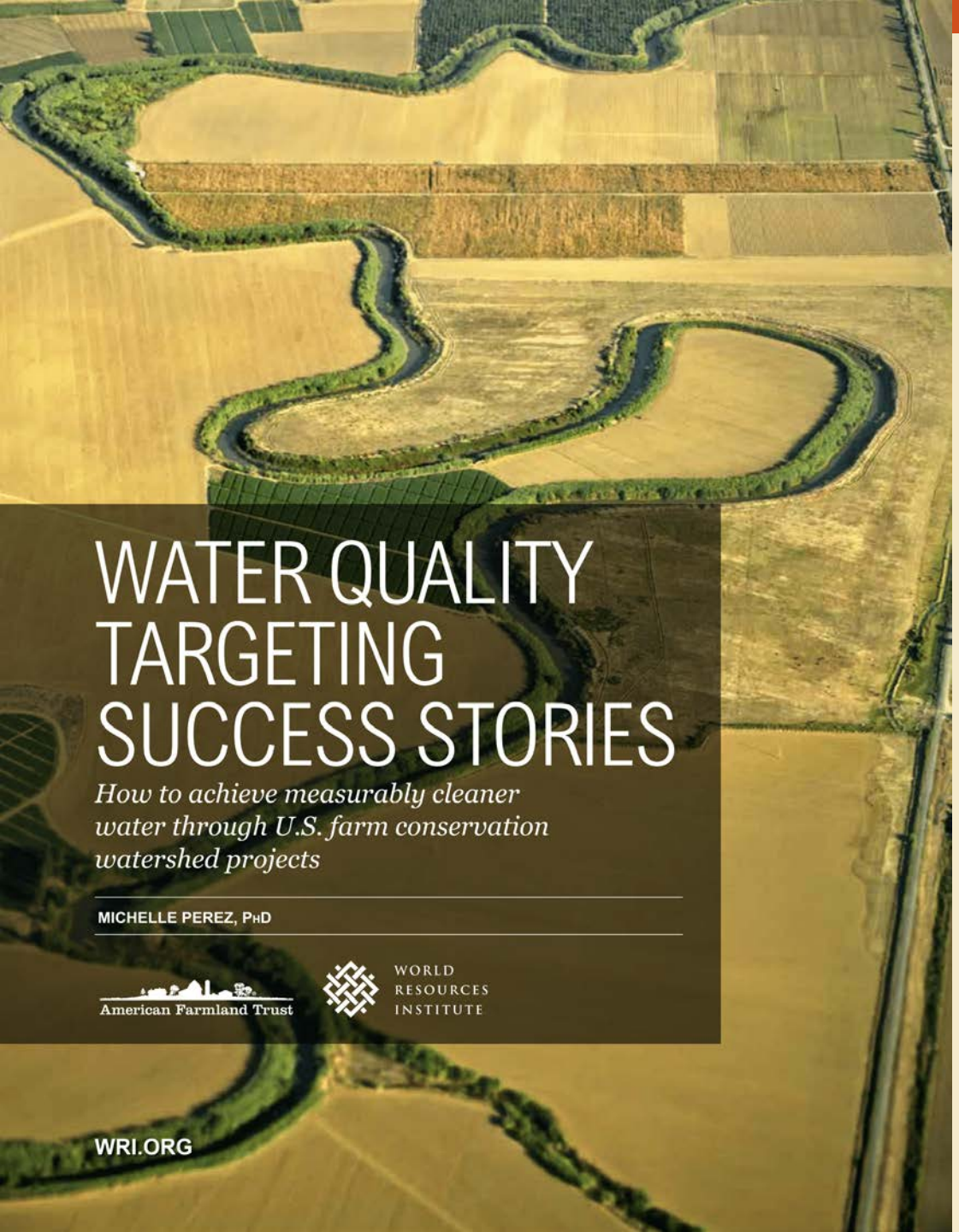

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May 24, 2017

Report Launch & Webinar
World Resources Institute

Special thanks:
Walton Family Foundation
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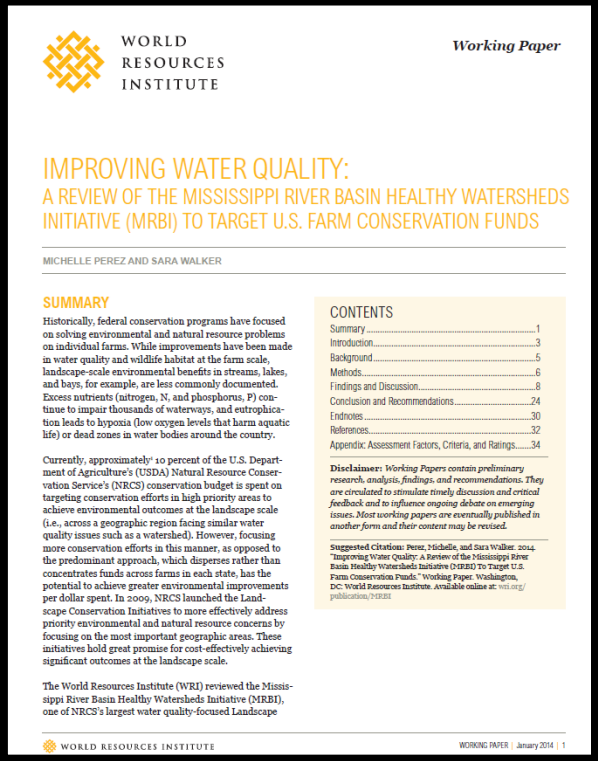
Improving Water Quality Through Better Targeting of U.S. Farm Conservation Funds

MRBI Review



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Working Paper

IMPROVING WATER QUALITY:
A REVIEW OF THE MISSISSIPPI RIVER BASIN HEALTHY WATERSHEDS INITIATIVE (MRBI) TO TARGET U.S. FARM CONSERVATION FUNDS

MICHELLE PEREZ AND SARA WALKER

SUMMARY

Historically, federal conservation programs have focused on solving environmental and natural resource problems on individual farms. While improvements have been made in water quality and wildlife habitat at the farm scale, landscape-scale environmental benefits in streams, lakes, and bays, for example, are less commonly documented. Excess nutrients (nitrogen, N, and phosphorus, P) continue to impair thousands of waterways, and eutrophication leads to hypoxia (low oxygen levels that harm aquatic life) or dead zones in water bodies around the country.

Currently, approximately[1] 10 percent of the U.S. Department of Agriculture's (USDA) Natural Resource Conservation Service's (NRCS) conservation budget is spent on targeting conservation efforts in high priority areas to achieve environmental outcomes at the landscape scale (i.e., across a geographic region facing similar water quality issues such as a watershed). However, focusing more conservation efforts in this manner, as opposed to the predominant approach, which disperses rather than concentrates funds across farms in each state, has the potential to achieve greater environmental improvements per dollar spent. In 2009, NRCS launched the Landscape Conservation Initiatives to more effectively address priority environmental and natural resource concerns by focusing on the most important geographic areas. These initiatives hold great promise for cost-effectively achieving significant outcomes at the landscape scale.

