Systems Based Approach to Managing Ag Watersheds

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Who We Are…..

"Born from the Dust Bowl"

- **USDA - Lead agency for ensuring conservation of private lands, sustainable production systems and resilient landscapes**
- **Work with landowners, conservation districts, tribes and other groups**

"Conservation Partnership"

What we do…

Helping People Help the Land

Helping our clients manage their natural resources and achieve their goals while at the same time meeting his or her responsibility to care for the land

- **Technical Assistance**
  - *Conservation Planning*
- **Financial Assistance**
  - *Farm Bill Programs*

Our Foundation - Conservation Planning

- ***Dynamic* Process used to Develop, Implement and Evaluate Conservation Plans**
- **Comprehensive Planning Effort**
  - Sets foundation for implementing conservation on land
  - Meets needs of resources, client, agency and public

Systems Based Approach

- Emphasis on Planning and Implementation of a resource management systems
  - Like pieces of a jigsaw puzzle – each piece fits together with another
  - Challenge – each piece may be controlled by different landowners
  - Local by-in – owners must want to do something
  - Coordination among partners and their resources

Addressing Water Quality in Ag Watersheds

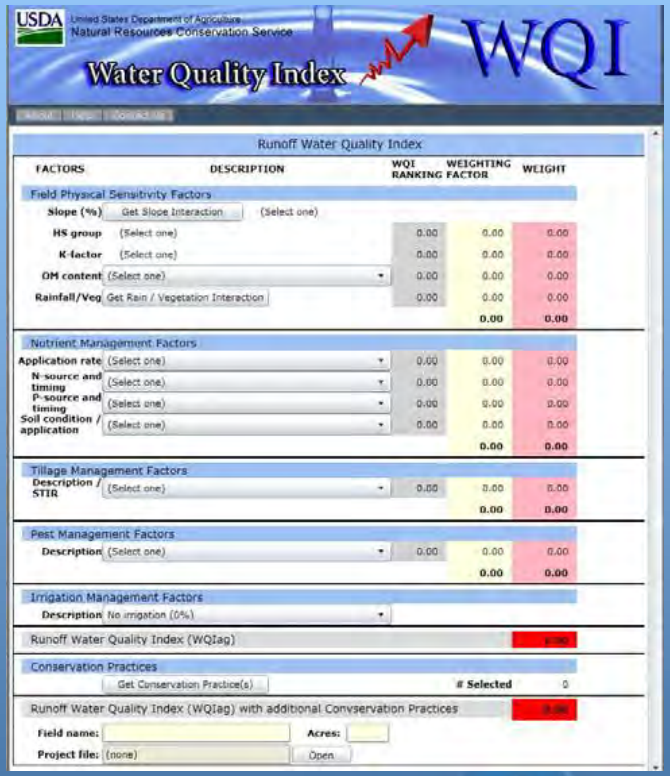
- **Improving water quality in agricultural watersheds should emphasize a strategy for conservation planning and implementation with 3 primary phases**
  - Collection and Analysis –assessment tools and monitoring activities
  - Develop solutions – Systems Approach – right practices, right time, right place
  - Implementation and Evaluation – Requires monitoring through time to evaluate effectiveness of implemented practices and allow for adaptive management

Collection and Analysis

- **Waterbody Impairments**
  - Nutrients
  - Sediments
  - Bacteria
- **Inventory and Assess Resources**
  - Nutrient management practices
  - Erosion
  - Livestock management

