USDA NRCS
U.S. Department of Agriculture
Natural Resources Conservation Service

Updated T and K Factors Q & A – Wisconsin

What is the K Factor?

- The K Factor is an index which quantifies the relative susceptibility of the soil to sheet and rill erosion.
- K Factor is used in the RUSLE2 soil loss prediction equation. Values range from .02 for the least erodible soils to .64 for the most erodible.
- Soil properties affecting K Factor include texture, organic matter content, structure, infiltration, and permeability.
- K Factors are based on extensive field research conducted by the USDA, Agricultural Research Service.

What is the T Factor?

- The T Factor is the maximum amount of annual sheet and rill erosion that permits the fertility and productive capacity of the soil to be maintained indefinitely.
- T Factor values range from 1 ton per acre per year for the most fragile soils, to 5 tons per acre per year for soils that can sustain more erosion without losing significant productive potential.
- Soil properties affecting T Factor include texture, permeability, available water capacity, and depth to restrictive layers such as rock, clay or gravel.
- T Factors are based on over 80 years of research establishing rates of soil formation and the effects of erosion on soil productivity.

Why are updates to the Factors needed?

- Updates are needed to reflect the latest research findings.
- As new soil property data is collected and soils are mapped in greater detail, more accurate estimates of T and K Factors can be made.
- Improved guidelines for estimating T and K Factors have been developed based on current research. Updated Factors, using these guidelines, will be more accurate and consistent nationwide.

How will the changes affect compliance?

- Wisconsin Agriculture Performance Standards recognize T Factor as the measure of performance for sheet and rill erosion. The T Factors in effect when the current law was passed will remain as the basis for determining compliance, until a rule update occurs to adopt the revised T Factors.
- USDA Conservation Compliance guidance recognizes 2T as the measure of compliance. The T and K Factors in effect when an NRCS approved Conservation Plan was developed will continue to be used until the Plan is significantly revised.
- When an existing NRCS approved Conservation Plan is significantly revised, or when a new Plan is developed, the updated T and K Factors will be used.
- Compliance with a Self Certified Conservation System will be determined by using the T and K Factors in effect at the time of the review.
- The T and K Factors in SNAP+ will be updated as new versions are released.

What actions are being taken to facilitate the transition to updated Factors?

- At the request of Wisconsin NRCS, national leadership has granted a delay in releasing updated Factors until NRCS and partners have time to fully consider impacts on compliance and program contracts. Release of the updated Factors in Wisconsin is not expected before the fall of 2011.
- In 2011, soil scientists will complete field investigations of soil properties affecting T and K Factors to ensure the updated Factors are as scientifically sound as possible.
- A project to update crop yield estimates will be completed before the updated Factors are released. Yield estimates will generally go up, increasing estimates of residue and crop canopy density, and decreasing soil loss estimates. This effect will help offset the sometimes limiting effect of T and K Factor changes on conservation system options.

For more information:

Contact your local USDA, NRCS Service Center or visit the Wisconsin NRCS website:

www.wi.nrcs.usda.gov

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What is changing?

- T and K Factors have been updated county-by-county for many years. For example, these factors were updated in over 14 Wisconsin counties within the last 10 years. The current plan will update all T and K Factors nationwide, to reflect the latest research and science and to provide nationwide consistency.
- Some T and K Factors are changing now because the technical criteria used to calculate the Factors have been updated. The new Factors have a solid research and scientific grounding and will facilitate more effective conservation planning and resource protection.
- NRCS is working with state and local partners to assess the policy and planning impacts of T and K Factor changes. Release of the updated Factors in Wisconsin is not expected before the fall of 2011.

What is the impact?

- A decrease in T Factor or an increase in K Factor may result in more limited conservation system options.
- T and K Factor changes have the most impact on sloping cropland. In Wisconsin, the changes may result in more limited conservation system options on about 4.9 million acres of sloping cropland. This represents about 46% of the total cropland in Wisconsin and about 14% of the total acreage in Wisconsin.
- Large changes in T and K Factors have more impact than smaller changes. More than half the changes are relatively small. Significant impacts for conservation planning are expected on an estimated 20% of the cropland in Wisconsin, just over 2 million acres.
- The most change will occur in the western Wisconsin counties, but significant impacts are expected on individual farms throughout Wisconsin. In some areas the changes will permit more conservation system options, rather than fewer.

How are the factors calculated?

- T and K Factors are based on research by the NRCS, University partners, the Agricultural Research Service and others, which establishes how soil properties affect erosion. Factors are updated in response to improved soil property data and new research.
- T and K Factors will continue to be updated as new knowledge and research becomes available.

Why do the Factors sometimes change on the county line?

- Soil properties, even within the same soil series, usually vary somewhat from place to place. To summarize this variability in a practical way, past soil survey work in Wisconsin identified representative values for the soil properties of each soil series in each county.
- T and K Factors are calculated from the representative values for key soil properties, like percent sand or depth to rock. Different representative values for soil properties in adjacent counties sometimes results in different T or K Factors.
- Our knowledge is based on county level research and data, so it is not known precisely where on the landscape a change in representative soil property values occurs. When the data supports different T or K Factors in adjacent counties, the maps show a change on the county line.

What are soil scientists doing now to improve the data?

- In Wisconsin, more than 15 NRCS soil scientists, and many Cooperative Soil Survey partners are working now to conduct new research and improve the soil mapping and property data to better meet user needs.
- Current soil survey work characterizes soil properties across broad natural landforms. Soil scientists identify patterns and natural breaks in soil property values, without concern for political boundaries. This process eliminates “no-joins” across county boundaries. Because work to improve the mapping and data requires significant time and resources, soil scientists are working with data users to ensure they efficiently address the highest priority needs first.
- Soil investigations concentrate on more fully and accurately characterizing soil properties to meet current needs. New technologies such as Ground Penetrating Radar, infrared photography, 3-D mapping software, and digital terrain models are used to validate and improve the soil mapping. New interpretations are developed to meet current needs.

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