

A written plan that meets  
“T” over the rotation

For the thousands of farmers not  
working with a conservation  
professional

# A written plan to keep soil erosion over rotation at or below “T”

## What is T?

- “T” is the designated its tolerable soil loss rate (T/A/Y) assigned to a particular soil series
- “T” equals either 1, 2, 3, 4, or 5 depending on soil properties.

# How is soil erosion determined?

Soil loss is the sum of

- Sheet and rill erosion
- Gully erosion
- Wind erosion
  - Wind erosion rates in PA rarely reach levels of concern

# To meet “T” in PA

- Eliminate both permanent and seasonal gullies
- Reduce or maintain sheet and rill erosion to T or below

# Conservation professionals can

Estimate sheet and rill soil loss using soil loss prediction technology

- USLE
- RUSLE
- RUSLE2

Then compare estimated soil loss to soil T.

If the soil loss estimate is  $\leq T$ , then T is met over the rotation.

# What NRCS will do...

- NRCS will always use RUSLE2 to estimate erosion
- NRCS will inform producers whether their plan meets “T”
- NRCS conservation plans will clearly document whether or not plan meets “T”

# Workload capacity problem

- Thousands need written 102.4 plans that meet “T”
- USLE, RUSLE, & RUSLE2 planning requires a trained professional
- Many farmers don’t have a plan to meet 102.4
- Insufficient professional capacity to develop (USLE, RUSLE, & RUSLE2) plans to meet demand

# Objectives

At DEP's request, NRCS is assisting to -

- Create guidance for the unassisted producer to develop and adopt a written plan to meet "T" that
  - Is easy-to-understand and use
  - Does not require a computer or calculator
  - Can be used state-wide

# Conservation Tillage Matrix - Review

CONSERVATION SYSTEMS TO MEET THE PA E&S GUIDELINES  
TO BE USED AS AN ITERIM GUIDELINE WHEN A PLAN MEETING SOIL LOSS (T) CANNOT BE OBTAINED.

**GUIDING PRINCIPLES FOR SOIL EROSION CONTROL.**

THE FOLLOWING ASSIST IN REDUCTION OF SOIL EROSION:

- No-Till
- More years of hay in the rotation
- Corn Residue left
- Contour Strips with alternating close grown crops such as small grain and hay
- Fields may be split to apply a different system if two different mapping units with different slopes occur

**For A slopes (0% to 3%) as an average across the field as shown on the County Soil Survey**

**Corn Silage (Typical for dairy)**

Corn silage and hay rotation, may include small grain.  
Cover crop established before or immediately after corn silage harvest.  
Cover crop must be 50% canopy or 4" before winter.  
All grain crops planted using reduced tillage with 30% residue remaining on the surface at planting.

**Corn Grain (Typical for livestock operations other than dairy)**

Corn grain and hay rotation (may include small grain).  
All grain crops planted and hay establishment using reduced tillage with 30% residue remaining on the surface at planting.

**Cash grain operations (Typical for operations without livestock)**

Corn grain, soybeans, small grain rotation.  
All crops planted using reduced tillage with 30% residue remaining on the surface at planting.

**For B slopes (3%-8%) as an average across the field as shown on the County Soil Survey**

**Corn Silage (Typical for dairy)**

Corn silage and hay rotation, may include small grain.  
Cover crop established immediately after corn silage harvest.  
Cover crop must be 50% canopy or 4" high before winter.  
All grain crops planted using reduced tillage with 30% residue remaining on the surface at planting.

**Corn Grain (Typical for livestock operations other than dairy)**

Corn and hay rotation (may include small grain).  
All crops planted and hay establishment using reduced tillage with 30% residue remaining on the surface at planting.

**Cash grain operations (Typical for operations without livestock)**

Corn grain, soybeans, and small grain rotation.  
All crops planted no-till.  
All crops planted leaving 30% residue after planting with rows on the contour.

**For C slopes (8%-15%) as an average across the field as shown on the County Soil Survey**

**Corn Silage (Typical for dairy)**

Corn silage, small grain, and hay rotation.  
Years of small grain and hay in the rotation must equal or exceed years of corn with residue removed.  
Cover crop established before or immediately after corn silage harvest.  
Cover crop must be 50% or 4" high before winter.  
All crops planted in contour strips with alternating hay or close grown crop such as wheat.  
All crops planted using no-till.

**Corn for Grain (Typical for livestock operations other than dairy)**

Corn, small grain, and hay rotation.  
All crops planted in contour strips with alternating hay or close grown crop such as wheat.  
All crops planted and hay establishment using no-till.

**Cash grain operations (Typical for operations without livestock)**

Corn, soybeans and small grain rotation.  
Cover crop may be established after soybean harvest.  
All crops planted in contour strips with alternating close grown crop such as wheat.  
All crops planted using no-till.

