HEALTH SOIL MEANS...
Healthy Farms and Cleaner Water!

National Hypoxia Taskforce Meeting
May 10, 2012
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Healthy, Productive Soils System Criteria

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
“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.
We can package a system of soil quality practices!

- Quality No-Till
- Advanced Nutrient Management
- Prescribed Cover Crops
- Crop Rotation And Stripcropping
- Controlled Traffic and Precision Technology
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 Infiltration
- Increased Water Holding
- Increased porosity
- Improved Water Filtering
- Improved Productivity
- Environmental Quality
Slake And Infiltration Demonstration

System Comparisons

Conservation Tillage

Continuous No-Till + Cover Crops

Conventional Tillage
Conservation Cropping Systems

Incomplete System = sediment and nutrient loss

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

Mississippi River Watershed

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

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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
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
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

Gabe Brown, ND

Steve Groff, PA

Ray Styer, NC

Ray McCormick, IN

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Soil Slake Test
Infiltration Test
Conservation Cropping Systems

Virginia

Incomplete System

Indiana

Incomplete System

Missouri

Managed Pasture System

Unmanaged pasture

Stable, Sustainable Food Supply

“Insurance” against drought, floods, markets

Risk Reduction

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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
Healthy, Productive Soils System Criteria

Are You Excited Yet?

there’s more!

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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

2004 2005 2006 2007 2008 2009 2010 2011

Focused Training and Partners
CCSI

TA and Program Focus
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
Healthy, Productive Soils System Criteria

Questions?

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