The World Resources Institute (WRI) reviewed the Mississippi River Basin Healthy Watersheds Initiative (MRBI), one of NRCS's largest water quality-focused Landscape

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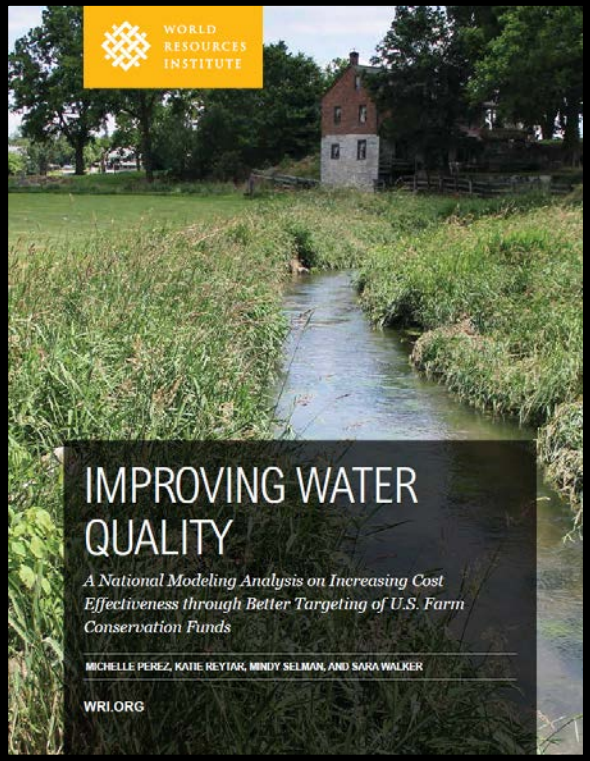
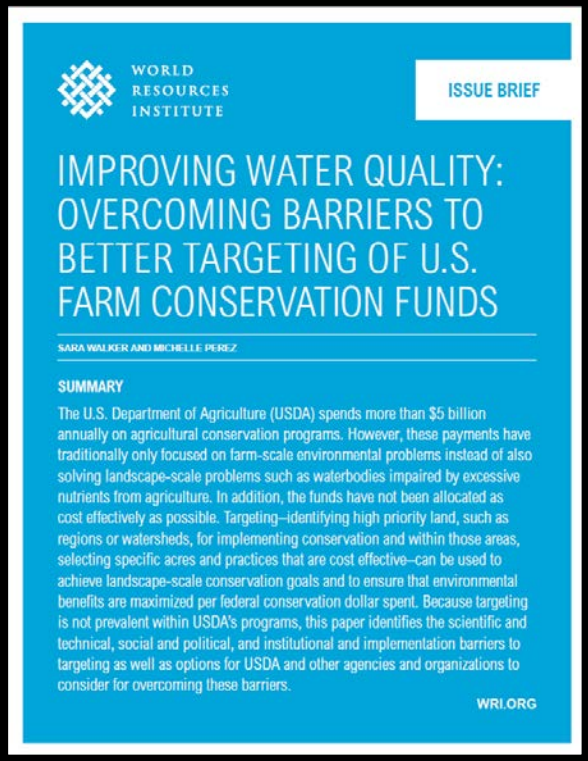
Disclaimer: *Working Papers contain preliminary research, analysis, findings, and recommendations. They are circulated to stimulate timely discussion and critical feedback and to influence ongoing debate on emerging issues. Most working papers are eventually published in another form and their content may be revised.*

Suggested Citation: Perez, Michelle, and Sara Walker. 2014. "Improving Water Quality: A Review of the Mississippi River Basin Healthy Watersheds Initiative (MRBI) To Target U.S. Farm Conservation Funds." Working Paper. Washington, DC: World Resources Institute. Available online at: wri.org/publication/MRBI

National Modeling Analysis



Overcoming Barriers



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ISSUE BRIEF

IMPROVING WATER QUALITY: OVERCOMING BARRIERS TO BETTER TARGETING OF U.S. FARM CONSERVATION FUNDS

SARA WALKER AND MICHELLE PEREZ

SUMMARY

The U.S. Department of Agriculture (USDA) spends more than $5 billion annually on agricultural conservation programs. However, these payments have traditionally only focused on farm-scale environmental problems instead of also solving landscape-scale problems such as waterbodies impaired by excessive nutrients from agriculture. In addition, the funds have not been allocated as cost effectively as possible. Targeting–identifying high priority land, such as regions or watersheds, for implementing conservation and within those areas, selecting specific acres and practices that are cost effective–can be used to achieve landscape-scale conservation goals and to ensure that environmental benefits are maximized per federal conservation dollar spent. Because targeting is not prevalent within USDA's programs, this paper identifies the scientific and technical, social and political, and institutional and implementation barriers to targeting as well as options for USDA and other agencies and organizations to consider for overcoming these barriers.

WRI.ORG

Keyword search: "WRI water quality targeting"

Agenda

- Introduce the new report
- Review agency conservation approaches & metrics of success
- Challenge finding success stories
- Highlight 6 case studies
- Some lessons learned
- Recommendations

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What I won't be sharing today

- All 16 key factors identified by project leaders as contributing to their success
- All 11 lessons learned
- Any of the project cost tables showing funding sources & costs by:
  - Project management
  - Financial assistance
  - Monitoring
- 3 Challenges to measuring success

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Traditional conservation program approach

- USDA financial conservation programs solves water quality problems on individual farms

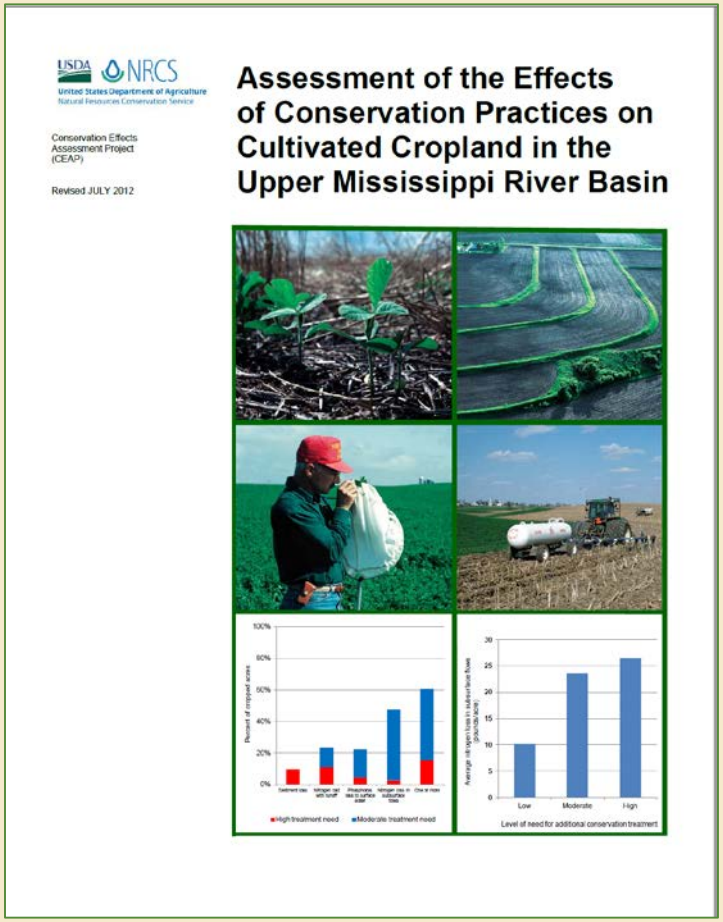
Before

After

Traditional & recent measures of success

- **NRCS reports on administrative metrics**: dollars spent, contracts signed, & acres or units of conservation practices implemented

