United States Department of Agriculture

NRCS Water Quality Activities

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Natural Resources Conservation Service

The Roadmap

- Organization
- What we do
- WQQT
- Water quality activities

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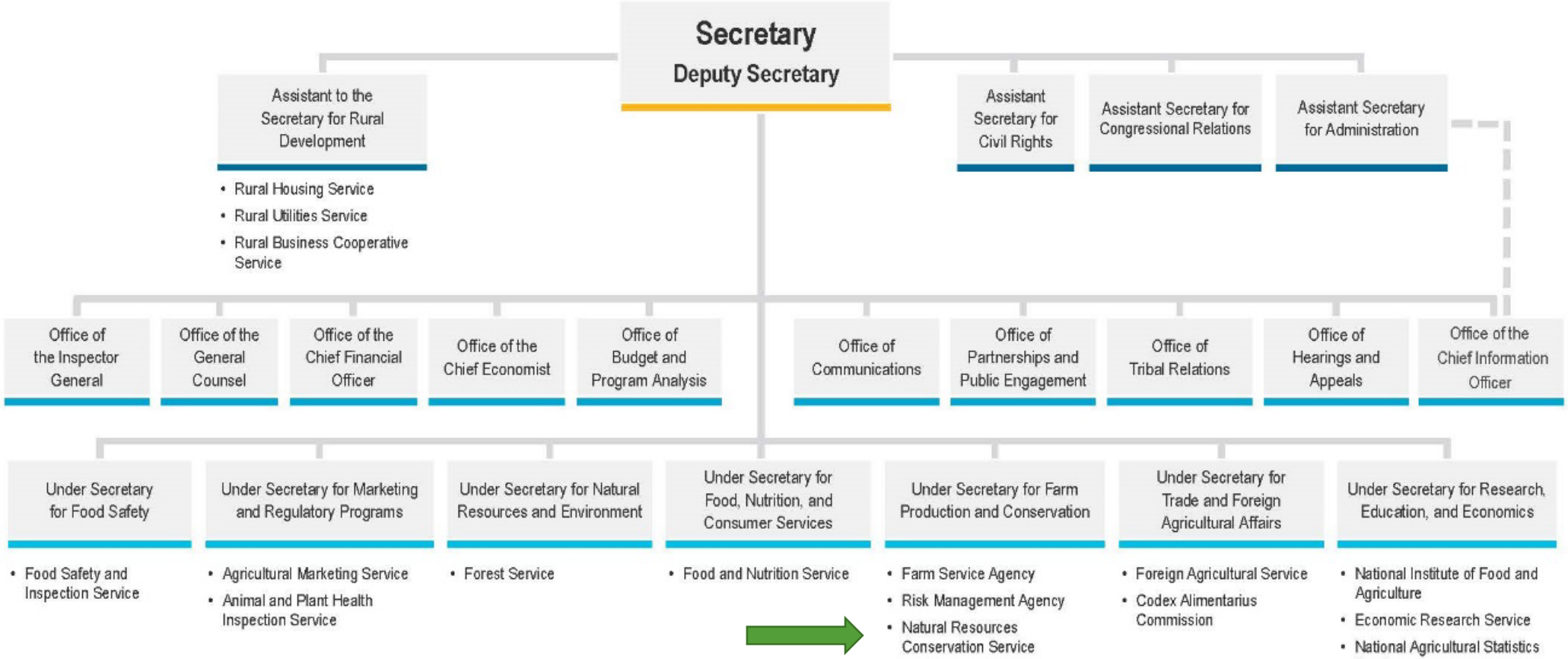
USDA Organization Chart



This organization chart displays the names of USDA offices, agencies, and mission areas. Each office, agency, and mission area is placed within a cell connected by lines to show the structure and hierarchy (Under Secretary, Deputy Secretary, or Secretary) for which they fall under. An HTML version that lists USDA Agencies and Offices and USDA Mission Areas is also available on usda.gov.

