USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

HEALTH SOIL MEANS… Healthy Farms and Cleaner Water!

National Hypoxia Taskforce Meeting
May 10, 2012
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State Soil Health Specialist, Indiana

NRCS - HELPING PEOPLE HELP THE LAND

Improving Soil Health and Water Quality through

Conservation Cropping Systems

Soil Health = Increased Productivity and Sustainability

KEY CHALLENGES FOR INDIANA'S WATER:

- NUTRIENTS
- CHEMICALS
- PATHOGENS
- SEDIMENT

Photo: coastalcare.com

“Houston. We have a problem.”

The Changing Landscape of Conservation Assistance

- The nation is facing expanding and conflicting environmental, land use, and food production priorities.
- The ability for government to provide increased education and support is becoming limited.
- Societal support for expanded regulation appears to be waning.


Quality No-Till


Conservation
Cropping Systems
IN itiative
Advanced Nutrient Management


Controlled Traffic
and
Precision Technology


Prescribed Cover Crops


Crop Rotation
And Stripcropping

Conservation Cropping Systems

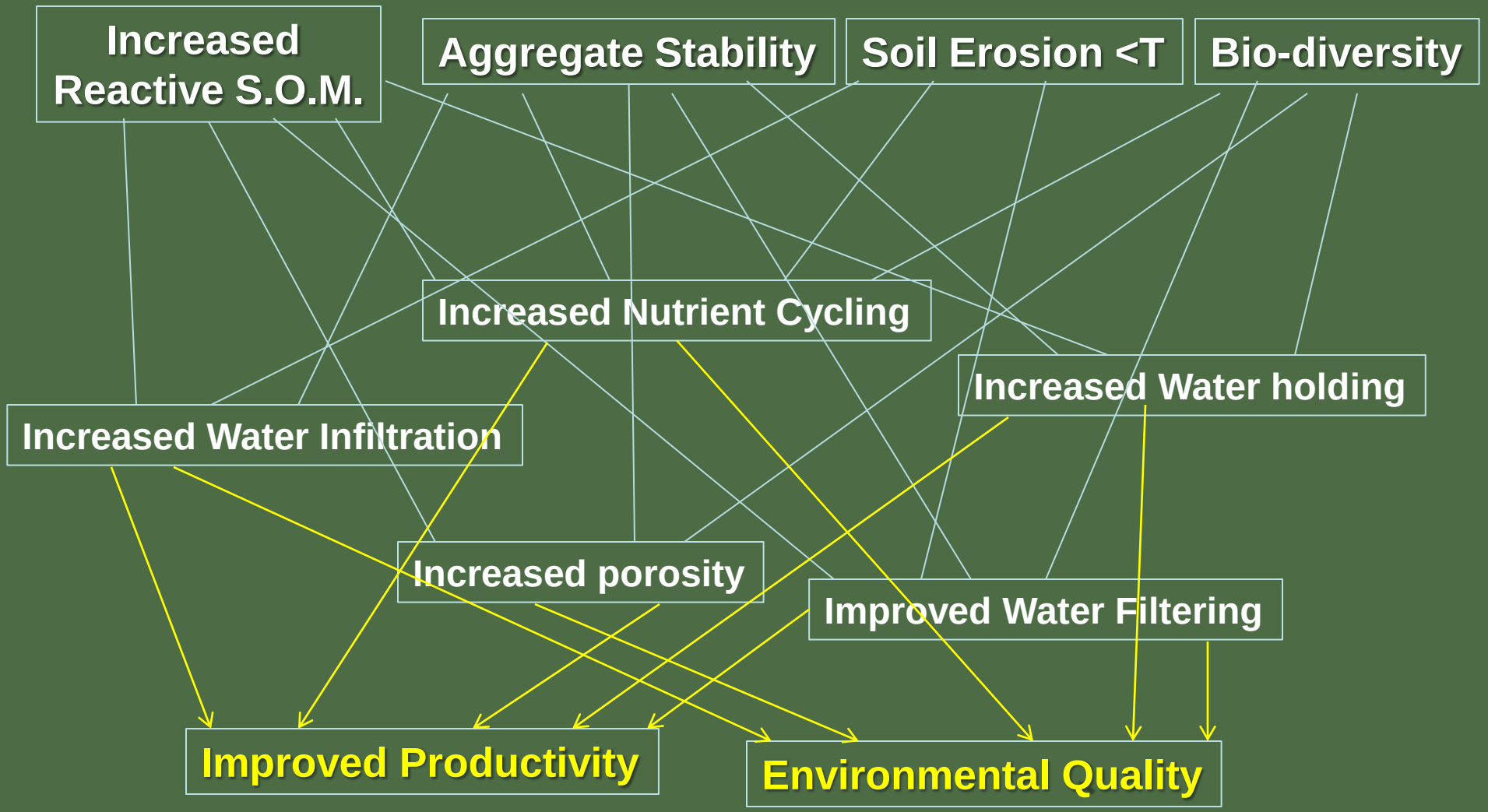
Soil Quality - functional ability of soil to support optimal biological activity and diversity for plant and animal productivity, to regulate water flow and storage, and to provide an environmental buffer