- **NRCS CEAP modeling estimates** nutrient & sediment reduction effects of practices & further reductions if treat “high and medium” priority areas



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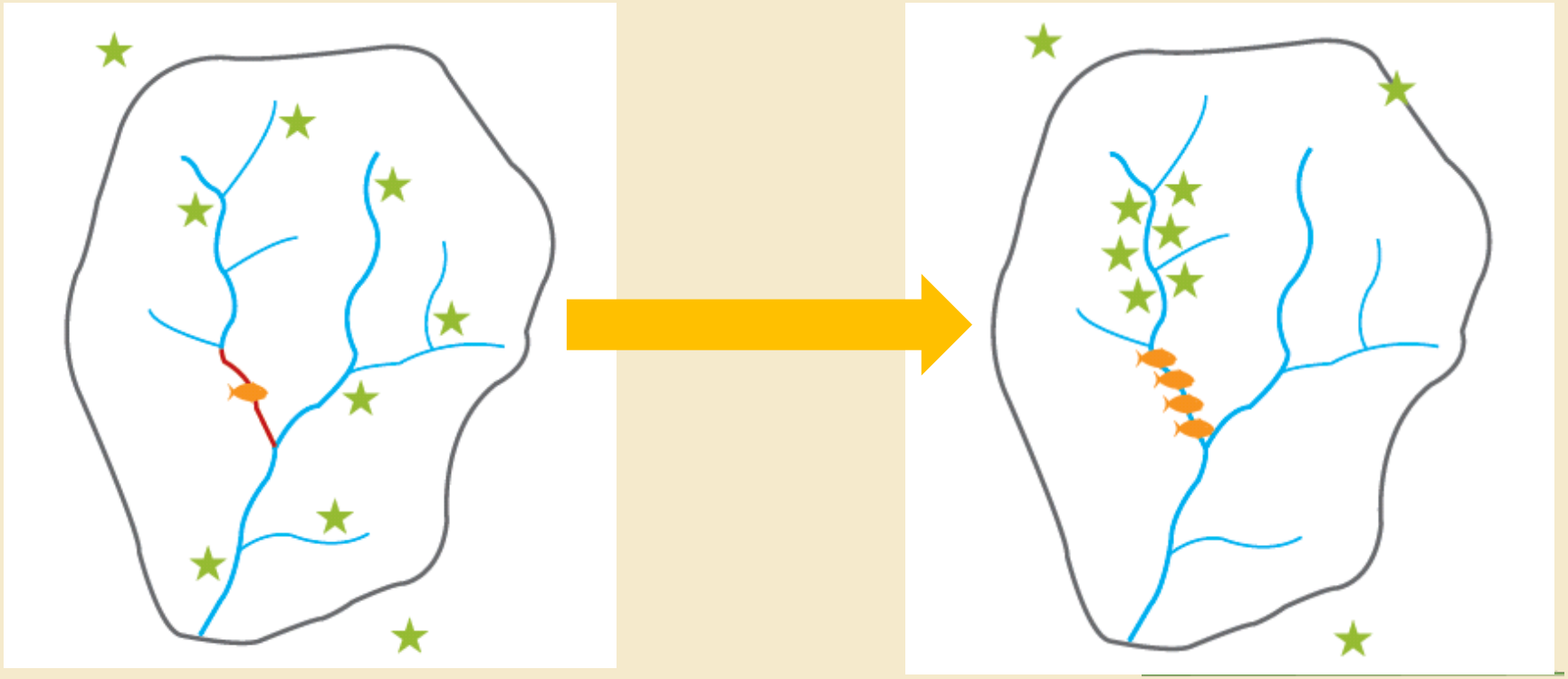
Targeted watershed projects

Traditional approach:
Solves individual farm water quality problems but may not be enough to solve in-stream water quality problems

Targeting to clean up streams:
Achieves amount of the right practices in right locations & has in-stream monitoring to document changes



★ Farm conservation contracts

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Recent landscape-scale efforts

- Emphasizing watershed-based projects:
  - **Demonstration** – Conservation Innovation Grant (CIG)
  - **Research** – National Institute of Food & Agriculture (NIFA-CEAP)
  - **Programs** – Landscape Conservation Initiatives (LCIs) (e.g., MRBI, NWQI, etc.) & Regional Conservation Partnerships Program (RCPP)

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Recent ways to quantify success

- MRBI encouraged projects to monitor water quality at edge-of-field, small watershed, large watershed (Tier 1, 2, & 3)

- RCPP prioritizes projects that achieve and measure "environmental, social, & economic outcomes"

→ A shift towards "outcomes-oriented conservation"

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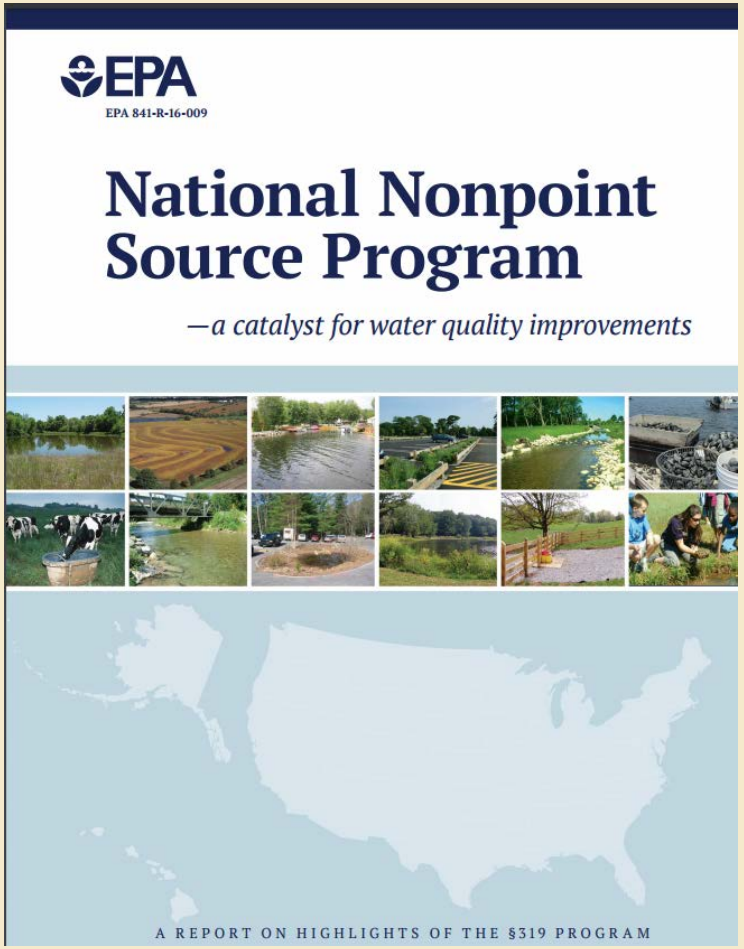
EPA-State Section 319 Success Stories