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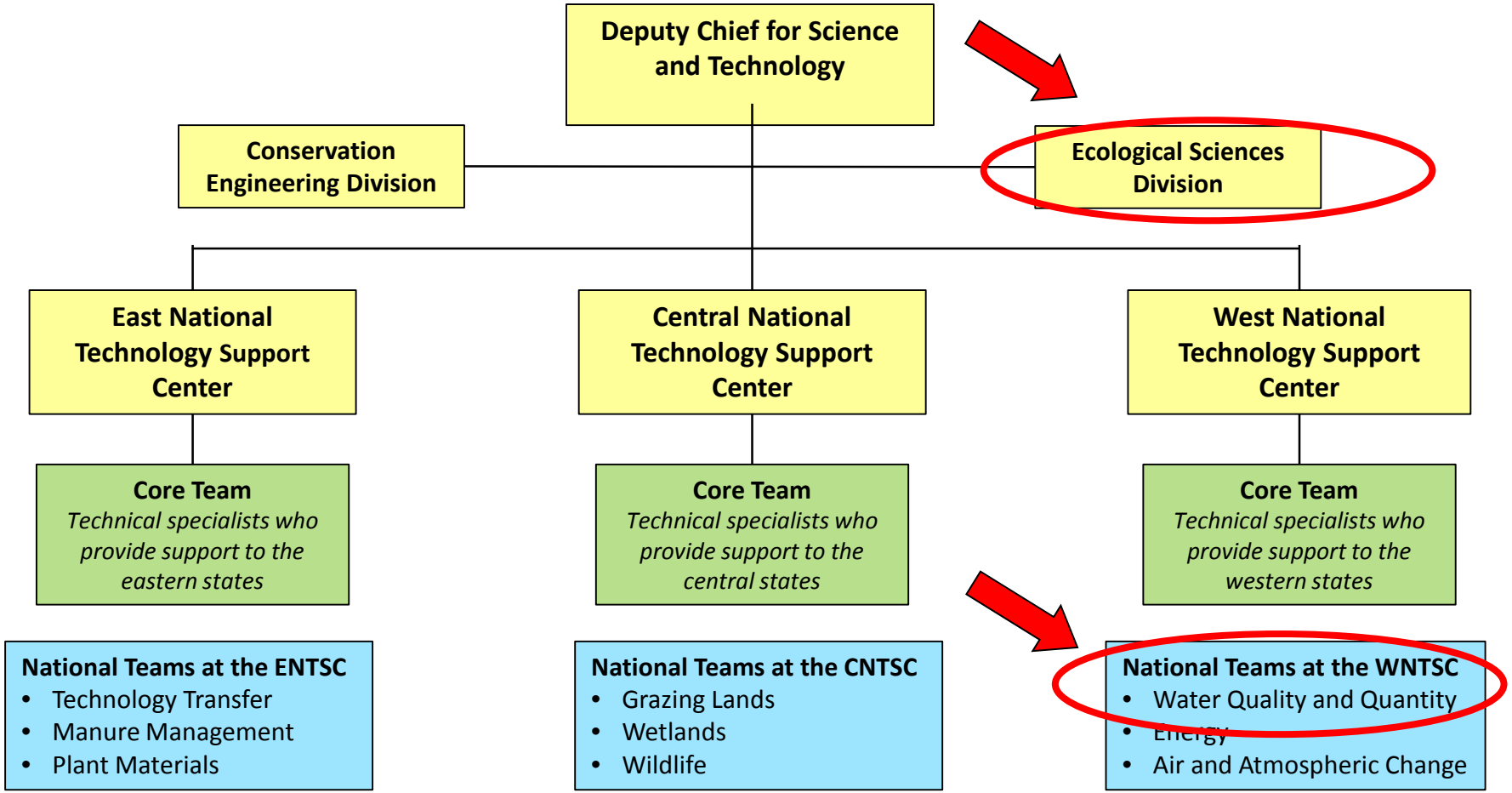


** National teams provide support nationwide, Core teams support the regions*

Ecological Sciences Division

The Ecological Sciences Division (ESD) leads the technology for Natural Resources Conservation Service (NRCS) in ecological, cultural resource, and environmental compliance technologies to ensure science-based conservation for our Nation's resources.