Soil Health: continued capacity of soil as a vital living system whereby plant and animal growth and environmental quality is sustained; a holistic approach in which plant, animal, and human health is promoted

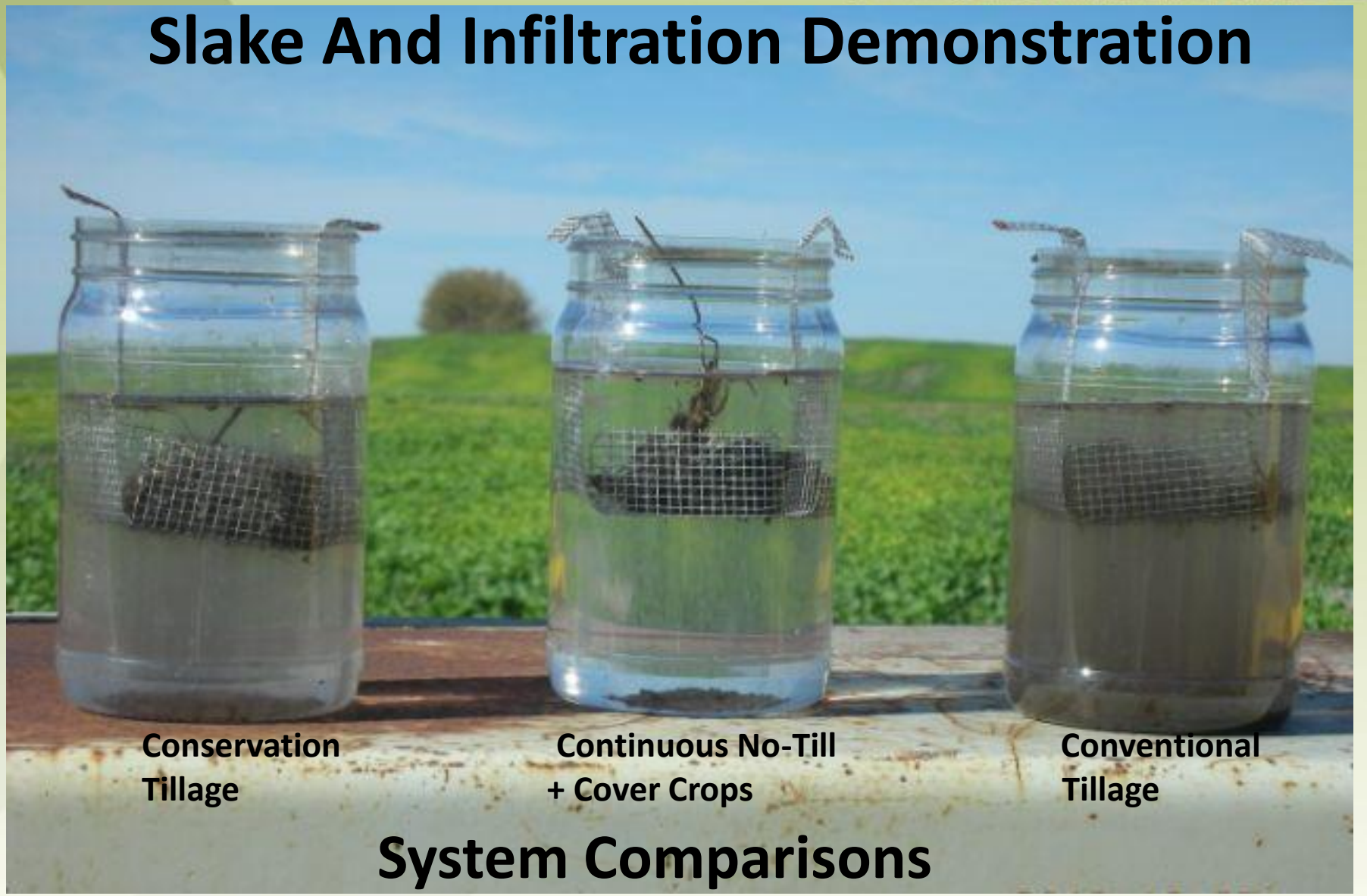
Soil Health: “the continued capacity of soil as a vital living system with balanced and complex biological communities whereby carbon, nutrients and water are cycled efficiently assuring primary production and environmental quality are optimized; a holistic approach in which plant, animal, and human health can flourish”