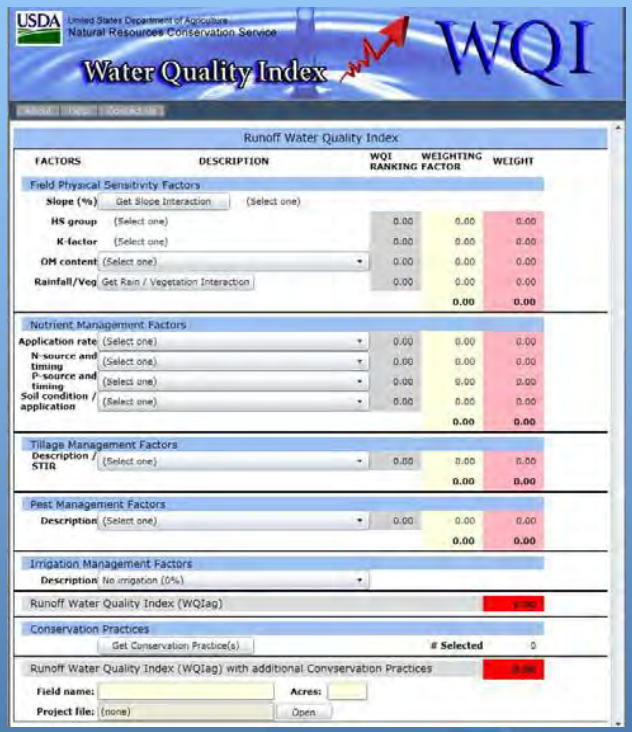
Water Quality Assessment

- **Field Level**
  - Water Quality Index for Ag Fields (WQIag)
- **Watershed level**
  - 12 Digit HUC Level - APEX (Agricultural policy/Environmental eXtender)

