EPA Update

Agriculture and Water Quality Partnerships

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Office of Water

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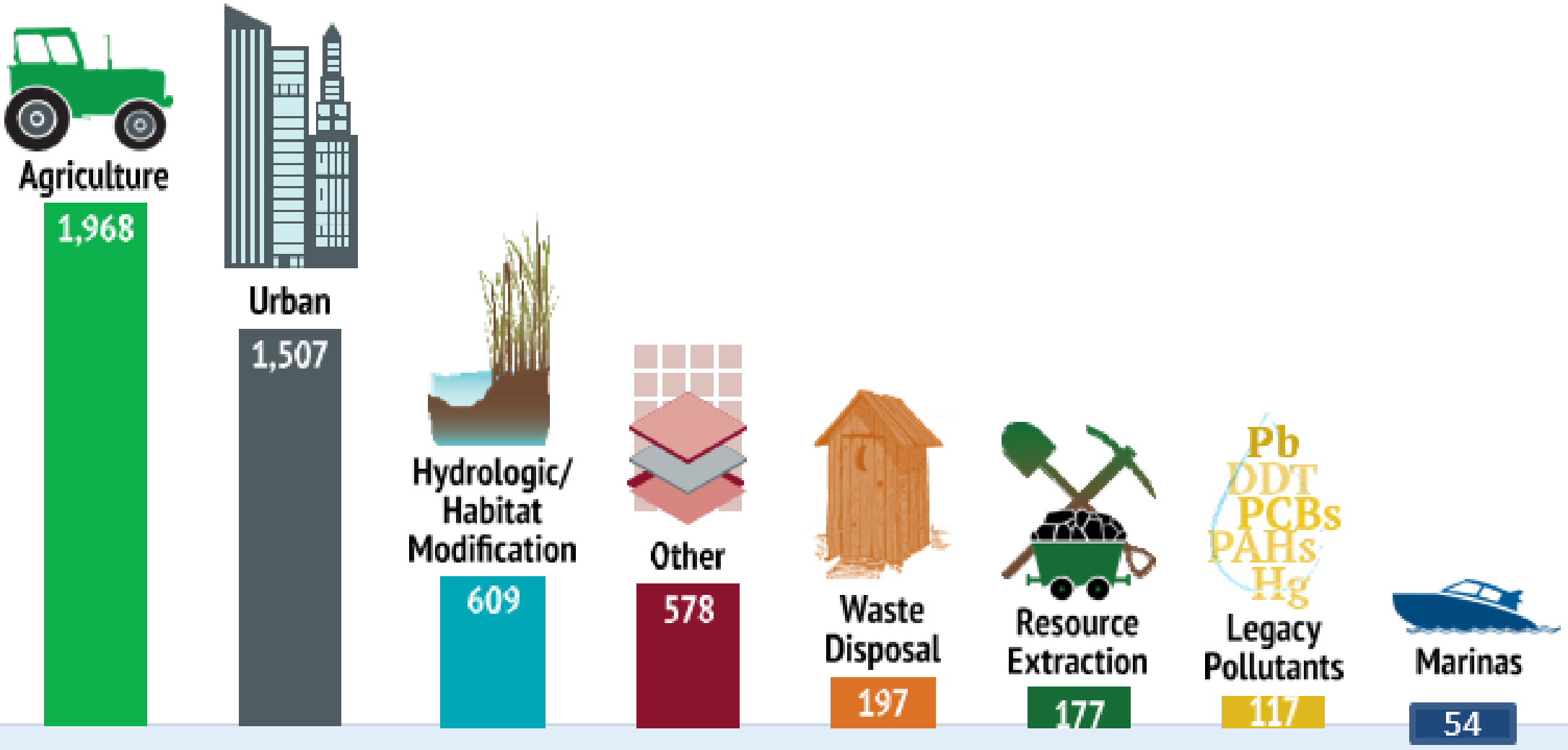
Section 319 of the Clean Water Act

- Nonpoint Sources are not specifically defined under the CWA – any source that EPA does not have authority to regulate as a point source
  - Includes agriculture stormwater discharge and irrigation return flows
- 319(b) - State NPS Management Programs
- 319(h) - Grant Program

- In addition to CWA, states follow EPA grant guidelines in spending 319 funds *https://www.epa.gov/nps/319*