(Fisher, last night)

Soil Health:


Increased Reactive S.O.M.
Aggregate Stability
Soil Erosion <T
Bio-diversity
Increased Nutrient Cycling
Increased Water holding
Increased Water Infiltration
Increased porosity
Improved Water Filtering
Improved Productivity
Environmental Quality

Slake And Infiltration Demonstration



System Comparisons

Conservation Cropping Systems

Incomplete System = sediment and nutrient loss

October, 2011

Lake Erie = sediment and algae plumes

SOLUTION = Conservation Cropping Systems

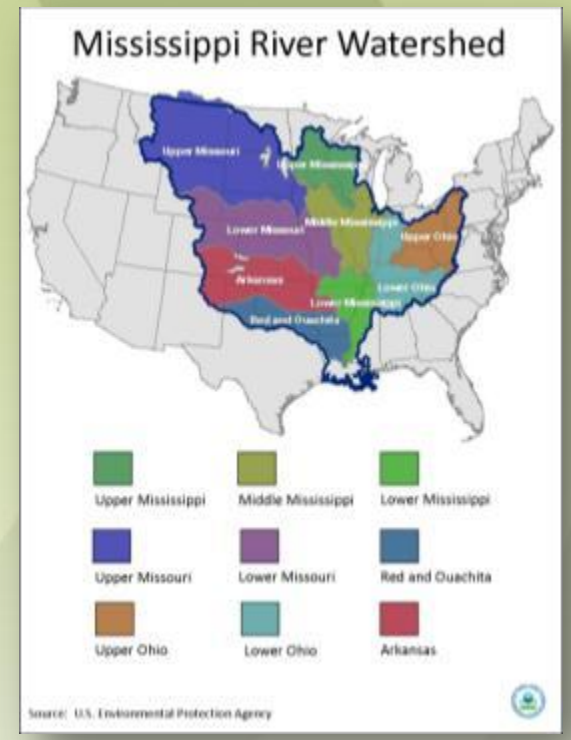
Water Quality

Synergistic Benefits of the System

- **Nutrient management, no-till, crop rotation and cover crops were implemented as a SYSTEM!**
- **Annual Nitrate concentrations in tile water dropped from over 30 mg/l to under 10 mg/l**