- Integrate agricultural, ecological, environmental, fish and wildlife, cultural heritage and energy concerns into all NRCS programs
- Provide national technical liaisons for NRCS with other agencies and groups for ecological and cultural resources-related legislation, policy, and initiatives.
- Develop policies and guidelines for NRCS compliance with laws, regulations, and Executive Orders pertaining to ESD expertise.

Ecological Sciences Division

National Water Quality Specialist & Aquatic Ecologist

- Lead on water quality and aquatic ecology policy
- Technical Liaison for many groups:
  - Hypoxia Task Force
  - HABARCA Workgroup
  - Association of State Wetland Managers
  - Caribbean Coral Reef Partnership
  - Sustainable Water Resources Roundtable
- Lead WQ practice standard development
- Response to Congressional inquiries

Water Quality and Quantity Team

Scope

- Nationwide support
- Field offices
- States
- NHQ
- Partners

https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/quality/tr/?cid=stelprdb1042846

Water Quality and Quantity Team

Skills and Resources

- Agricultural Engineering
- Edge-of-Field Monitoring
- Environmental Engineering
- Geomorphology
- Hydrology
- Hydraulic Engineering
- Irrigation Management
- Nutrient Management
- Pest Management
- Soil Science
- Wetland/Drainage Engineering
- Water Quality

Water Quality and Quantity Team

Training

The WQQT provides extensive training

- Water Quality
- Salinity Management
- Pest Management
- Hydrology
- Stream Restoration
- Nutrient Management
- In support of all the tools we develop

Water Quality and Quantity Team

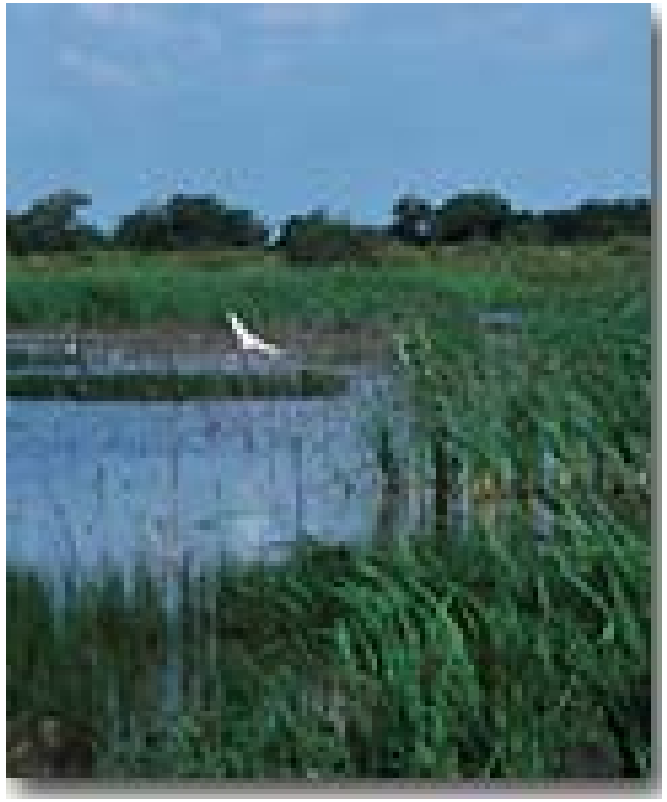
Tech Transfer / Communication

- Web site – http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/quality/tr/
  - Tools available to download
  - Information and Resources on Water Quality and Quantity
- Marketing
  - Articles
  - Professional interactions
- Working with NHQ and States to Support Water Quality and Quantity needs for the Agency

Water Quality and Quantity Team

Technology Development

- Nutrient Management
- Pest Management
- Hydraulics and Hydrology
- Irrigation Management
- Stream Restoration
- Market Based Solutions
- Watershed Management
- Water Quality



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Nutrient Management

- Agriculture Waste Management (AWM)
  - A tool to assist in structural and engineering Design for waste handling facilities
- Manure Management Planner (MMP)
  - A tool that schedules and helps facilitate nutrient management at the field level