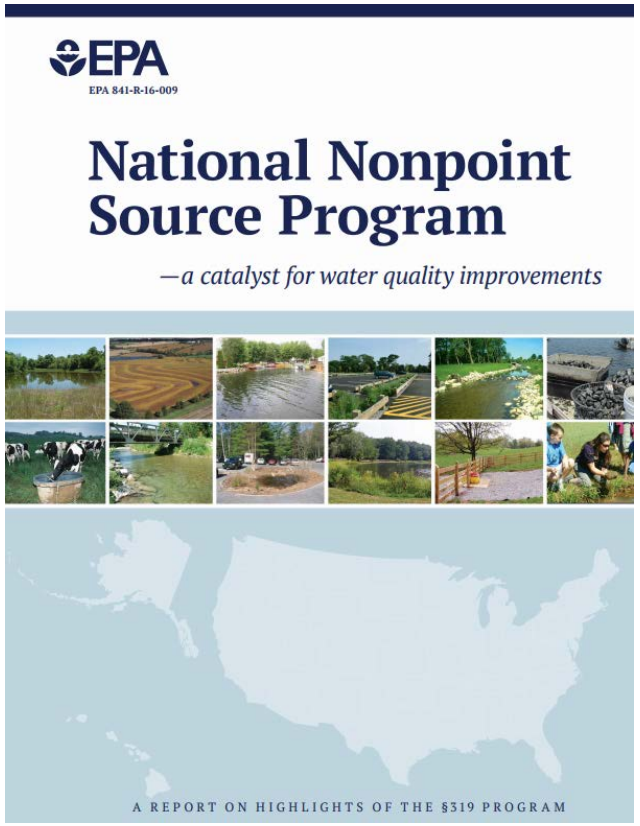
§319 Projects by Type 2008-2013



USDA and §319 Agricultural Projects

- Are complementary with §319 and best deliver water quality results when leveraged: the two programs share goals, rely on local partners and voluntary landowner action

- §319 funds expand and complement USDA funds: provides planning framework and flexibility to support all aspects of watershed implementation, while USDA mainly funds cost-share for on-the-ground practices and some technical assistance



- The 319 program has documented >680 waterways restored through NPS projects – USDA programs and conservation districts played important roles in about half these successes

Partners for on-the-ground agricultural projects and landowner engagement

- USDA Natural Resources Conservation Service (NRCS)
- National Association of Conservation Districts
  - Soil and Water Conservation Districts
- Industry Service Providers: i.e. Certified Crop Advisors (CCAs) and Agricultural Retailers
- 4R Nutrient Stewardship Programs supported by The Fertilizer Institute, The Nature Conservancy (TNC), and other partners
- Nonprofits and NGO's
  - Conservation Technology Innovation Center (CTIC)
  - TNC
  - Watershed groups, locally led producer networks etc.
- State Departments of Agriculture

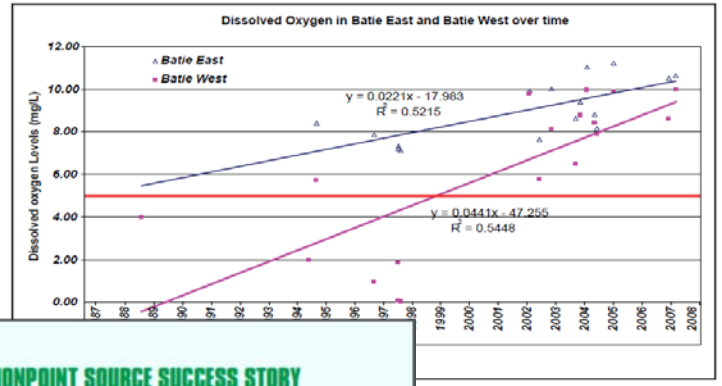
Forums for Agricultural Research, Coordination, Education and Science

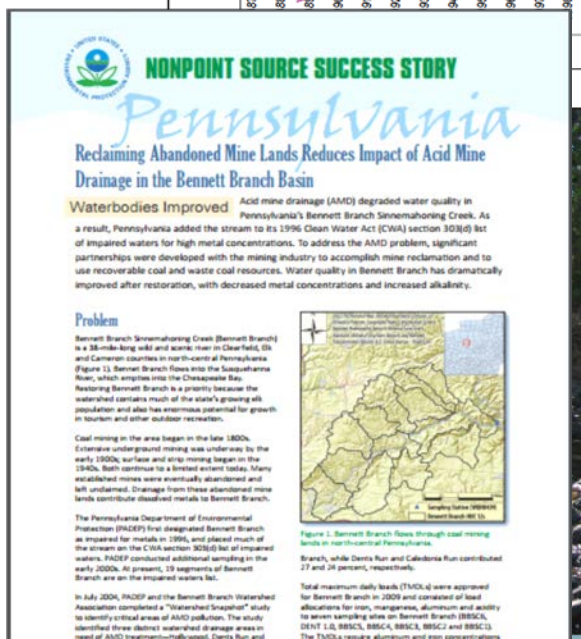
- Universities
  - Land-grant Universities
  - Water Quality Labs
  - Extension Service
- USDA
  - Agricultural Research Service (ARS)
  - National Institute of Food and Agriculture (NIFA)
  - Natural Resources Conservation Service (NRCS)
- Professional/Scientific organizations and Coalitions:
  - American Society of Agronomy, Crop Science Society of America, Soil Science Society of America (ASA/CSA/ASA or Tri-societies)
  - Soil and Water Conservation Society (SWCS)
  - Agricultural Drainage Water Management Task Force
  - National Working Group on Cover Crops and Soil Health