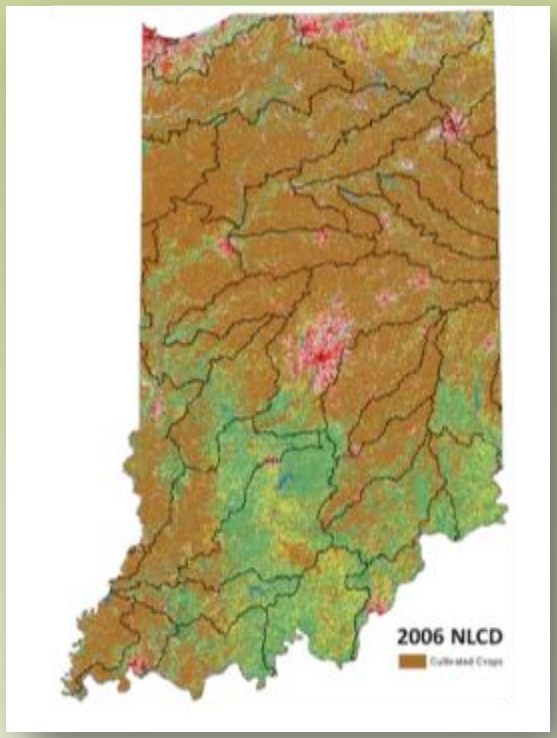
- Dr. Eileen Kladivko
Purdue University

Conservation Cropping Systems



Incomplete System = more runoff & less water-holding capacity

Mississippi River Watershed Flood 2011 = flood damage, sediment and nutrients



SOLUTION = Conservation Cropping Systems on a watershed scale

Water Quantity

Conservation Tillage

No-Till

Continuous No-Till + Cover Crops

A landscape example…

By **increasing the water absorption** of all of the cropland in the Mississippi River Basin by just **one-half inch** (through improved soil quality), that water retention would be the equivalent of…

A landscape example…

- The amount of water that flows over Niagara Falls in 83 days!!!

Conservation Cropping Systems

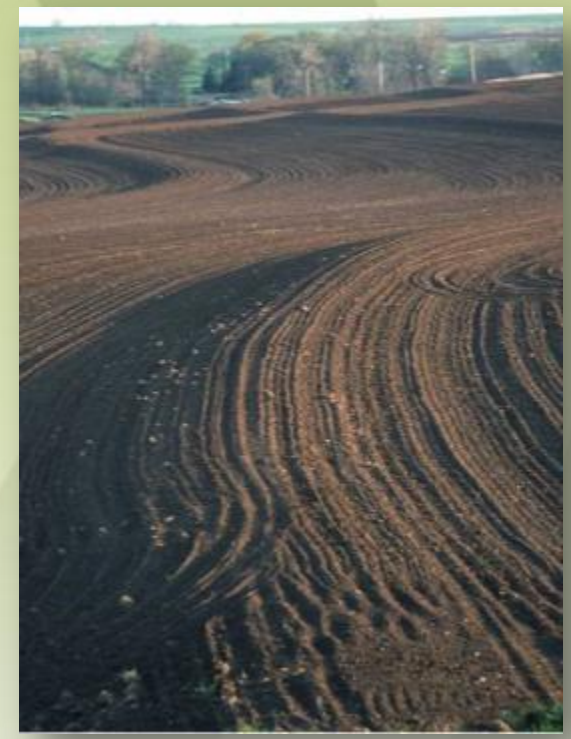
Incomplete System = particulate matter and emissions

Lubbock, Texas 2011 = particulate matter

SOLUTION = Conservation Cropping Systems

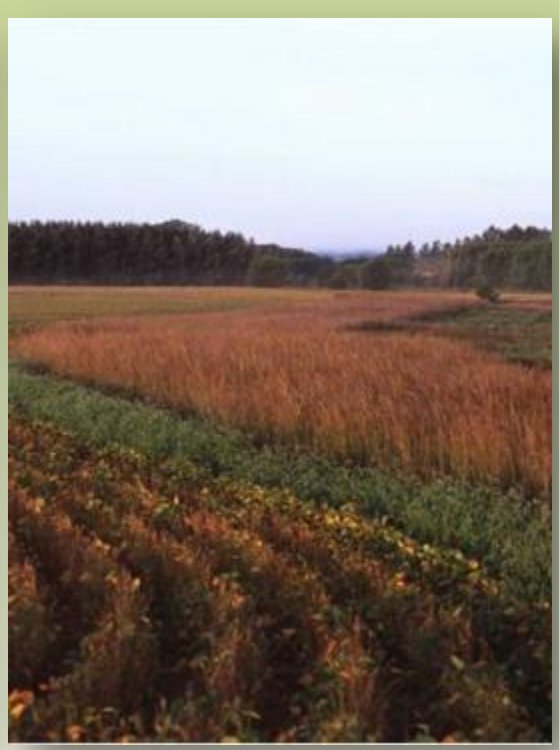
Air Quality

Conservation Cropping Systems



Incomplete System = no cover, minimal biology

Healthy Soil Biota



SOLUTION = Conservation Cropping Systems

Wildlife

Conservation Cropping Systems

Incomplete System =
Higher likelihood for environmental concerns

Gully Erosion Repair =
1 acre treated/$16,000 to install/40+ hours NRCS staff time

