Soil Health, Nutrient Management and the New 590 Standard

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Helping People Help the Land
There are several different resource concerns in Ohio

Most can be put under the category of...

- Water Quality Concerns
- Soil Quality Concerns
When we talk about water quality concerns...

- Nutrients and pesticides in surface water
- Nutrients and pesticides in ground water
- Suspended sediment in surface water
So why are we seeing an increase in SRP?

The evidence points to...

• poor soil health and
• poor nutrient management practices
One indicator of poor soil health

Compaction

= Poor infiltration
= High runoff
= Higher “flashiness”
Blount soil showing severe compaction
(very low infiltration = very high runoff)

Blount soil under continuous NoTill showing good soil structure
(and good infiltration)
Let’s look at some common practices that have a negative impact on soil health and water quality

No soil structure, no infiltration
Conventional Tillage

Moldboard plowing or multiple tillage passes that bury all residue from the previous crop.
Conventional Tillage

- Destroys soils structure
- Reduces infiltration
- Oxidizes soil organic matter
- Can cause compaction
Rotational Tillage?

Not actually a conservation practice
It is a term generally used for a producer who
–NoTill one year (soybeans into corn stalks)
–Conventional tillage or mulch tillage the next year

• Destroys the soil structure gained with the NoTillage
• Oxidizes organic matter
• Reduces infiltration over continuous NoTillage
Long Term No-Till vs. Rotational Tillage

Both Fields are a Corn/Soybean Rotation
These pictures are of a newly emerging corn crop

NoTill soybeans then StripTill Corn    NoTill Soybeans then Tilled corn

Same rain event on May 15
¾” less than 1/8 mile apart
Poor Nutrient Management

Poor management of the...
- Amount
- Placement
- Form
- or Timing

of manure and commercial fertilizer
Poor Nutrient Management

Over the years we have seen an increase of...

- Fertilizer broadcast on the soil surface
- Custom application
- Fall and winter application
- Not incorporated

Combined with compaction, the fertilizer dissolves and runs off with the first rainfall event
Proper Nutrient Management

- Reduces nutrients in surface and ground water
- Improves the efficiency of crop uptake
- Improves profits
Proper Nutrient Management

Four R’s of Nutrient Management

Right Source

Right Time

Right Place

Right Rate
Proper Nutrient Management

Phosphorus must contact the soil to be tied up

- Injected
- Banded
- Incorporated (if Broadcast)
- StripTill – with Controlled Traffic Farming
- Top dress on growing crop / cover crop (not dormant)

Surface application without incorporation causes nutrient loss due to runoff.
Phosphorus must contact the soil to be tied up

- Injected
- Banded
- Incorporated (if Broadcast)
- StripTill – with Controlled Traffic Farming
- Top dress on growing crop / cover crop (not dormant)

This is especially true if fertilizer is broadcast or frozen or snow covered ground.
Ohio 590 Nutrient Management Revision Team

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Ohio 590 Nutrient Management Revision Team

This was a major undertaking...

Combining 590 and 633 into one state standard
• Two of our largest practice standards into one
Ohio 590 Nutrient Management Revision Team

It was also reviewed by the State Technical Guide Committee for comment.

This is an internal review committee for quality control of technical documents.
1. Definition
2. Purposes
3. Criteria
   - General Criteria
   - Additional Criteria for a specific purpose
4. Considerations
5. Plans and Specifications
6. Operation and Maintenance
DEFINITION
Managing the...
• Amount (rate)
• Source
• Placement (method of application)
• Timing of plant nutrients

(4-Rs)
PURPOSES

• To budget, supply, and conserve nutrients for plant production.
• To minimize agricultural nonpoint source pollution of surface and groundwater resources.
• To properly utilize manure or organic by-products as a plant nutrient source.
• To maintain or improve the physical, chemical, and biological condition of soil.
CRITERIA
General Criteria Applicable to All Purposes

• A nutrient budget (plan) for nitrogen, phosphorus, and potassium must be developed that considers all potential sources of nutrients.
This is a big change...

ALL nutrients (including manure) are now under the 590 standard...

Manure used to be under 633 Waste Utilization
Change in definition of a “current soil test”...

Criteria:

• Current soil tests are those no older than 3 years.

Considerations:

• Soil test no older than 1 year when developing new plans.

