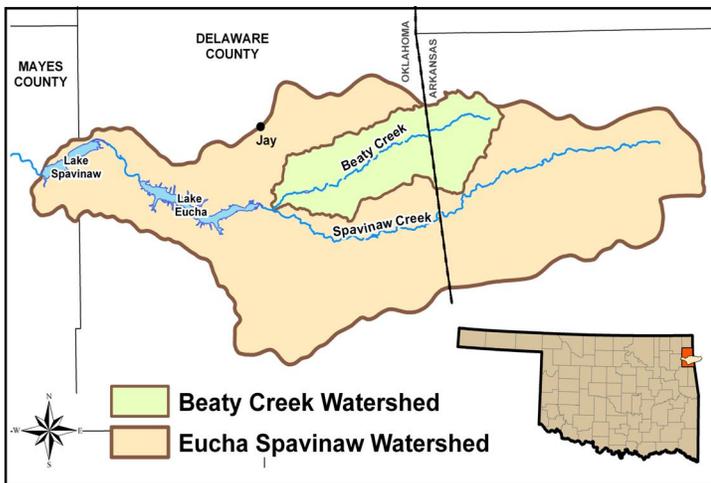
The Spavinaw Creek / Beaty Creek Watershed Implementation Projects showcase the successful partnership between local landowners, conservation districts (CD), the Oklahoma Conservation Commission (OCC), the USEPA, and the NRCS. Lakes Eucha and Spavinaw and the feeder streams have bacteria and nutrient (phosphorus) impairments. Installation of Best Management Practices (BMPs) from 2001-2007 by over 200 landowners has resulted in a 66% decrease in expected total phosphorus, as well as significant reductions in bacteria. This project has been nationally recognized by the USEPA for significantly improving water quality.

Background:

- 1990s:** Lakes Eucha and Spavinaw (water supply for Tulsa area) begin to have **algae blooms and taste/odor issues**.
- 1997:** Clean Lakes Study determines that **excessive phosphorus loading** to Lake Eucha is cause of problems; **animal waste is one of the likely sources** of this phosphorus.
- 1998-2003:** OCC implements a **demonstration project in Beaty Creek watershed** (a subwatershed).
- 2003-2008:** OCC begins a project to encompass the entire **Spavinaw Creek watershed**.

Project Planning:

- Objective:** To demonstrate the effectiveness of BMPs in improving water quality by reducing the amount of nonpoint source pollutants entering the watershed.
- Funded** through EPA Clean Water Act Section 319 grants that require a 40% nonfederal match. The 1998 Beaty Creek Watershed project totaled **\$1,938,856**; the 2003 Spavinaw Creek Watershed project totaled **\$3,425,729**.
- Partnered** primarily with the Delaware County Conservation District and the local USDA-NRCS.
- Locally-led** effort: Hired local project staff to coordinate project. Based practices and cost-share rates on the advice of a watershed advisory group representing local interests, like landowners, producers, poultry integrators, and public land trusts.
- Practices were targeted** towards most significant sources in “hotspot” areas based on computer modeling by OSU. **Practices included:**
- Riparian Area Establishment & Management
 - Streambank Stabilization
 - Animal Waste Storage Facilities / Composters
 - Pasture Establishment & Management
 - Proper Waste Utilization (proper litter usage)
 - Heavy Use Areas
 - Rural Waste Systems



Project Implementation: The 2003 Spavinaw Creek project has enhanced the implementation in Beaty Creek; Beaty Creek landowners have continued to install practices and have kept practices in place.