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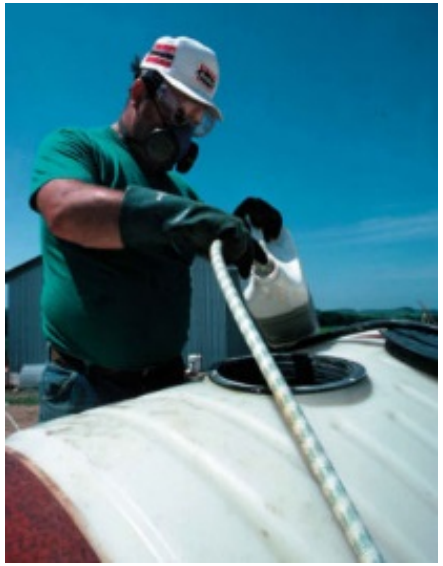
Pest Management

Windows Pesticide Screening Tool, (WIN-PST)



- An environmental risk screening tool that assesses a pesticide's potential to impact off-site resources.
- The risk depends on the pesticide's properties, (including toxicity), the field's soil properties, and how the pesticide is applied.

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Water Quality and Quantity

Hydraulics and Hydrology

http://go.usa.gov/rXYw

- Win TR 20
  - Analyzes the impacts of watershed changes
- Win TR 55
  - Urban Hydrology for Small Watersheds
- NRCS Hydro
  - Spatial integration of Win TR 20 and Win 55 using ESRI products
- HEC RAS
  - Corps of Engineers Program that we collaborate on
  - Working on frozen runoff routine

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Irrigation and Water Management

- Surface – Surface Irrigation design
- WinSRFR – Surface Irrigation support
- AGPipe – Pipe line design
- FIRI – Farm Irrigation Evaluation
- IWR – Irrigation Water Requirements
- EPANET – Pipe network design
- IWM – Irrigation Water Mgt.
- SPAW – Daily Hydraulic Budget Model
- Drainmod – Tile drainage modeling
- WinDam – Dam Design

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Stream Restoration

Technical resources

- Stream Corridor Management Handbook
- NRCS Stream Restoration Design Guide
- Future – Stream Restoration for Land Owners

Watershed Management training and assistance

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Market Based Solutions

- Nutrient Trading Tool, (NTT)
  - Compares changes from a baseline scenario of nitrogen, phosphorus, and sediment levels, to an alternate scenario under different crop management and conservation practices.
- Water Quality Index (WQIag)
  - The Water Quality Index for Runoff Water from agricultural fields (WQIag) is a web-based, qualitative tool to characterize runoff water quality at the field scale.

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Edge-of-Field Water Quality Monitoring

In 2013, NRCS introduced Conservation Activity Standards:

- Edge-of-Field Water Quality Monitoring Data Collection and Evaluation (201)
- Edge-of-Field Water Quality Monitoring System Installation (202)

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Edge-of-Field Water Quality Monitoring

Objectives:

1) Evaluate conservation system performance;

2) Validate and calibrate NRCS models, and

3) Help the farmer make the best conservation investments possible.

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Edge-of-Field Water Quality Monitoring

- NRCS EOF monitoring is a convergence of Farm Bill Programs and scientific research
  - Funded through EQIP
  - Farm Bill EQIP payment limitation of $450k
  - Data confidentiality
- The farmer has to keep the specified crop rotation for up to 9 years.
- Baseline monitoring may have to be extended due to unusual weather events.

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Edge-of-Field Water Quality Monitoring

- NRCS has existing AS 201/202 projects in AR, IN, KY, MO, MS, NY, OH, VT, WA, and WI.
- Since 2013, NRCS has provided nearly $6M in funding for over **40 projects.**

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Edge-of-Field Water Quality Monitoring

What is being monitored?

#	Practices Ranked by Occurrence	
14	340	Cover Crop
11	590	Nutrient Management
9	449	Irrigation Water Management
6	393	Filter Strip
2	328	Conservation Crop Rotation
1	390	Riparian Herbaceous Cover
1	412	Grassed Waterway
1	554	Drainage Water Management
1	VT 782	Phoshporous Removal System