Old standard
3 yrs for manure
5 yrs for fertilizer
CRITERIA
Criteria Applicable to All Purposes

The NRCS-approved nutrient risk assessment for nitrogen must be completed on all sites unless... nitrogen leaching is not a risk to water quality, including drinking water.
CRITERIA
Criteria Applicable to All Purposes

The Phosphorus Risk Index must be used when:

• Phosphorus application rate exceeds land-grant university recommendations.

• The planned area is within a phosphorus-impaired watershed.
Because of this emphasis on the P-Risk Index...

It is more important than ever to re-evaluate our current Ohio P-Risk Index to be sure it is predictive.
Another big change...

Nutrients must not be surface-applied on:

• Frozen and or snow-covered soils
• When the top 2 inches of soil are saturated from rainfall or snow melt.

This includes both manure and fertilizer.
The new 590 standard requires a system of practices that work together to avoid, control and trap excessive nutrients.
We have been requiring this with the 590 Conservation System through EQIP.

Conservation Management Systems

Soil and Water Quality System
Nutrient Management (590)

This Conservation Management System (CMS) combines practices that work together to reduce energy consumption, maintain water quality, and improve soil quality. They are to be planned and contracted together as listed below. The Soil and Water Quality System, Nutrient Management (590) payment is NOT to be used in combination with any other conservation management system, nor is it to be used in combination with any other federal program such as CSP or CRP for the same practice on the same land. If manure is going to be applied to the contracted acres use the Waste Utilization (533) management system rather than this system.

This system assumes adequate drainage. Practices may not be feasible without adequate subsurface drainage. If soils are not adequately drained, a systematic tile system should be considered prior to contracting this conservation management system.

Base Level Activities:
To qualify for any of these payments, the participant must have:
1) All gully erosion controlled
2) All tile breaks repaired within a year of the contract being signed

Payment Considerations:
(The above Definitions and Payment Considerations’ section for more specific payment considerations.)

1) All supporting practices must be initiated prior to issuing the (590) Nutrient Management payment
2) Fertilizer application records must be submitted to the District Conservationist (DC) for review
3) Soil test records must be presented to the DC for review
4) If the Residue and Tillage Management - Controlled Traffic option is selected, a geo-referenced traffic map will be submitted to the DC for review prior to this payment being issued
5) For Nutrient Management Level II, the Pardue Manure Management Planner (MMF) will be used (in Ohio) to develop Precision Nutrient Management Plans utilizing the Ohio templates. A copy of the Variable Rate Technology (VRT) Precision Nutrient Management Plan developed by a Certified Crop Advisor (CCA), or a Certified Professional Agricultural (CPA), including yield maps, grid or zone maps along with geo-referenced biennial soil tests will be submitted to the DC prior to issuing the 590 Nutrient Management payment
6) The participant must sign the self-certification form verifying that supporting practices have been initiated and that the 590 Nutrient Management plan standard and the Tri-State Fertility Guide were followed on all contracted acres
7) Some payment rates have been rounded and may differ slightly in actual conservation program contracts
When nutrients in surface water are a problem...

Nutrient efficiency / technologies strategies that are to be considered

1. Slow and controlled release fertilizers
2. Nitrification inhibitors and urease inhibitors
3. Enhanced efficiency fertilizers
4. Incorporation or injection
5. Timing and number of application
6. Soil nitrate and organic N testing
7. Coordination of nutrient applications with crop nutrient uptake
8. CSNT, PSNT, PSNT
9. Tissue testing chlorophyll meters, and spectral analysis technologies
10. Other land grant university recommended technologies that improve nutrient use efficiency and minimize surface or groundwater concerns.
1. “A process used to plan, implement, evaluate, and adjust nutrient application strategies over time (multiple seasons).

2. Must follow prescribed NRCS protocols
Use variable-rate nitrogen...
Use variable-rate phosphorus...
Develop site-specific yield maps...
Use the data to further diagnose low- and high-yield areas, or zones, and make the necessary management changes.

Again already a requirement in the 590 Conservation System through EQIP.
Proper Nutrient Management

- Reduces nutrients in surface and ground water
- Improves the efficiency of crop uptake
- Improves profits
Everyone benefits from a sustainable system that improves soil and water quality...

as well as the bottom line.

Contact your local SWCD,
Your local NRCS District Conservationist
Or me for more information.
Agriculture...

It’s what feeds the world.