§319 Program Delivers Results: Ag Success Stories

Section 319
NONPOINT SOURCE PROGRAM SUCCESS STORY

Figure 1. Regression of dissolved oxygen 1998-2007.





NONPOINT SOURCE SUCCESS STORY

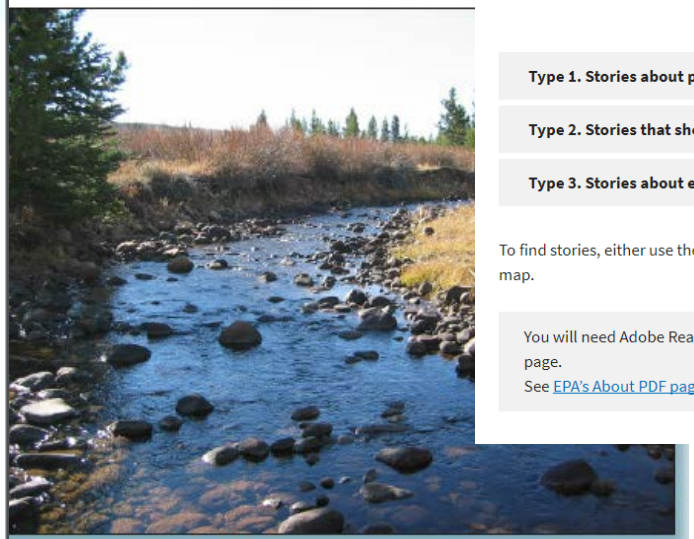
Pennsylvania

Reclaiming Abandoned Mine Lands Reduces Impact of Acid Mine Drainage in the Bennett Branch Basin

Waterbodies Improved

Acid mine drainage (AMD) degraded water quality in Pennsylvania's Bennett Branch Sinnemahoning Creek. As a result, Pennsylvania added the stream to its 1996 Clean Water Act (CWA) section 303(d) list of impaired waters for high metal concentrations. To address the AMD problem, significant partnerships were developed with the mining industry to accomplish mine reclamation and to use recoverable coal and waste coal resources. Water quality in Bennett Branch has dramatically improved after restoration, with decreased metal concentrations and increased alkalinity.

Problem



Nonpoint Source Success Stories

Success Stories | About Success Stories

This **Nonpoint Source Success Stories** web site features stories about primarily nonpoint source-impaired waterbodies where restoration efforts have led to documented water quality improvements. **Waterbodies are separated into three categories of stories**, depending on the type of water quality improvement achieved:

- **Type 1. Stories about partially or fully restored waterbodies** +
- **Type 2. Stories that show progress toward achieving water quality goals** +
- **Type 3. Stories about ecological restoration** +

To find stories, either use the table below or choose a state from the map.

You will need Adobe Reader to view some of the files on this page.
See EPA's About PDF page to learn more.

Partially or Fully Restored Waterbodies
684

Key Agricultural Partnership Programs- What's next?

- Agricultural partnerships are key to success of 319 NPS program
- Continue to advance partnerships through:
  - National Water Quality Initiative
    - Emphasis on watershed planning, identifying critical areas, and outreach strategies
  - Hypoxia Task Force
    - Tracking progress, Land grant University Collaboration
  - Animal Ag collaborations
    - Facilitate open dialogue for a shared understanding of how to enhance agricultural practices and maintain clean water
- Implement grant-supported Ag partnerships for training and adoption of high impact practice systems and watershed planning
- Nonpoint Source Technical Exchange- information exchange on key issues for nonpoint source community

National Water Quality Initiative (NWQI)