- EPA & States reported 674 restored waterbodies (405 success stories) – about half involve ag

- EPA requires States & Local Watershed Partners to:
  - Develop a 9-element watershed-based plan
  - Develop a recommended in-stream monitoring program: paired watershed, upstream/downstream, before/after, or trend



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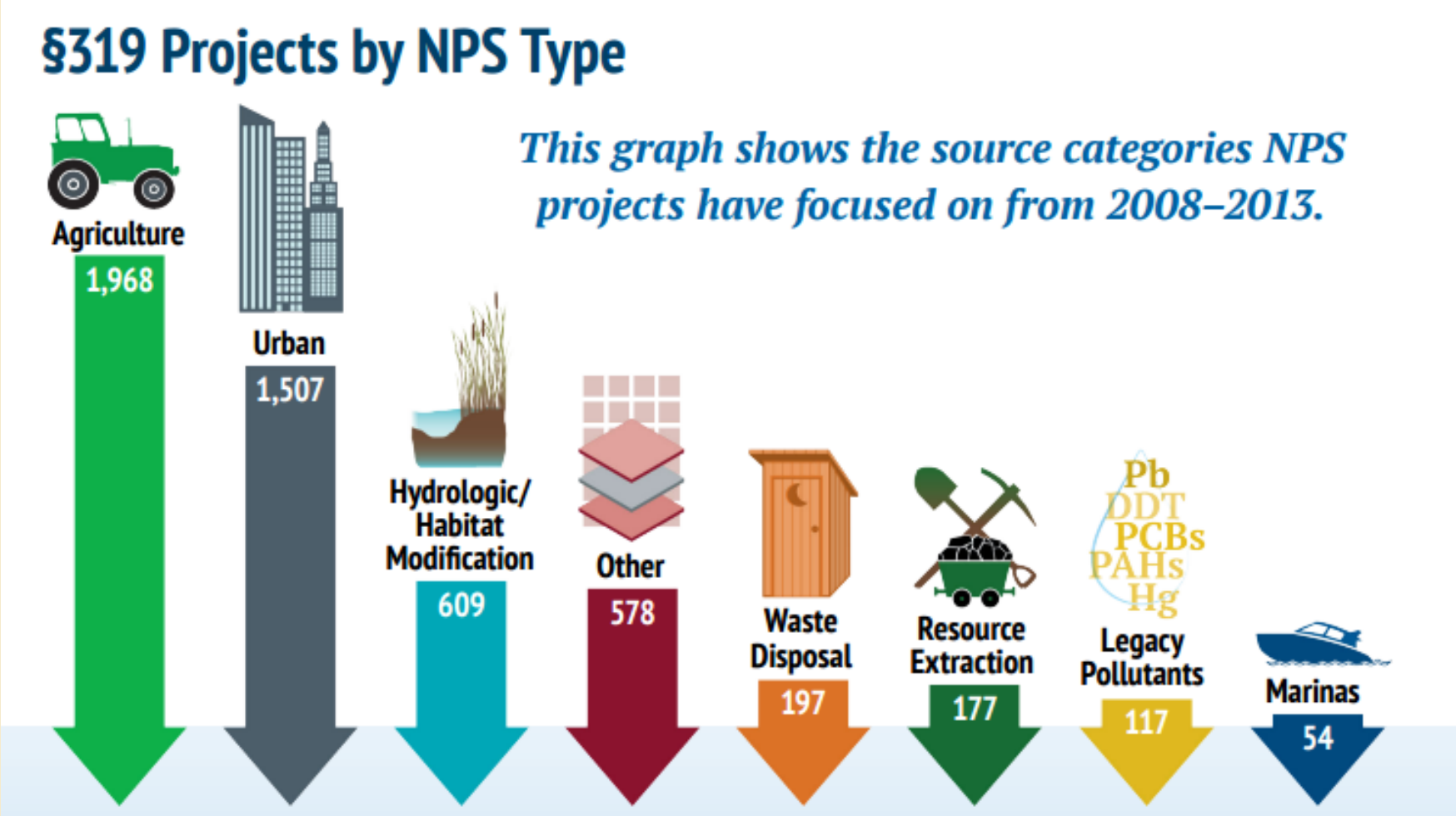
Most Section 319 projects are ag-related



Source: EPA. 2016. National Nonpoint Source Program. Highlights Report. Dec.