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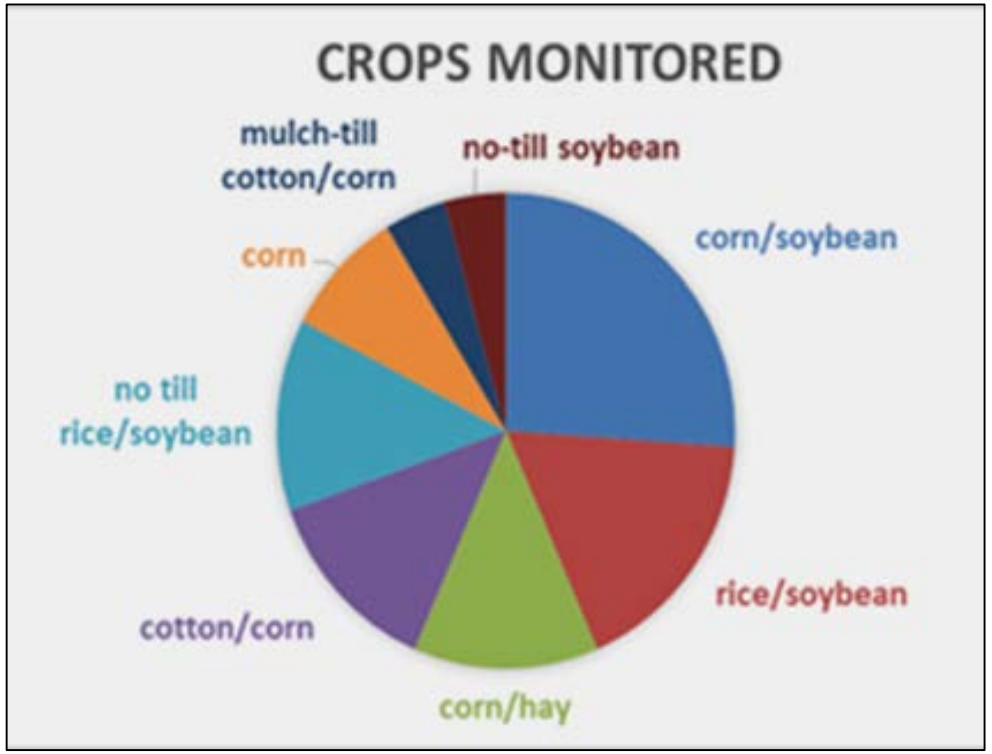
Edge-of-Field Water Quality Monitoring

Common Monitoring Questions:

- What is the effect of nutrient management and Irrigation Water Management on a rice/soybean rotation in the Mississippi River Basin?
- Do cover crops reduce nutrient runoff in a corn/soybean rotation?
- Do grassed waterways impact nutrient runoff?
- Is the Interim Practice Standard 782, Phosphorus Removal System, effective in removing phosphorous from tile drainage?



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Edge-of-Field Water Quality Monitoring

- Many projects are still in the baseline monitoring stage
  - Baseline monitoring is required for a minimum of 2 years
  - Some projects had unforeseen circumstances (extreme weather events) and had to extend baseline monitoring.

It will take time to gather sufficient data to analyze trends, however…

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Edge-of-Field Water Quality Monitoring

What we've found:

- MRBI states reported out on their progress
  - One study in AR indicates a 20% increase in water efficiency when using irrigation water management
  - MO – (799 & 201/202) A winter cover or cash crop can reduce nutrient and sediment approximately 30% on runoff collected during the following spring, summer, and fall.
- VT – (799)
  - Runoff of dissolved phosphorous (TDP) on hay fields is higher than expected. TDP in runoff from annually cropped fields can also be high (25 – 64 percent).
  - Rainfall events closely following manure application on hayfields can produce very high nutrient concentrations in runoff
  - Mass loading of phosphorus (TP) from hayfields can be as high, or higher, than some annually tilled fields.
  - Event mean concentrations of phosphorus in runoff are positively correlated with soil phosphorus levels.

NRCS Water Quality and Quantity

- Water quality & quantity are priorities for the agency
- Cover a wide variety of issues through multiple divisions
- Change
  - Staffing
  - 2018 Farm Bill

NRCS Resources

National water website:

- https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/

National water quality website:

- https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/water/quality/

National Water Quality & Quantity Team:

- https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/national/water/quality/tr/?cid=stelprdb1042846

National Water Quality Initiative:

- https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/water/?cid=stelprdb1047761

Questions?