- Launched in FY12; NRCS coordinates with EPA and state water quality agencies to address Ag nonpoint sources
- NRCS targets EQIP funds ($25-33M/yr) to *water quality-focused* conservation practices in small watersheds (currently 197) impaired by nutrients, sediment, and animal agriculture pathogens
- Designed for multiyear investment to treat all critical areas in watershed
- State agencies monitor water quality in at least one watershed to track practice impacts over multiple years
- NWQI has been an excellent path to greater collaboration towards water quality improvement among State agencies, NRCS and watershed partners
- What's next? FY18 NWQI Readiness Phase emphasizes watershed planning, local collaboration, and on-farm conservation planning prior to targeted conservation practice implementation

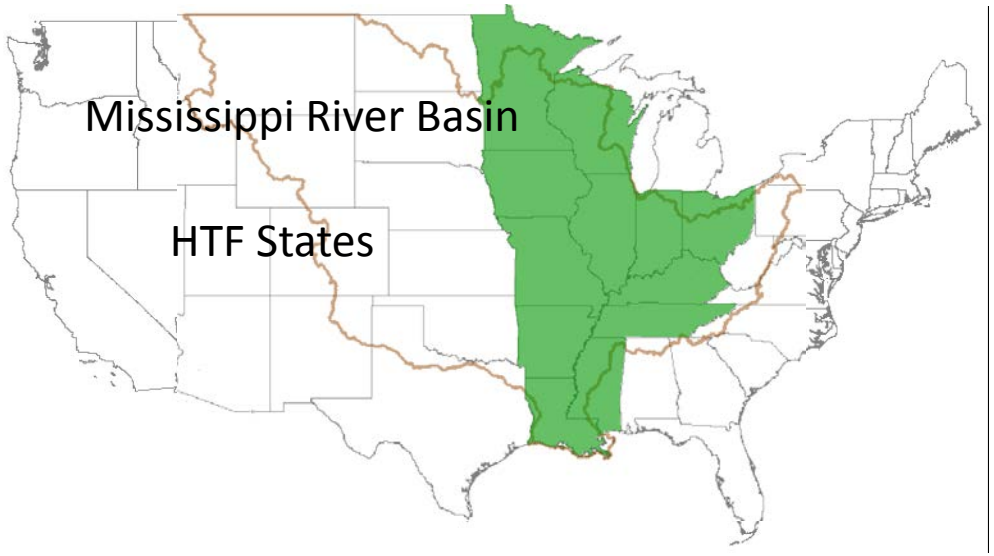
Hypoxia Task Force

5 Federal Agencies and Tribes:

- US Army Corps of Engineers
- US Environmental Protection Agency
- US Department of Agriculture
- US Geological Survey
- National Oceanic and Atmospheric Administration
- National Tribal Water Council

12 State Agencies:

- Arkansas
- Missouri
- Iowa
- Tennessee
- Minnesota
- Indiana
- Ohio
- Louisiana
- Illinois
- Mississippi
- Kentucky
- Wisconsin