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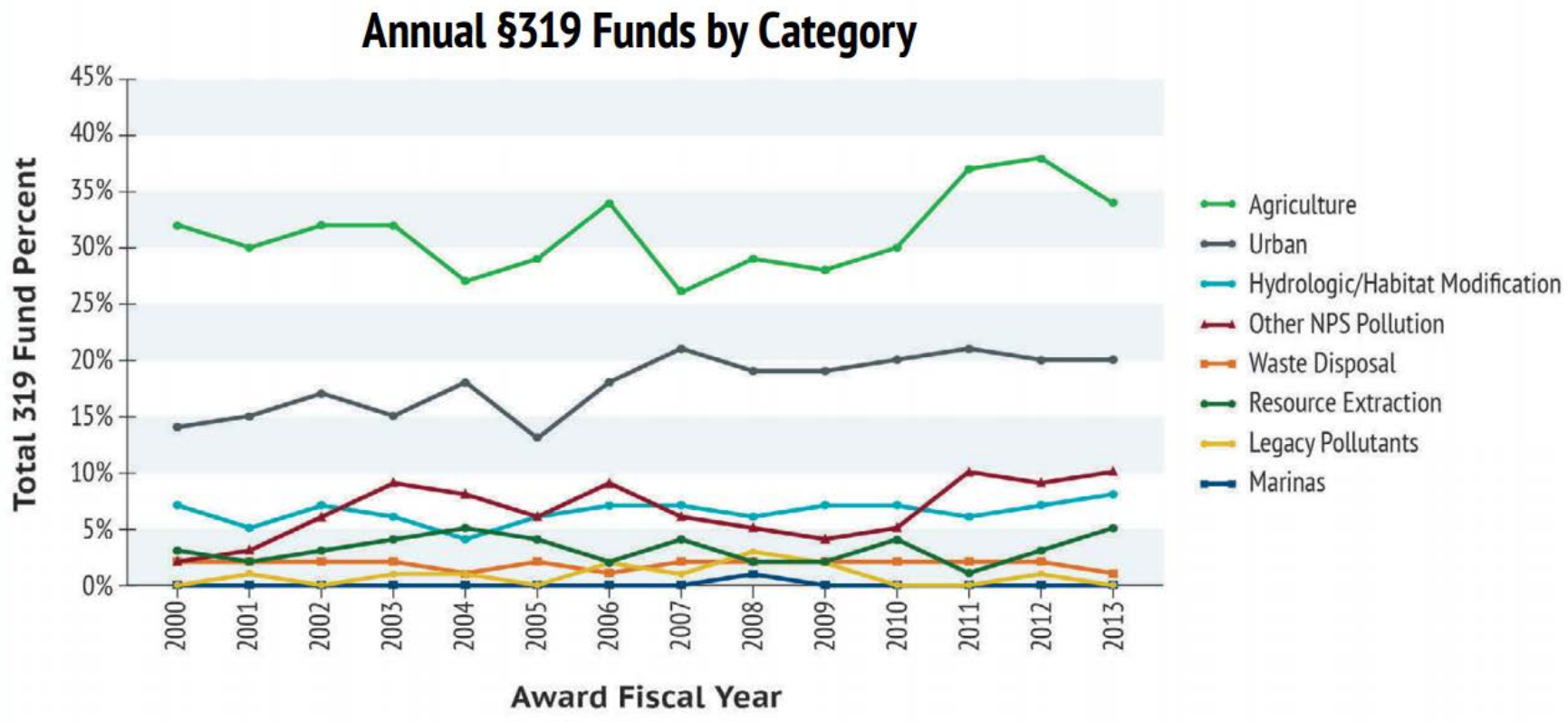
EPA Section 319 funding pot is small ($165M/year) & Ag is biggest recipient



Source: USEPA Grants Reporting and Tracking System[8]

Source: EPA. 2016. National Nonpoint Source Program. Highlights Report. Dec.

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Research questions & methods

- **Impetus questions:** Have recent watershed projects achieved instream monitored success? If so, how'd they do it?

- **Methods**
  - Literature reviews
  - Interviews with NRCS staff, farm conservation & water quality experts
  - Emails to conservation community
  - In-depth interviews with 2 to 5 leaders per project & review of their project documents

- **Overarching questions:** How can the agency's federal conservation programs be more successful in improving water quality and how can those positive impacts be documented?

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First major finding

It was really hard to find any watershed projects with instream monitored success:

1. **Mississippi River Basin Healthy Watersheds Initiative (MRBI) –** published two write-ups about 3 successes
2. **Great Lakes Partnership Initiative (GLRI)**
3. **Gulf of Mexico Initiative (GOMI)**
4. **Chesapeake Bay Watershed Initiative (CBWI)**
5. **Illinois River Eucha-Spavinaw Initiative (IRESI)**
6. **Bay Delta Initiative (BDI) in California –** Walker Creek Project featured in the report
7. **National Water Quality Initiative (NWQI)**

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Likely challenges with watershed projects & why we don't know

- **Monitoring programs not in place? Or is it a natural lag time problem?** 41 of 100 MRBI projects said they'd do instream water quality monitoring

- **Monitoring program design or implementation challenges?** Some project leaders at Leadership for Midwestern Watersheds meetings say they're struggling with monitoring & many don't know what quantifying outcomes means & want more guidance

- **Is it a reporting challenge?** Projects aren't reporting to NRCS & NRCS isn't asking for results?

- **If past is prologue, this stuff is hard -** Gale et al (1993) & Osmond et al (2012) reveal how difficult it is to achieve & detect instream improvements

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AFT-WRI report found 6 projects with monitored water quality success

Projects	Watershed (ac) & HUC size	Topography	Major crops / land uses
California Walker Creek	27,000 (~HUC12)	Rolling hills to flat flood plains	Almond, walnut, alfalfa
Oklahoma Honey Creek	55,000 in OK (3 HUC12s)	Rolling hills	Beef pasture, broilers, cropland
Iowa Hewitt Creek	25,000 (HUC12)	Rolling hills, some tile drains	Corn-Soybeans; confined beef, dairy, & swine
Wisconsin Pleasant Valley Branch 1 & 2	12,300 (half HUC12)	Ridge tops, steep slopes, valley bottoms	Corn-Soybeans, alfalfa, pasture
Indiana Shatto Ditch	3,300 (fraction HUC12)	Relatively flat, all tile drained	Corn-Soybeans & broilers

Project	Project Leaders	Goal
California Walker Creek	Led by **farm** trade association & resource conservation **district**	Solve Chlorpyrifos pesticide exceedance
Oklahoma Honey Creek	EPA 319 project; Led by state water quality agency & **farmer** watershed advisory group	Remove stream from impaired list for *E.coli*, low dissolved oxygen, etc.
Iowa Hewitt Creek	Led by ISU **extension** & a **farmer** watershed council	Remove stream from impaired list for sediment, low dissolved oxygen, etc.
Wisconsin Pleasant Valley 1	Led by WI DNR & county conservation **district**	Remove stream from impaired list for sediments & improve trout fishery
Wisconsin Pleasant Valley 2	Led by TNC-WI, UWI, USGS, & county conservation **district**	Test targeting in one of Top P loss watersheds in WI
Indiana Shatto Ditch	Led by TNC-IN, U of Notre Dame, & soil water cons **district**	Test effect of widespread cover crop adoption on water quality

Project	Geographic Targeting	Monitoring Program	Monitoring Lead
California Walker Creek	Yes. First focused on farmers above exceedance point.	Long-term pesticide monitoring	Private consulting firm
Oklahoma Honey Creek	Yes. SWAT model identified hi P loss risk areas.	Paired watershed + Upstream/Downstream	State water quality agency
Iowa Hewitt Creek	Yes. IA Phosphorus Index identified hi P loss risk areas.	Trend	Regional college professor
Wisconsin Pleasant Valley 1	Yes. Prioritized streambank restoration sites.	Before/After + Fish & Habitat analyses	State dept of natural resources
Wisconsin Pleasant Valley 2	Yes. WI Phosphorus Index identified hi P loss risk areas.	Paired watershed	USGS
Indiana Shatto Ditch	No. Got 70% cropland ac in cover crops.	Fish & Habitat analyses Before/After	Private biomonitoring firm & University

Project	Successes
California Walker Creek	Achieved No Chlorpyrifos pesticide exceedance for 3 years & no Ceriodaphnia toxicity for 5 years = Management Plan complete!
Oklahoma Honey Creek	Proposed removal of stream from impaired list for *E.coli* (51% reduction). Load reductions in nitrate, total phosphorus, & Enterococcus by 35, 28, & 34% compared to control watershed.
Iowa Hewitt Creek	Documented a 60% decrease in turbidity & 40% decrease in total phosphorus concentrations. Quantified social and economic outcomes—e.g., created a "watershed community" and increased farmer profitability.
Wisconsin Pleasant Valley 1	Proposed removal of stream from impaired list for stream for sediments (50% decrease in fine sediment) & increased trout populations 70 to 100%
Wisconsin Pleasant Valley 2	Reduced total phosphorus storm event loads by 55% compared with control watershed.
Indiana Shatto Ditch	Documented 80% reduction in nitrate-N loss from title drains from watershed-scale sampling.