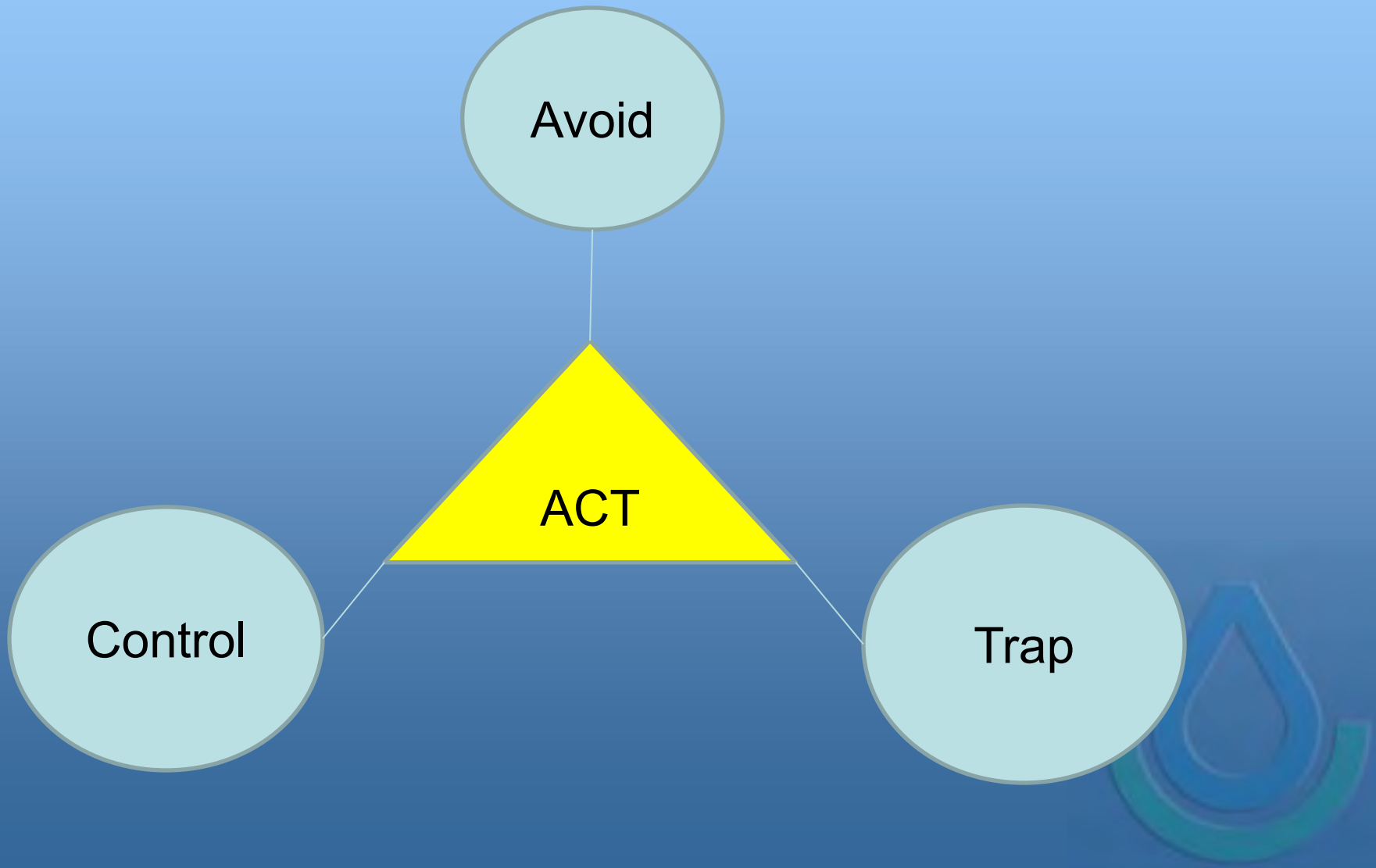


Water Quality Index

- Characterizes the quality of surface runoff water – Before/After
  - Field Sensitivity – Slope, soils, OM, rainfall and vegetation
  - Nutrient Management – source, timing, soil condition
  - Tillage Management – STIR rating from RUSLE2
  - Pest Management – level (i.e. IPM) and risk
  - Irrigation Management - Type



Develop Solutions - Systems Based Approach

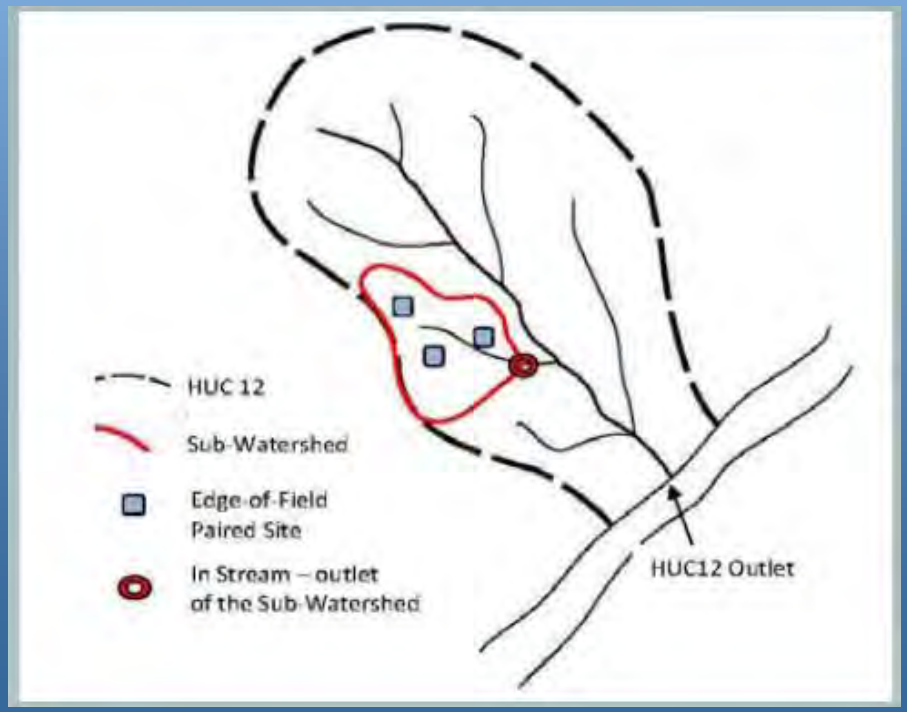


Develop Solutions - Systems Based Approach

- **Avoiding**
  - Practices that avoid contributing impairments
- **Controlling**
  - Practices that control what, how, when, where
- **Trapping**
  - Practices that trap and control potential contaminants

Assessment and Monitoring

- Monitoring
  - Edge of Field
  - Instream
  - Watershed Outlet



Edge of Field Monitoring

- **Where to use EOF monitoring**
  - Surface runoff - ag pollutants significant to receiving waters
  - In-stream monitoring in place
  - Conservation practices planned and applied
- **Site specific field data**
  - Practice/system performance
  - Validate models (APEX)
  - Support adaptive management by producer

The Future – Improving Soil Health

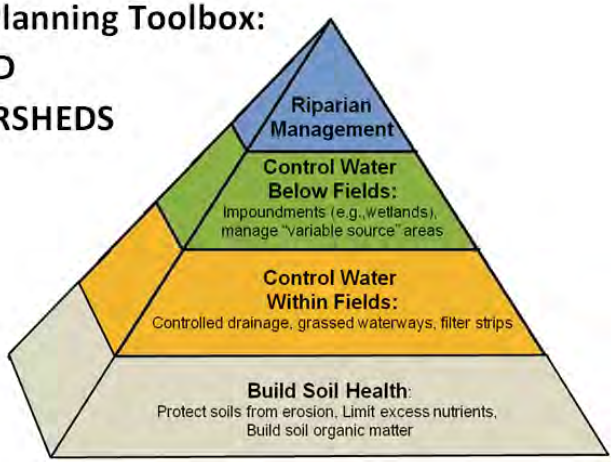
Focus not only on what we do on top of the ground (ACT).....