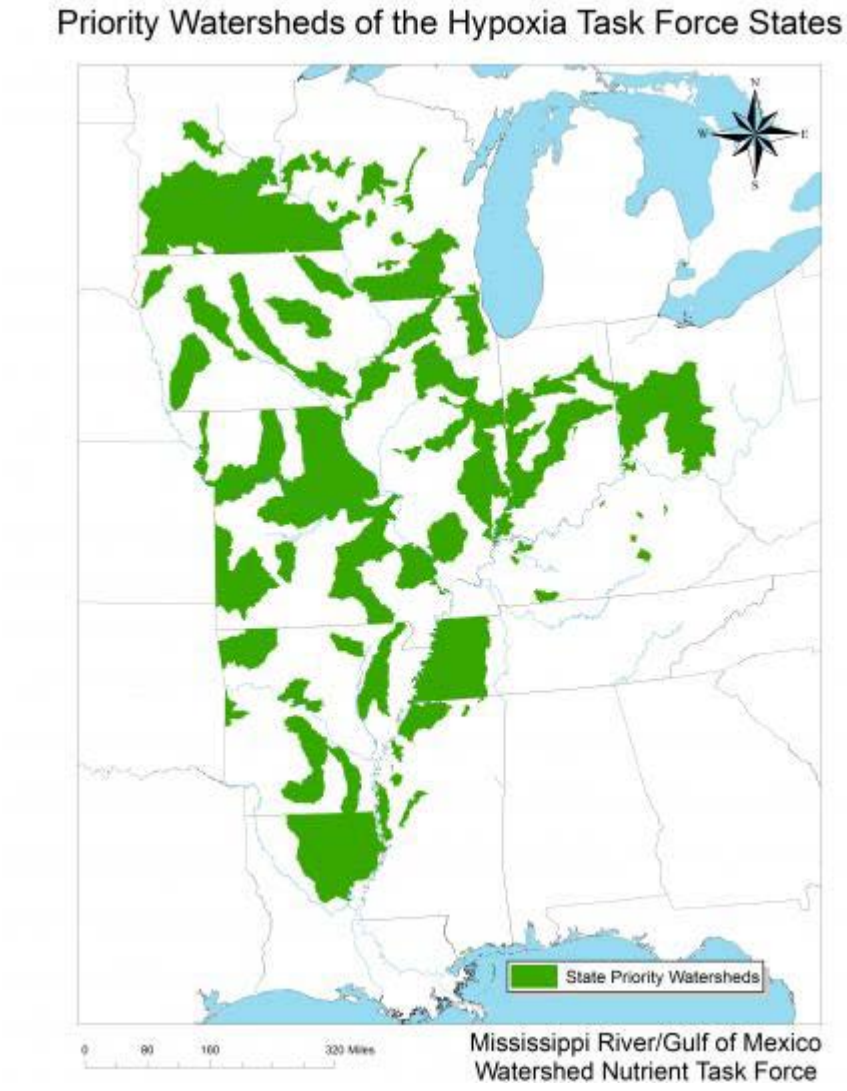


Each state is represented by one of:

Agriculture agency, Environmental Quality agency, or Natural Resources agency

Current HTF Focus Areas

- Tracking progress towards the goal
  - **-Coastal Goal**:
    By 2035, reduce 5-year running average size of the Gulf hypoxic zone to 5,000 km^2
  - **-Interim Target:**
    20% reduction of nitrogen and phosphorus loading by 2025
- Nutrient Reduction Strategies
- SERA-46 Priorities for Collaboration
- Collaboration and Partnerships
- Communicating Success



Grant-supported Partnerships: Training and Research on High-Impact Practices and Watershed Planning

- EPA is enhancing water quality-focused training opportunities to agricultural advisors, including crop advisors, through a series of grants, including:
  - Connecting certified crop advisors and conservation districts
  - Two grants to train ag industry, CCAs and other consultants on conservation systems and watershed planning efforts that protect water quality
  - Grant with land-grant universities to enhance understanding of soil health and water quality interactions

Cover Crop Resource Series

COVER CROP FACTS

Cover Crops at Work: Increasing Infiltration

An overview of cover crop impacts on water infiltration to the soil[1]

Photo Credit: Edwin Remsberg

ABOUT COVER CROPS

Cover crops are tools to keep the soil in place, bolster soil health, improve water quality and reduce pollution from agricultural activities.

- They include cereals, brassicas, legumes and other broadleaf species, and can be annual or perennial plants. Cover crops can be adapted to fit almost any production system.
- Popular cover crops include cereal rye, crimson clover and oilseed radish. Familiar small grain crops, like winter wheat and barley, can also be adapted for use as cover crops.

Learn more at www.sare.org/cover-crops

Cover Crops and Infiltration

Cover crops can successfully increase the infiltration of water into the soil layer. They do this by covering the ground with their biomass and by improving soil structure with their roots. Some specific mechanisms include:

- Preventing soil surface sealing (where the soil becomes impermeable after rainfall)
- Improving soil structure with increased soil aggregate stability, soil porosity and water storage capacity

Different types of cover crops may have different effects on infiltration because of their unique biomass growth and composition, and results vary based on how long the cover crop is grown.

- Non-legume cover crops, including bromegrass and rye, increased infiltration by 8% to 462%, based on a range of studies.
- Legume cover crops, including crimson clover, hairy vetch and strawberry clover, increased infiltration by 39% to 528%.
- Soil surface cover by residue alone increased infiltration by up to 180% in field trials.

Management Decisions Matter

Management that encourages continuous ground coverage by residues and cover crops will be best suited to positively impact the infiltration of water to the soil surface. Tillage practices are another important management decision for water infiltration.

- No-till management has been found to increase rainfall infiltration.
- One study reported that runoff from no-till fields was two to four times less than from conventional-till plots.

A Far-Reaching Solution

When water is able to enter the soil profile, rather than running off the soil surface, there is less risk of displacing soil particles through erosion. Increased infiltration also signals possible benefits to the water conditions within the soil profile. By keeping the soil in place and improving soil conditions, cover crops are mitigating pollution risk while also boosting the productive capacity of the soil.

[1] Unless otherwise cited, all data comes from a bibliography that will soon be available online.