Favorite findings about leadership

- **Farmer leadership** - Very important to three projects (CA, OK, IA) to lead and design project & encourage farmer participation
  - CA Colusa Glenn Subwatershed Program
  - OK Watershed Advisory Group
  - IA Hewitt Creek Watershed Council

- **Local conservation districts –** Three projects (CA, WI-1, WI-2) relied on districts for outreach, education, & technical services to design & implement project
  - CA Glenn County Resource Conservation District
  - WI-1 Dane County Land Conservation Division
  - WI-2 Dane County Land Conservation Division

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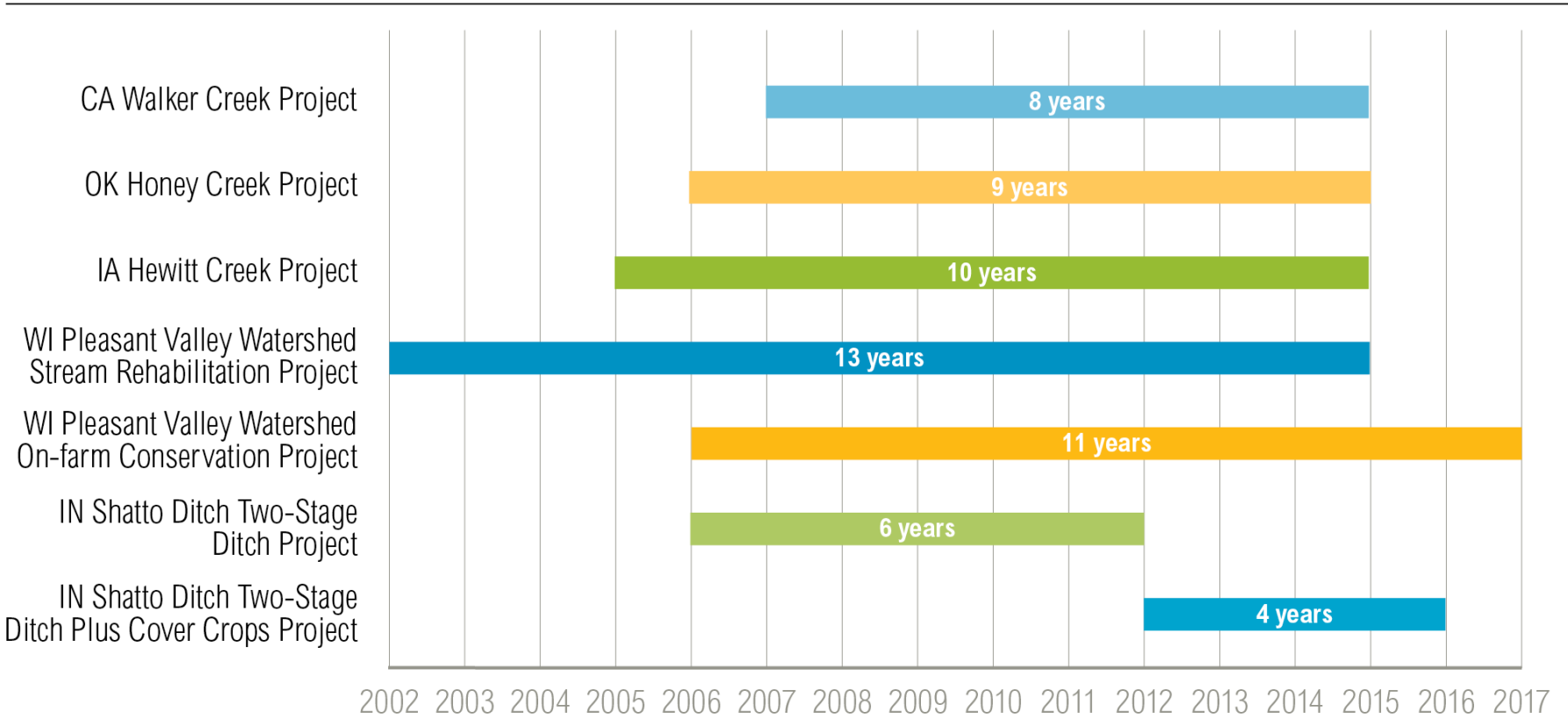
Project duration can be long



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Oklahoma's Honey Creek Section 319 Project

Excellent targeting & monitoring

Priority practices: fenced livestock out of stream, alternative watering, riparian area restoration, manure transport, pasture improvement, sediment ponds, heavy use protection areas for livestock, etc.