SOLUTION = Conservation Cropping Systems
60+ acres treated/$16,000 to adopt/16 hours NRCS staff time

Public Cost Savings

Cover Crops in the System

Year-Round LIVING Cover:

- Improves water quality
- Protects the soil
- traps nutrients
- Reduces compaction
- Increases infiltration
- Promotes soil biology
- Builds and sequesters carbon

Cover Crop No Cover Crop

Nutrient Management/Precision Technology

The Soil is NOT a chemistry set

- Apply right source and right amount, at the right time, in the right place based on soil function, biology and crop need
- Minimizes soil disturbance, compaction and overlap
- Reduces nutrient losses and improves soil biological function

Strategic Buffers in the System

- Strategic locations
  - Low-Yielding Areas
  - Filtering Opportunities

- Reduces inputs, filters sediment and nutrients, provides habitat

So…. What Are Farmers Saying?

FARMERS CAN SEE THAT HEALTHY SOIL MAKES SENSE AND MONEY!

Meet Landowners Who Are Incorporating Conservation Cropping Systems

Dave Brandt, OH

Steve Groff, PA

Gabe Brown, ND

Ray Styer, NC

Ray McCormick, IN

Soil Slake Test
Infiltration Test

Conservation Cropping Systems

Virginia

System Incomplete System

Indiana

System Incomplete System

Missouri

Unmanaged pasture

Managed Pasture System

Stable, Sustainable Food Supply

Risk Reduction

"Insurance" against drought, floods, markets

Cameron Mills, Cass County, IN

Corn, soybeans rotation

+Add annual rye grass after the corn in the fall

=4-6 bushels more soybeans

"The sun's energy is our free resource …In 20 years, gone from 2%-4% O.M."
Dan DeSutter, Attica, IN

- Every 1% O.M. in top 12" =16,500 gpa in increased water holding capacity

- How much is a 1.2" rain in August worth?

Healthy Soil Means…

- Lower energy and fuel needs because of less soil disturbance and less labor needed
- Increased capture of the sun's energy by using winter cover crops to add an extra 4 to 5 months of photosynthesis
- Increased crop production capability because more water is available due to increased organic matter, soil nutrient cycling is improved, and more pathways for crops to obtain needed resources are created

Healthy Soil Means (continued)

- Increased land is available for crop production (not horizontally on sensitive lands, but vertically by accessing much more of the soil profile)
- Greater yield protection
- Only *one extra inch of water in August* (saved through soil health practices) *can mean an extra 20-40 bushels per acre in corn yield.*
- Reduced compaction
- Weed control

NRCS is Making Soil Health A Priority!

- Decision based the positive resource benefits achieved from the promotion of soil health through conservation cropping systems over past several years
- Achieving soil health is accomplished through conservation cropping systems that implement:
  - **A Functioning No-till System**
  - **Cover Crops**
  - **Nutrient Management**
  - **Pest Management**
  - **Crop Rotation**
  - **Buffers**