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Tables

Table 1: Cover crop impacts on nitrogen and/or nitrate loads and yields in water quality experiments

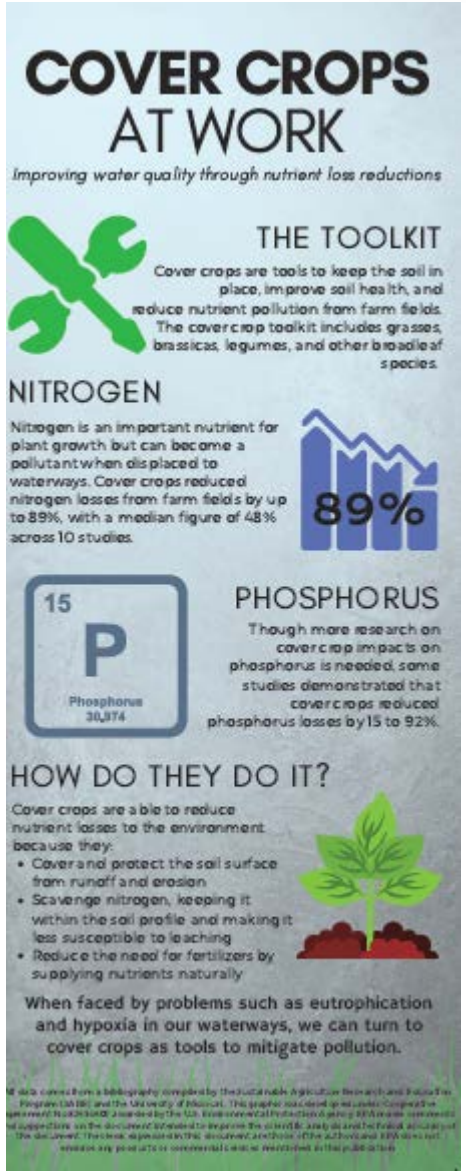
Source	*Location*	*Type of Cover Crop*	*No-till***	*Control plot management****	*Change in nitrate or nitrogen load from control*
Aronsson et al. (2016)*	Denmark	PR	U	No cover crop	-(18-89)%
Aronsson et al. (2016)*	Denmark	RG	U	No cover crop	-(38-69)%
Aronsson et al. (2016)*	Denmark	RA	U	No cover crop	-(8-84)%
Aronsson et al. (2016)*	Denmark	M	U	No cover crop	-(12-40)%
Aronsson et al. (2016)*	Sweden	PR	U	No cover crop	-(18-72)%
Aronsson et al. (2016)*	Sweden	RG	U	No cover crop	-83%
Aronsson et al. (2016)*	Finland	RG	U	No cover crop	-(7-69)%
Aronsson et al. (2016)*	Norway	PR	U	No cover crop	-(69-83)%
Bertilsson, G. (1988)	Sweden	RP	N	No cover crop	-66%
Blanco-Canqui et al. (2013)	Kansas	WT	Y	No-till winter wheat, fallow	-76%
Blanco-Canqui et al. (2013)	Kansas	SP	Y	No-till winter wheat, fallow	-72%
Chapman et al. (1949)	California	M	U	Sudangrass grown with no cover crop in the fall, straw mulch	-80%
Daigh et al. (2015)	Iowa	R	Y	No-till continuous corn, no cover crop	-58%
Drinkwater et al. (1998)	Pennsylvania	LG	U	Corn and soybean rotation treated with nitrogen fertilizer and pesticides	-35%
Kaspar et al. (2012)	Iowa	O	Y	No-till corn-soybean rotation, no cover crop	-39%
Kaspar et al. (2012)	Iowa	R	Y	No-till corn-soybean rotation, no cover crop	-47%
Kladivko et al. (2004)	Indiana	W	Y	Continuous corn, chisel-plow tillage, no cover crop, 1986-1988	-61%
Martinez, J. and G. Guirard (1990)	France	RG	U	Fertilized, winter wheat crop with no cover crop	-63%
Strock et al. (2004)	Minnesota	R	Y	No-till corn-soybean rotation, no cover crop	-13%
Torstensson et al. (2006)	Sweden	RC, PR, F	N	Conventional-till, grain system (barley-oat-spring wheat/potato) without cover crop	-34%
Volk, G.M. and C.E. Bell (1945)	Florida	TN	U	Fall-fertilized soil in lysimeter, no cover crop	-87%

Abbreviations: F: fescue; LG: legume; M: mustard; N: no; O: oat; PR: perennial ryegrass; R: rye; RA: radish; RC: red clover; RG: Italian ryegrass; RP: rapeseed; SP: spring pea; TN: turnip; W: wheat; WT: winter triticale; U: unknown; Y: yes