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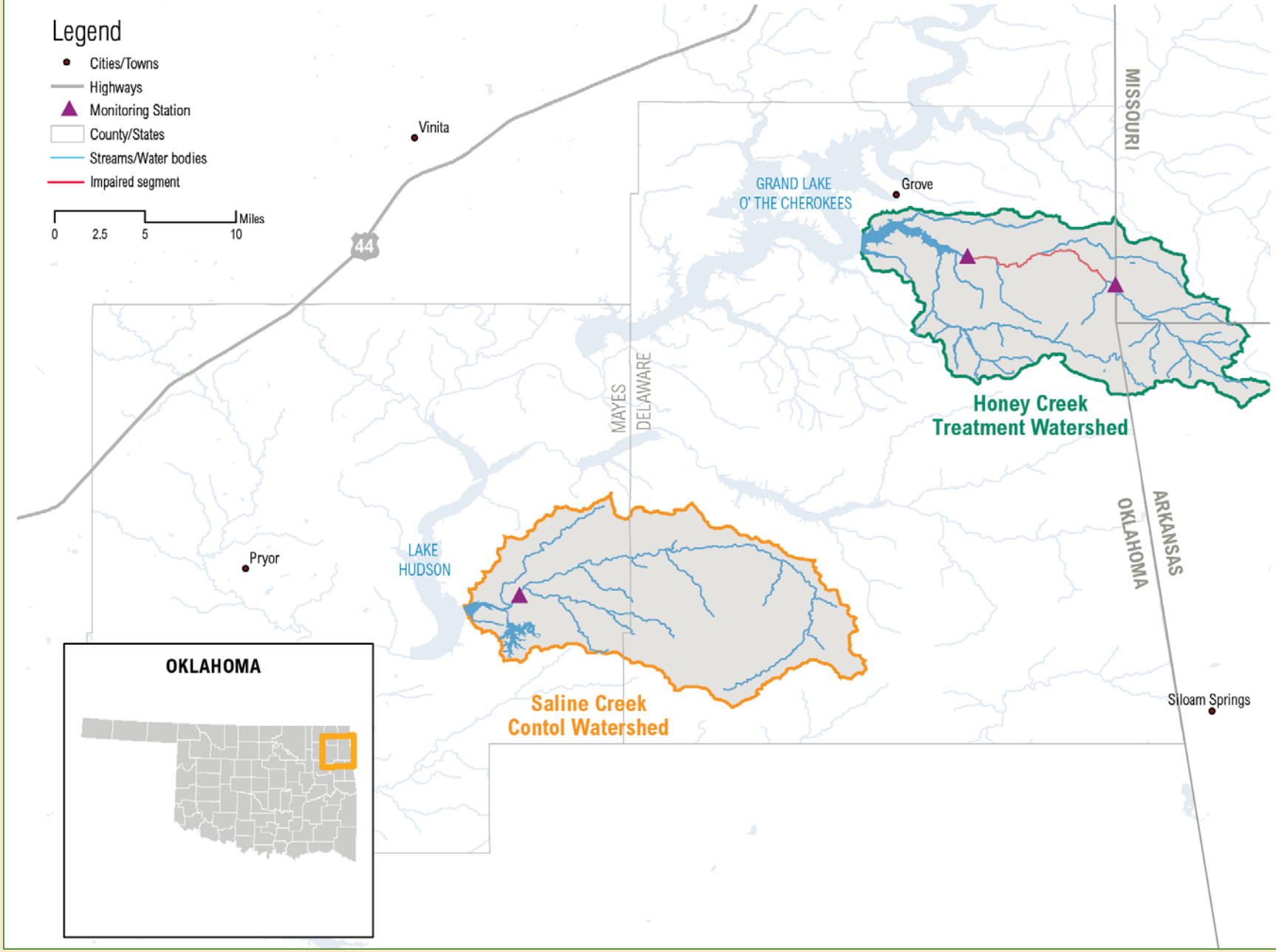
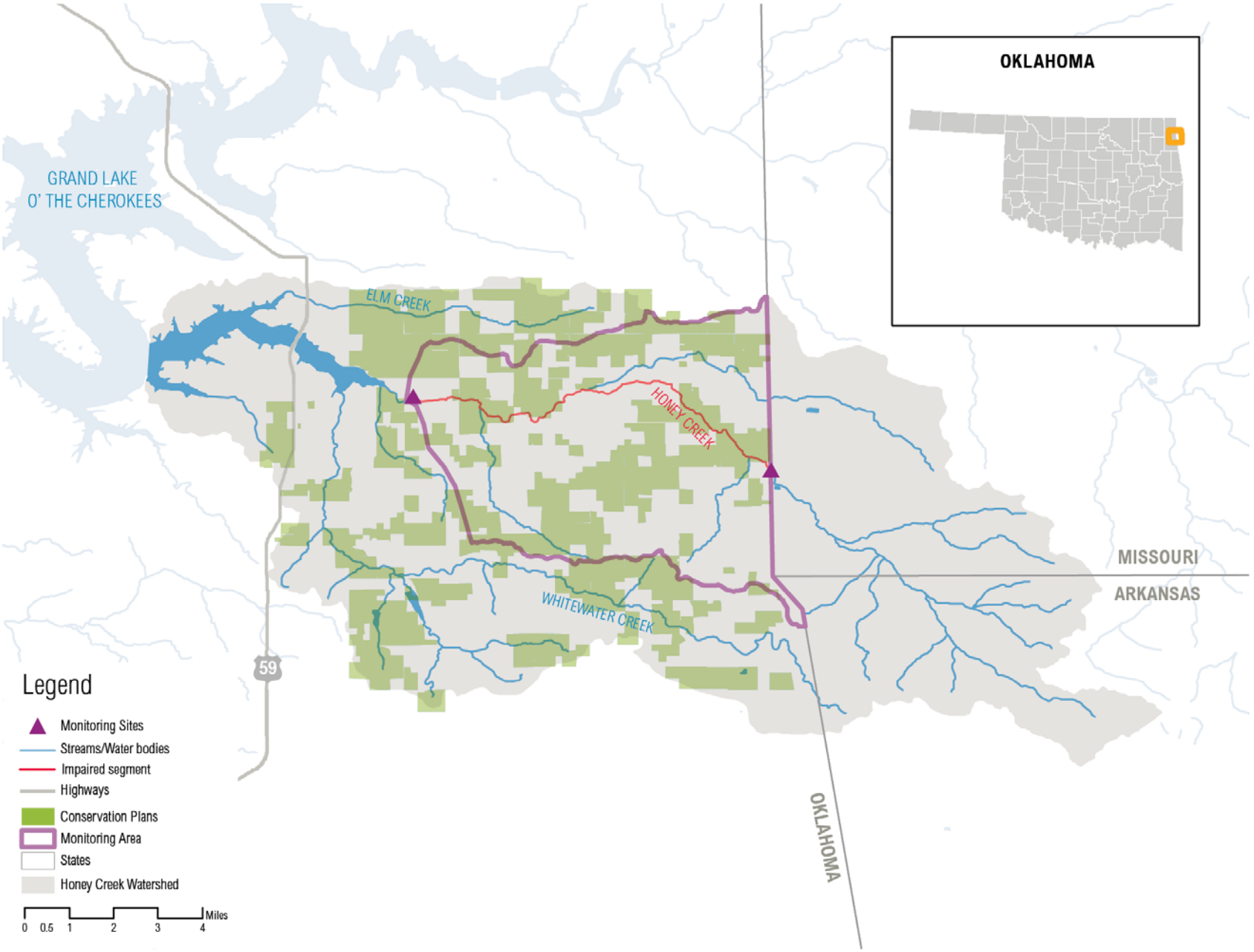
The Honey Creek Project Treatment and Control Watersheds



Map of the Oklahoma Honey Creek Watershed Project



Iowa Hewitt Creek Project: Extension & Farmer Watershed Council

(25,000 ac; ~HUC12)

Excellent farmer leadership, goal setting, & quantification of social & economic outcomes

Used peer-to-peer farmer learning meetings to exchange conservation & production information based on the results of the IA Phosphorus Index, Soil Conditioning Index, & Cornstalk Nitrate Test