*Well designed and constructed diversions and terraces to reduce the slope length, may sometimes be supplemented for agronomic practices. Where concentrated flows of water during storms cause soil erosion, plover skips with good sod must be used in small areas and constructed grass waterways in larger flow areas.  
For assistance, call your local county conservation district office.*

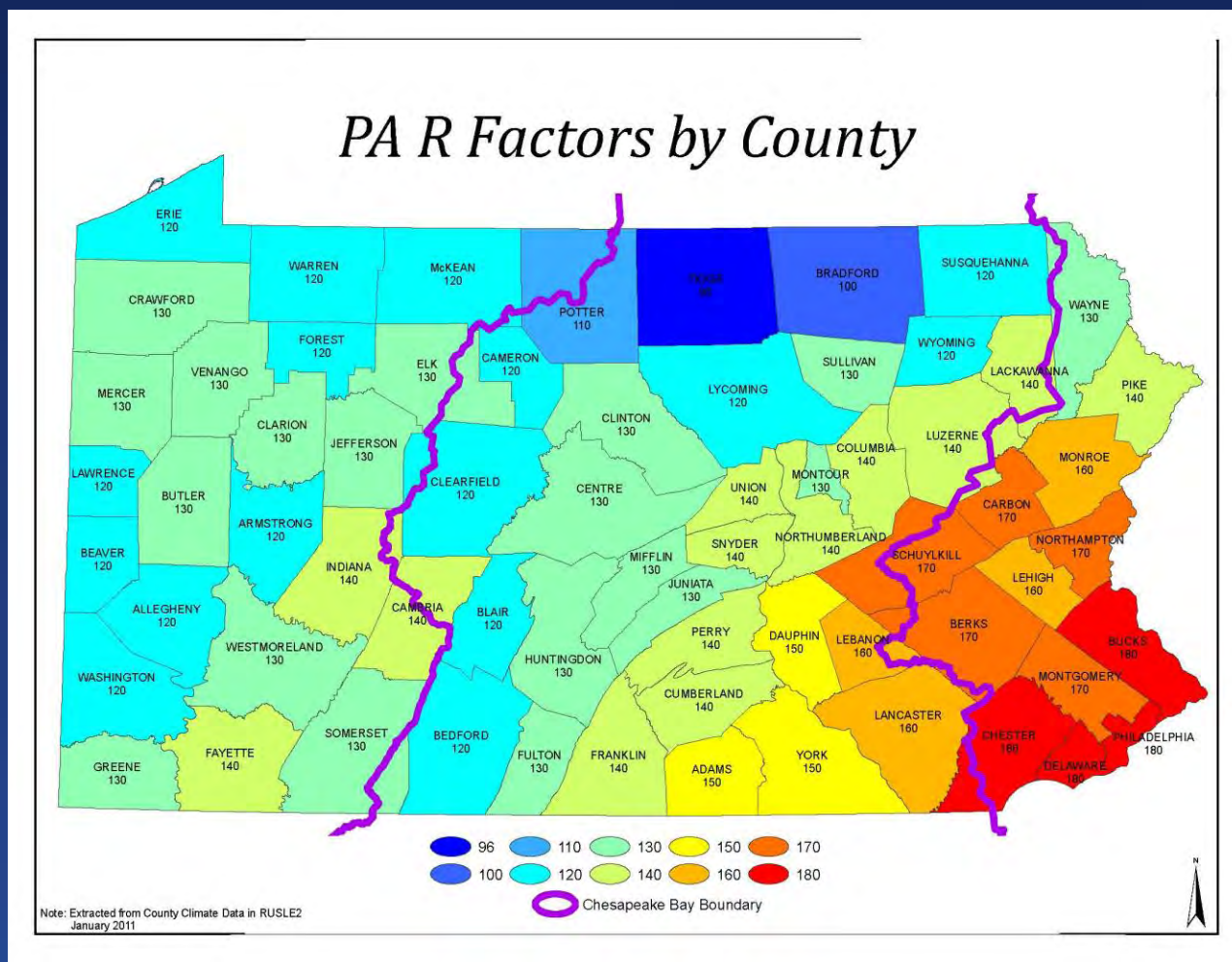
# Conservation Tillage Matrix Review

Among PA counties

- Rainfall variation
- Yield variation

We also defined slope criteria

# 10 County Rainfall Climates



County	R2 R Climate	corn grain	corn silage	Alf Yield DM	Soybe an	Wheat
Chester	180	162	22	3.5	45	73
Berks	170	126	20	3.5	46	58
Lancaster	160	166	22	4.0	47	73
York	150	140	22	3.5	43	63
Franklin	140	121	17	3.0	39	62
Mifflin	130	134	18	3.0	45	62
Armstrong	120	114	15	2.5	38	47
Potter	110	126	17	3.0	0	61
Bradford	100	129	15	2.0	43	0
Tioga	96	114	16	2.0	45	60
Average		133	19	3.0	43	62
2005 - 2009 NASS data average for counties with available data						