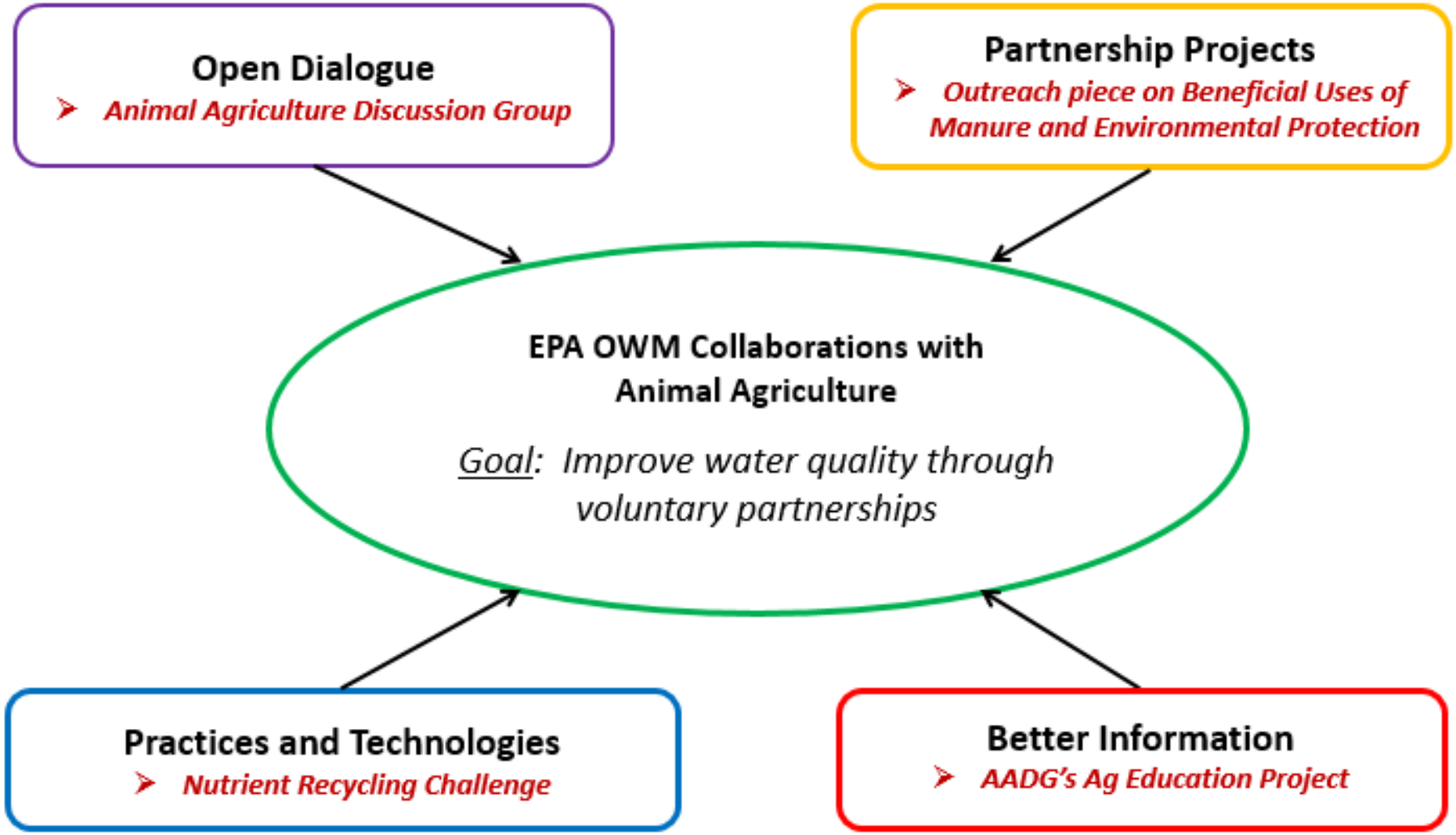
*This study was a literature review, therefore the data in this row has been pulled from multiple sources and does not represent one field, one site, or one experiment. Please see the summary for this source to identify the original data.

**This addresses whether or not no-till management was used in the cover crop plots, not the control plots.

*** The control systems are those to which the cover crop (or residue) systems are compared. They provide a check to measure the impact of the practices in question against a standard, like comparing cover crop to no cover crop or comparing no-till to conventional-till.