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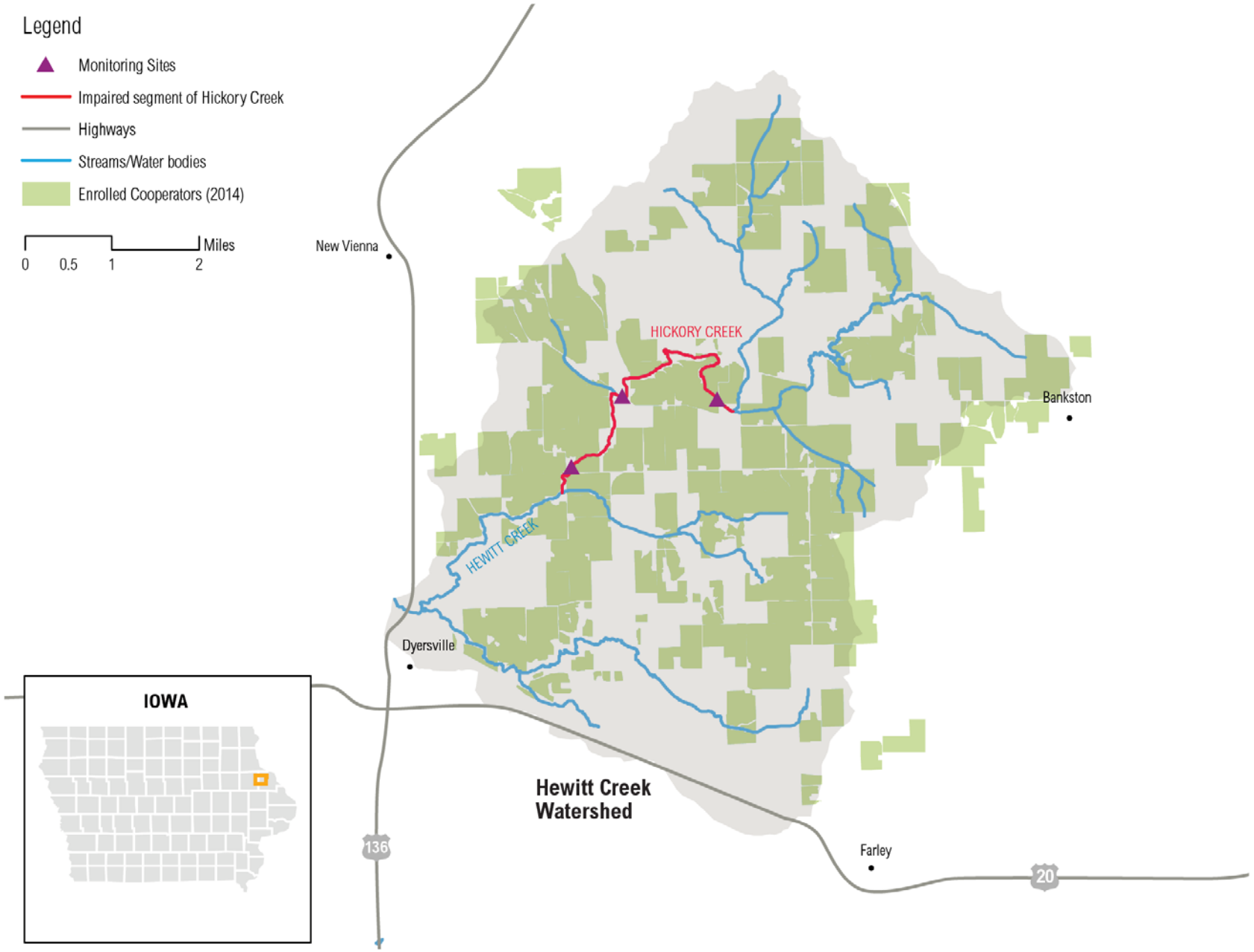
Map of the Iowa Hewitt Creek Watershed Project



Recommendations

1. **Watershed project leaders**
   - Heed available guidance on instream water quality monitoring (USDA 2003 & EPA 2016).
   - Adopt appropriate field-scale modeling tools to quantify & report on field & project-level environmental outcomes.
   - Ask for help if you need it.

2. **NRCS**
   - Provide additional guidance on water quality monitoring & quantification of environmental, social and economic outcomes to watershed project leaders.
   - Set up a reporting system to collect success stories.
   - Collaborate with government & NGO partners to do this.

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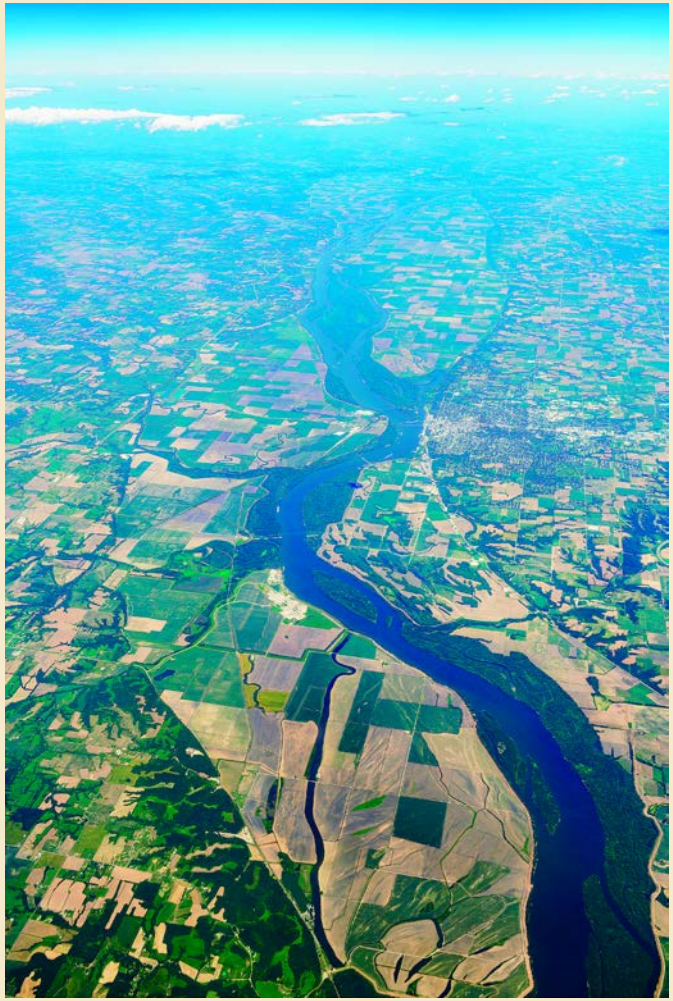
Recommendations

3. **EPA**
   - Offer training events to disseminate new 2016 guidance on water quality monitoring to help leaders of RCPP or any targeted watershed projects develop & implement effective monitoring plans.
   - Offer to help train NRCS staff to evaluate monitoring plans included in future RCPP or other proposals.

4. **The research community**
   - Better understand whether a “critical mass” of conservation adoption or an “intensity” of treatment of each priority acre is needed before projects can expect to achieve measurable improvements in water quality.



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Recommendations

5. **Congress**
   - Increase financial & technical assistance for USDA's RCPP and the EPA's 319 program and fund research agenda.
   - Require USDA to provide guidance to the RCPP project leaders on how to collect environmental, social, and economic outcomes
   - Require USDA to report on outcomes quantification progress.

6. **Charitable foundations & corporations with sustainability goals**
   - Provide significant, sustained financial support to project leaders and farmers to leverage govt funding & help drive this new outcomes-oriented conservation.

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Saving the Land and Water that Sustains Us

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