Beaty Creek project (1998-2003)

89 cooperators; approx. 50% of acreage
\$1,468,727 of practices installed, total:

- ◇ \$495,800 from State funds
- ◇ \$546,615 from Federal 319 funds
- ◇ \$426,311 from landowners (29%)

Spavinaw Creek project (2003-2008):

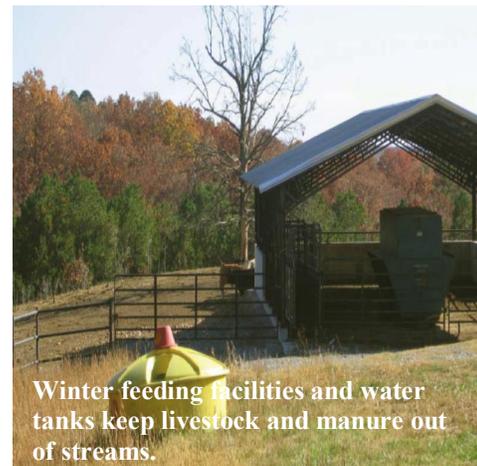
160 cooperators; approx. 26% of acreage
\$2,337,441 of practices installed, total:

- ◇ \$147,904 from State funds
- ◇ \$1,184,437 from Federal 319 funds
- ◇ \$1,005,100 from landowners (43%)

Best Management Practices

(BMPs) installed through both projects include:

- 485 acres of protected **riparian area** and field buffers established
- 55 acres of critical area planting for **streambank stabilization**
- 49 **waste storage facilities** and 14 **cakeout houses**
- **Pasture improvement** through installation of 398,241 linear feet of cross-fence; planted over 2,600 acres of pasture that was formerly either cropland or poorly vegetated pasture; installed 188 **water tanks**, 49 **ponds**, and 60 **wells** to optimize pasture usage
- Approximately 28,236 tons of **litter applied properly** (after soil test) or **moved out of watershed**
- 128 **heavy use areas** installed



Winter feeding facilities and water tanks keep livestock and manure out of streams.

Project Monitoring and Results:

- **Paired Watershed Design:** Used automated samplers to monitor a site on Beaty Creek, where BMPs were installed as part of 319 projects from 2000-2008, and a “control” site on Little Saline Creek, where no BMPs were implemented through the 319 project. The comparison of data from the control watershed to the data from Beaty Creek allows estimation of the effect of BMPs while controlling for environmental variability.
- **Automated samplers** collect continuous flow-weighted data; this allows statistically robust analysis of nutrient loading.
- 2006 analysis of data showed **31% reduction** in phosphorus load in Beaty Creek (*2 years post-implementation*)
- **2008 analysis of data shows 66% reduction in phosphorus load** in Beaty Creek (*4 years post-implementation*) as compared to what would have been expected without the installation of BMPs.
- Beaty Creek, where BMPs were implemented, had **significant reductions in average nutrient loading** four years after implementation, while Little Saline Creek, the control watershed where no BMPs were implemented through the 319 program, had *increased* nutrient loading:

Observed Average Total Phosphorus Load (lbs/week)					
Beaty Creek (project area)			Little Saline Creek (no BMP implementation)		
Calibration (1999-2001)	Post-Implementation (2003-2007)	Change	Calibration (1999-2001)	Post-Implementation (2003-2007)	Change
139.0	116.9	↓	30.8	48.5	↑

- **Bacteria levels** have been **significantly reduced** since BMP implementation; Beaty Creek was removed from the impaired list in 2006 for *E. coli* bacteria.
- Spavinaw Creek is being monitored in a similar way as Beaty: Saline Creek and Flint Creek are control watersheds and will be compared to Spavinaw to assess the effects of BMPs. **Similar load reductions are expected in Spavinaw Creek within a couple of years**, after the maturation of BMPs.

Continuing efforts in the Spavinaw Creek watershed:

- **2008 Spavinaw Creek Project** – Projected implementation total \$716,000* through 2010
*(*includes expected \$200,000 landowner contribution, approx. 40%)*
- **Conservation Reserve Enhancement Program (CREP)** – \$20.6 million to protect riparian areas in the Illinois River and Eucha/Spavinaw watersheds for at least 15 years; City of Tulsa has pledged at least \$1.25 million for permanent easements.

To see success, it takes long-term commitment from landowners and government. †



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Visit our website at: www.conservation.ok.gov

†Oklahoma's nationally recognized Water Quality successes can be viewed at <http://www.epa.gov/nps/success/>