EPA Office of Wastewater Management's Collaborations with Animal Agriculture



For more information, contact:
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Animal Ag Discussion Group

Ag Education Project

https://extension.org/73649

2-Way Ag & Water Quality Education Program for Farmers and State/Federal Employees

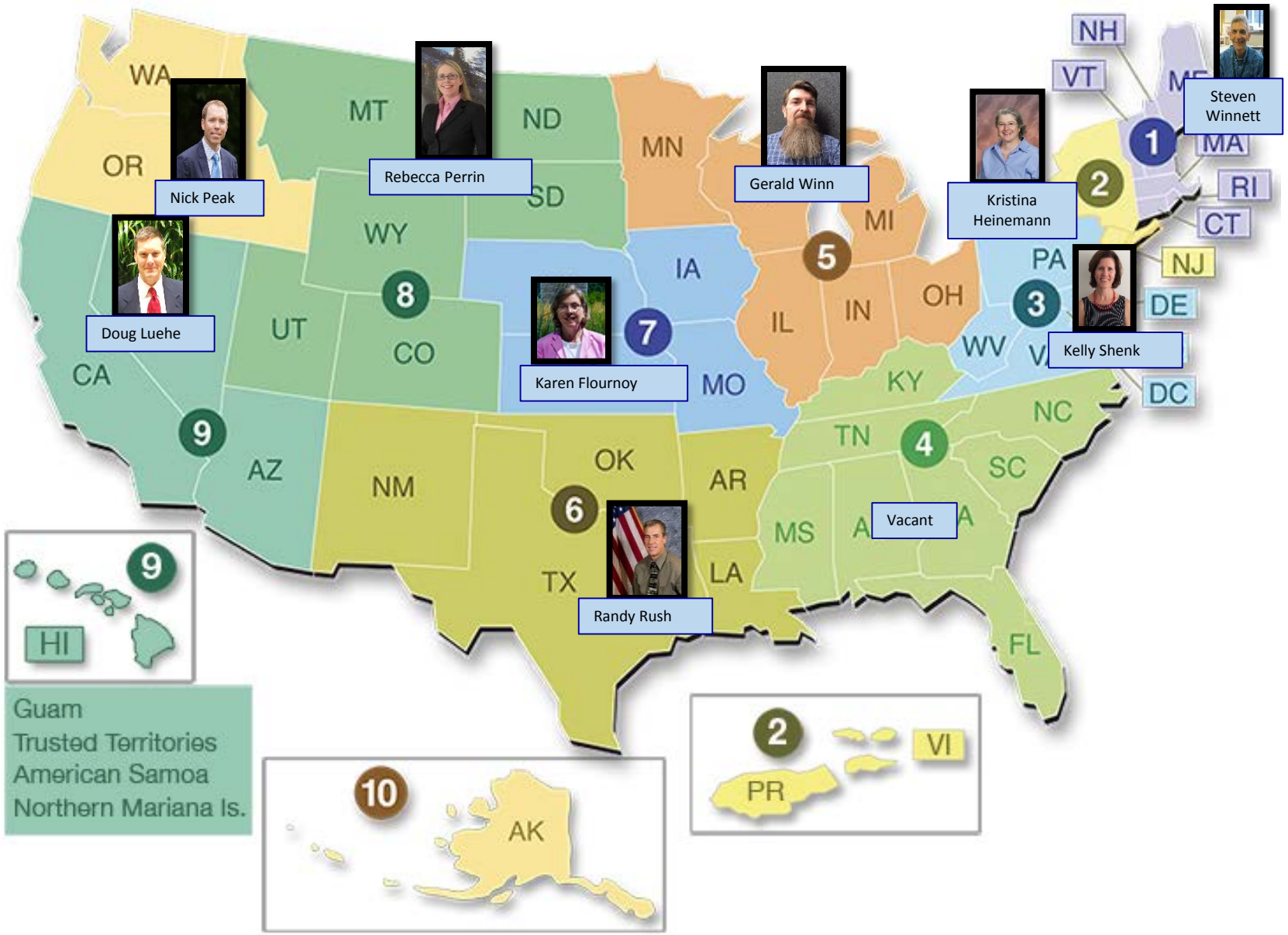
Animal Agriculture Discussion Group

- Competition to develop affordable technologies that recycle nutrients from livestock waste.
- We asked producers what **they** needed.
- Built program from the ground up with our ag partners.

Engagement opportunities

- Information exchange between EPA, State water quality agencies and Certified Crop Advisors
  - Webcast: EPA/State agencies learn about CCA program
  - Mid-Atlantic Crop Management School: EPA presentation
- CCA state boards- Engage with water quality agencies and local projects
- Nonpoint Source Technical Exchange- webcasts on agricultural topics
- How best to engage/communicate?

EPA Regions & Ag Advisors



Questions/Discussion

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