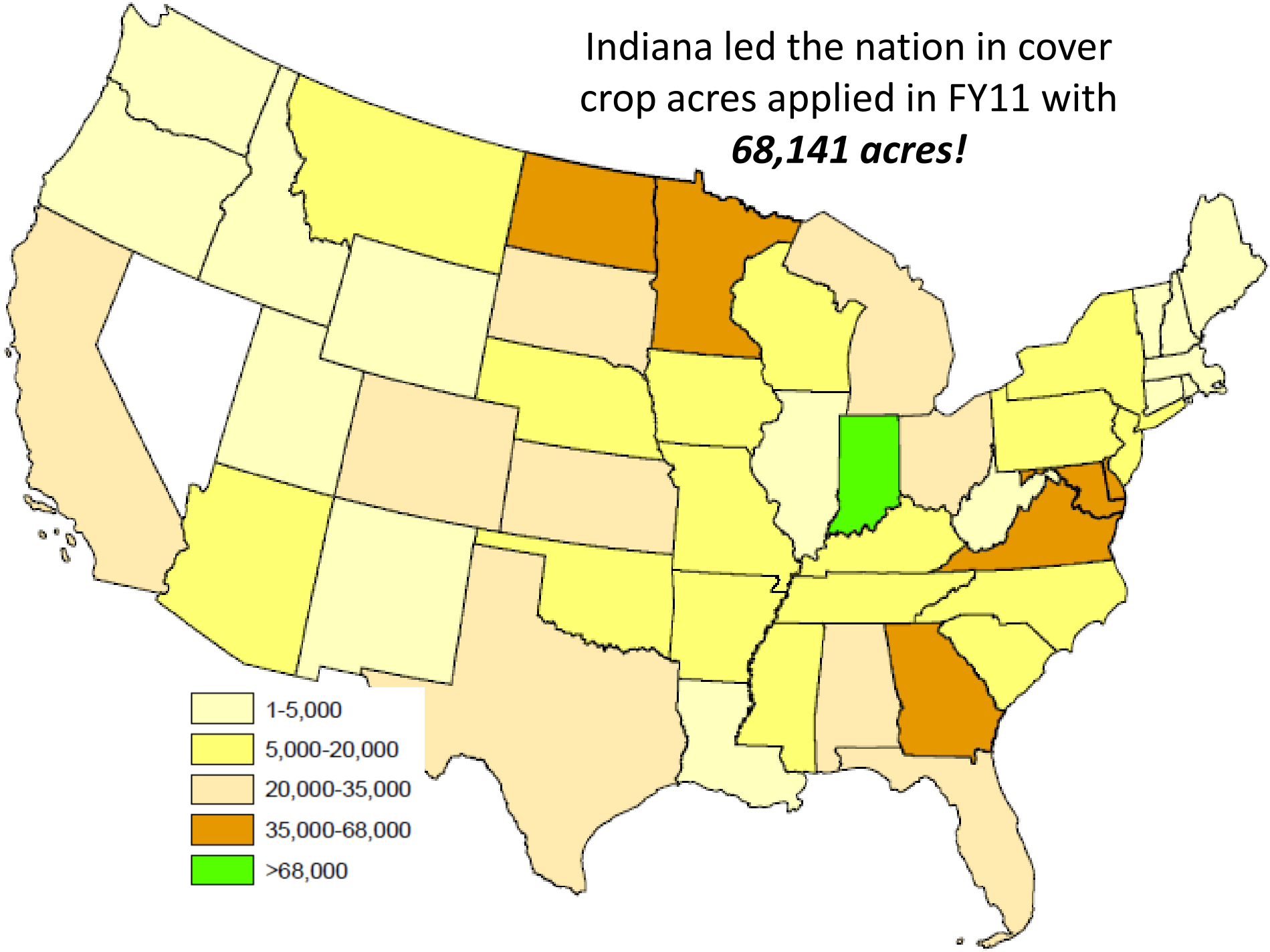
With new agricultural tools, technology, and genetics available today, achieving functioning soil health is a reality

Indiana's Soil Health Strategy

- Establish a State Soil Health Specialist position
- Establish Area Soil Health Teams to identify local training and technical needs
- Prioritize contribution agreements, staffing decisions, development of tools, alternative work situations and mobile planning concepts
- Make soil health a priority in the Indiana communications plan
- Require NRCS Indiana employees meet skill level for soil health concepts
- Support soil health as a training priority for all employees
- Ensure partners and leaders are aware of the positive effect of conservation cropping systems on soil health