# Slope criteria

- A = 200 feet, 3%
- B = 130 feet, 8%
- C = 70 feet, 15%

# Templates are county average

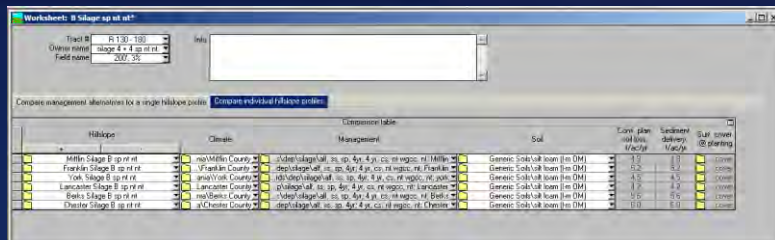
Locations:

- Soil generic silt loam soil with 3.5% OM
- LS – A, B, C grades
- C - cover management
- P – all templates include contouring

Factor	Variable
R	<ul style="list-style-type: none"> <li>• Chester</li> <li>• Berks</li> <li>• Lancaster,</li> <li>• York</li> <li>• Franklin</li> <li>• Mifflin</li> </ul>
K	SL (3.5% OM)
LS	A (200', 3%) B (130' 8%) C (70', 15%)
C	Till & no-till Forage & grain County Yield averages
P	Contouring

# Version 2 Matrix features

- Farm on the contour
- small grain cover crop planted after corn silage harvest
- Most hay is pure alfalfa (no grass)
- All grain crop residues remain in field
- Meet “T” = 3



4 + 4 sp nt nt	A	B	B strip
	200', 3%	130', 8%	4
Mifflin	2	4	4
Franklin	2	5	4
York	2	4	3
Lancaster	1	4	5
Berks	2	5	5
Chester	2	6	5

Scenarios tested in RUSLE2 – Plowed alfalfa (4 years) followed by 4 years of corn silage with cover crop

# A Slope – Forage go to hand-out

- **Alfalfa/corn silage/corn grain – 8 year rotation**
  - Alfalfa seeding (spring moldboard plow) 4 years
  - corn grain (spring chisel) 2 years
  - corn silage (spring chisel) with rye cover crop (broadcast) 2 years
- **Alfalfa/corn silage mixed tillage – 8 year rotation**
  - Alfalfa seeding (spring moldboard plow) 4 years,
  - corn silage (no-till) with rye cover crop (no-till) 4 years

**PLUS template for a B or C slope**

## B Slopes - Forage

- **Alfalfa/corn silage w/cc – 8 year rotation**
  - Alfalfa seeding (no-till) 4 years
  - corn silage (no-till) with rye CC (broadcast) 2 years
- **Alfalfa-grass/corn grain rye cc/corn silage rye cc – 6 years - CBS**
  - Alfalfa/grass w/small grain CC (fall moldboard plow, fall planted) 4 years
  - short season corn grain (spring chisel) with rye cover crop (disk till) 1 year
  - corn silage (spring chisel) with winter rye cover crop (disk till) 1 year
  - permanent contour buffer strip (fifteen foot cool season grass)

# C Slope - Forage

- **Orchardgrass/corn silage/wheat grain**
  - Orchardgrass seeding (Fall disking, fall planting) 3 years
  - corn silage (no-till) -winter wheat grain (no-till) 2 years

# A Slope - Grain

## **Corn grain/soybean grain – 2 year**

- Corn grain (spring or fall chisel)
  - soybean grain - (spring or fall chisel)
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- **Any B or C slope template**

## B Slope - Grain

- **Corn grain/soybean grain 2 year**
  - All no-till
- **Corn grain (2)/wheat/double crop soybean 3 year**
  - Corn grain (spring chisel)
  - short season corn grain (spring chisel) followed by
  - winter wheat (fall chisel)
  - double crop soybean (summer chisel)
- **Any C slope template**

# C Slope - Grain

- **Corn grain (2)/wheat/soybeans - 3 year**
  - Corn grain (no-till)
  - short season corn grain (spring chisel plow)
  - winter wheat grain (fall chisel plow)
  - double crop soybeans (no-till)
- **Corn grain/wheat/soybeans – 2 year**
  - Short season corn grain (no-till) –
  - winter wheat grain (fall chisel) –
  - double crop soybeans (no-till)
- **Corn grain (no-till) - soybean (no-till) – 2 year**



# Suggestions...

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