Start managing below the soil surface

The Future – Challenges and Opportunities

- Increased commitment to a systems approach to conservation, with soil health as the foundation.

Concept for Conservation Planning Toolbox:
A CONSERVATION PYRAMID
FOR AGRICULTURAL WATERSHEDS



FIRST, FOCUS ON SOIL HEALTH TO SUSTAIN/IMPROVE PRODUCTION, LIMIT FLOOD AND DROUGHT IMPACTS, BUILD SOIL CARBON, AND REDUCE NUTRIENT LOSSES

A. PROTECT SOIL (e.g., no-tillage, strip tillage),
B. BUILD SOIL (e.g., cover crops, living mulches), and
C. LIMIT EXCESS NUTRIENTS (e.g., NMPs, MMPs, 4R PRACTICES)

The Future – Challenges and Opportunities

- **Economics of agriculture:**
  - Increased competition for natural resources;
  - Economics increasingly dominant in decision-making;
  - Ecosystem Services / Markets
- **Environment and public health:**
  - Intensifying dissatisfaction with slow progress in improving water quality;
  - Keen interest in food safety and quality

The Future – Challenges and Opportunities

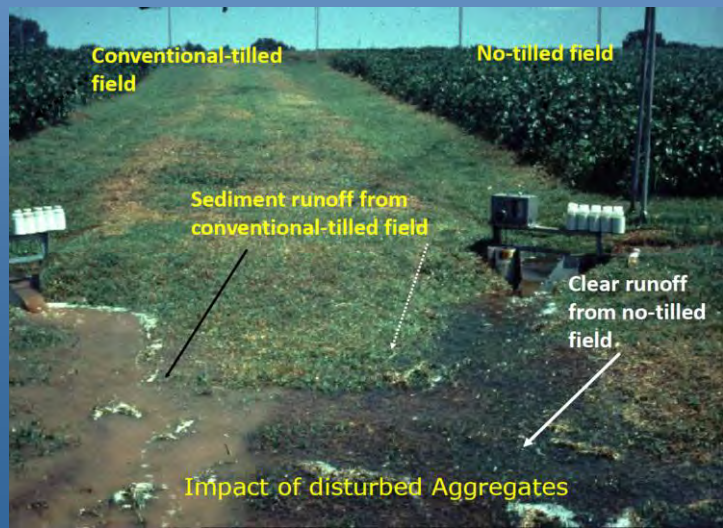
- **Changing climate:**
  - Increasing temperature and more severe droughts, floods, and storms
  - More pressure on farms to reduce GHG emissions and increase energy efficiency
- **Demographic trends:**
  - Population growth leading to increased demand for food, fiber, and water
- **Regulatory Assurances**

What is Soil Health

- **Soil health is *how well the soil functions*.**
  - Infiltrate and hold water
  - Cycle nutrients to water and feed sustain growing plants
  - Filtering of potential pollutants
- Good soil health results in optimized inputs, sustainable outputs and increased resiliency.

Healthy Soils = Multiple Benefits

- Captures, holds, and releases water
- Filters and cleanses both water and air
- Breaks down and degrades pollutants
- Processes and cycles nutrients
- Sequesters and cycles carbon and other GHGs
- Provides the foundation for the water cycle and for plants, wildlife, and humans



Soil Health Management Systems

- **The Key conservation practices are:**
  - Conservation Cropping Rotation
  - No-till or Strip-till
  - Cover Crops
  - Nutrient Management
  - Integrated Pest Management
  - Conservation Buffers/Filter Strip
  - Grazing Management
  - Vegetation Establishment

Summary

- Improvements to water quality will only truly be realized when systems are applied and maintained, not only at the field level but more importantly at the landscape or watershed level.