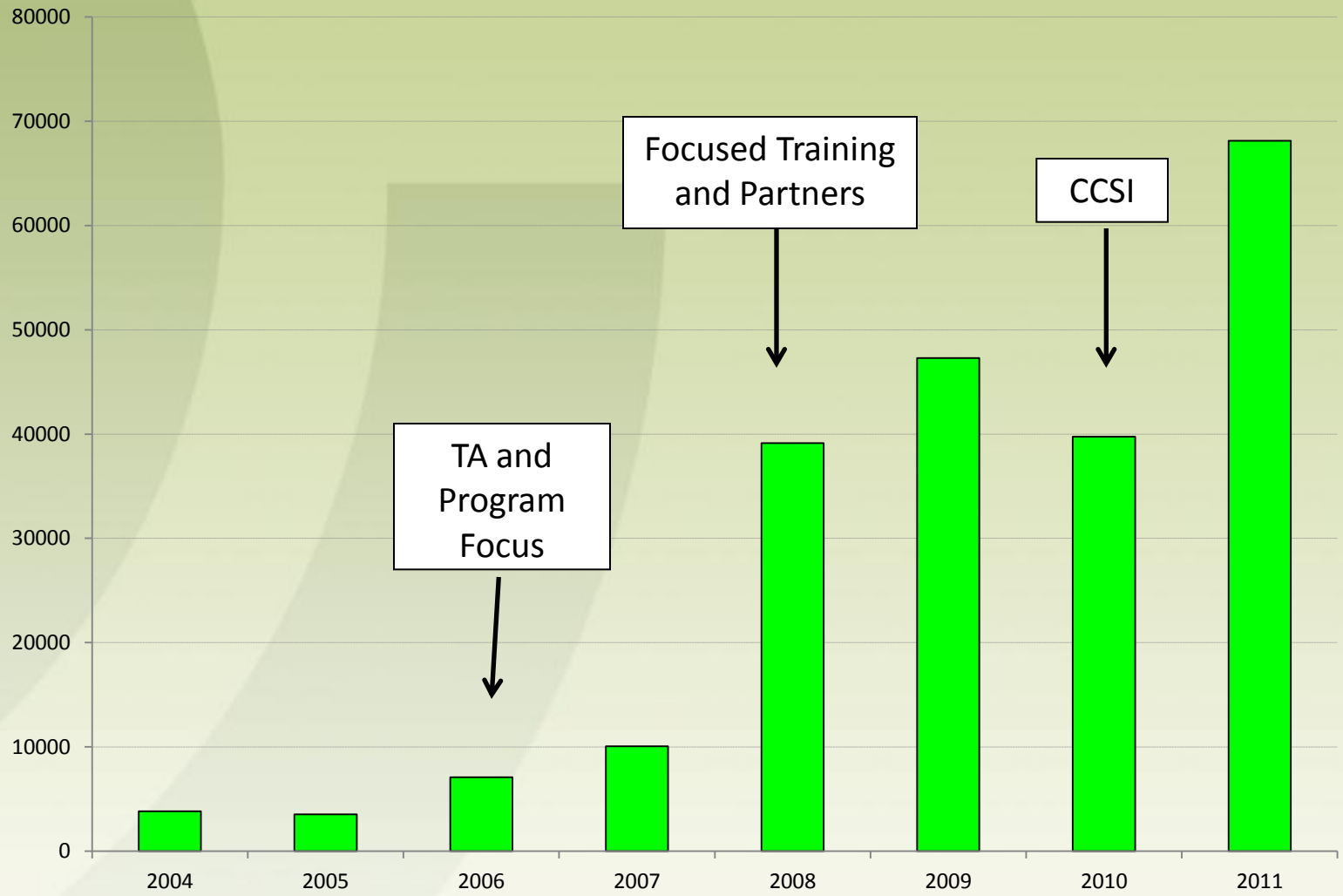
Indiana's **SUCCESS** = Measured by Cover Crops

Indiana led the nation in cover crop acres applied in FY11 with ***68,141 acres!***



From Indiana's Tillage Transect, there were an estimated ***180,000+ acres*** of cover crops planted for crop year 2011!

INDIANA APPLIED COVER CROP ACRES



INDIANA'S ROAD TO SUCCESS:

- **2010 – present** = Conservation Cropping Systems Initiative (CCSI)

  - CCSI = workshops, field days, and technical assistance to producers

    - To Date = over 130 workshops and presentations;
      over 7500 farmers and private providers

    - The Future = expand and engage the ***PRIVATE SECTOR*** and
      MONITOR/MEASURE benefits

Questions?

For More Information:
www.in.nrcs.usda.gov