

The potential for nitrate nitrogen to leach through an agricultural soil depends on several factors, including soil properties that affect rate of water movement through the soil and rate of surface runoff, rainfall, and the amount and type of nitrogen fertilizer being applied to the field. Soil infiltration rate, the ease with which water moves into and through the soil, is by far the best indicator of leaching potential. This permeability is determined by factors such as soil texture, soil structure, bulk density and depth to restrictive layers such as bedrock and fragipans (hard pans). Different soil map unit components have been categorized into different soil hydrologic groups, where soils with different runoff and infiltration potential are grouped into one of the following four groups:

- **Group A.** Well drained soils with a high infiltration rate and thus a high potential for leaching nitrate.
- **Group B.** Moderately well-drained soils with a moderate infiltration rate and thus a moderate potential for leaching nitrate.
- **Group C.** Somewhat poorly drained soils with a slow infiltration rate and thus a low potential for leaching nitrate.
- **Group D.** Poorly drained soils with a very slow infiltration rate and thus a very low potential for leaching nitrate.

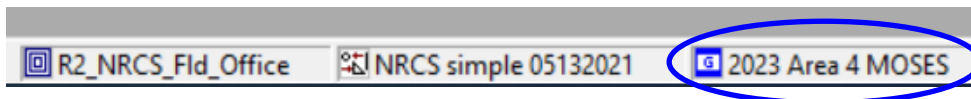
Another important aspect to know is whether the field is in an area that has karst topography. Karst topography is formed in limestone, gypsum or other soluble rocks by dissolution. It is characterized by closed depressions, sinkholes, caves or underground drainage. Missouri is well known for its areas of karst topography such as the Salem Plateau, Springfield Plateau and the Lincoln Hills. If the field is in an area that potentially has karst topography, then the potential risk of nitrate leaching maybe higher.

Assessing Leaching Potential and Leaching Index Rating

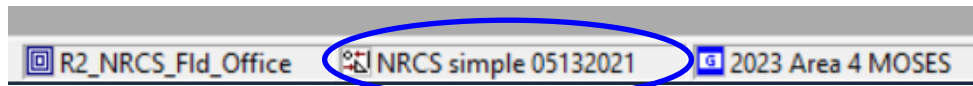
In order to assess the potential for nitrate nitrogen to leach from a field, follow the three-step process outlined below:

Step 1: Identify the dominant soil map unit in the field and enter into RUSLE2.

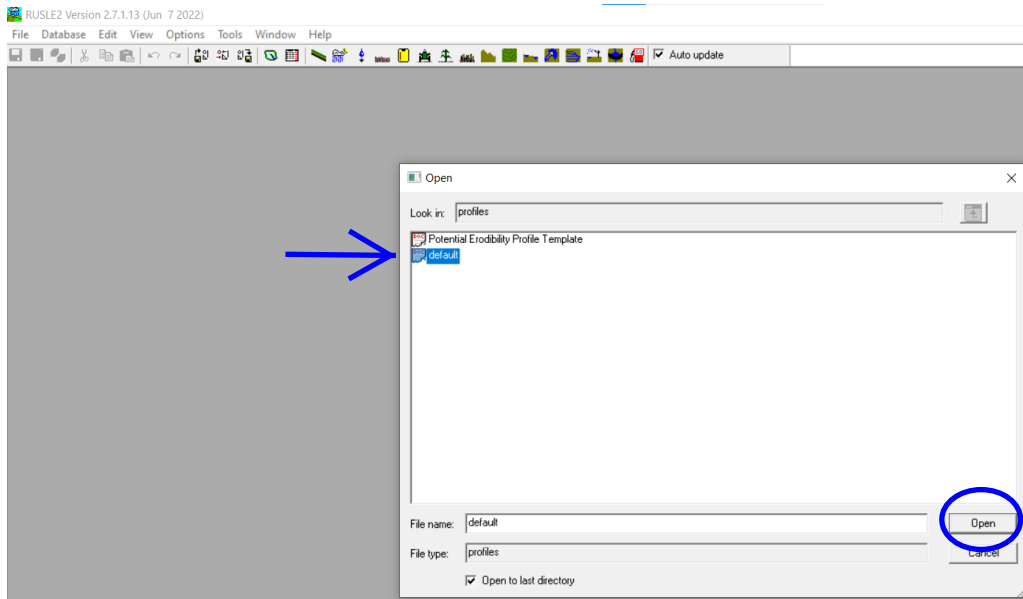
The RUSLE 2 program calculates the Nitrogen Leaching Index (N-LI) rating by using the county climate and selected soil type information. To determine the N-LI using RUSLE2, first utilize the Area database containing your county of interest.



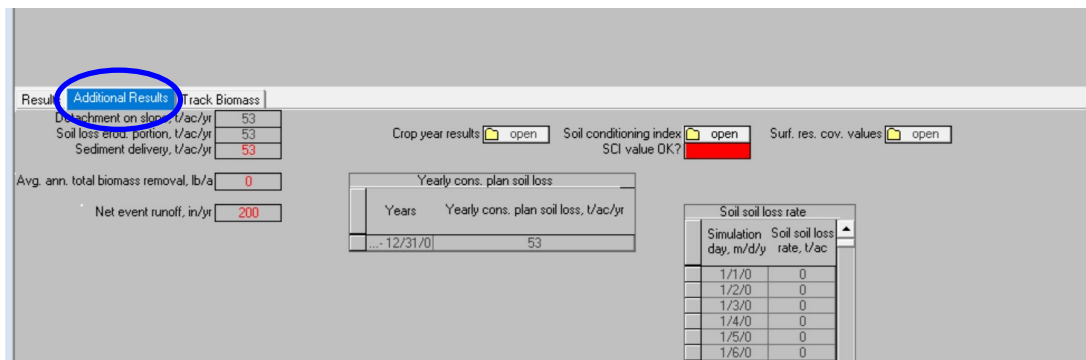
Next, the NRCS Simple 05132021 template will need to be updated to show the Nitrogen Leaching Index rating.



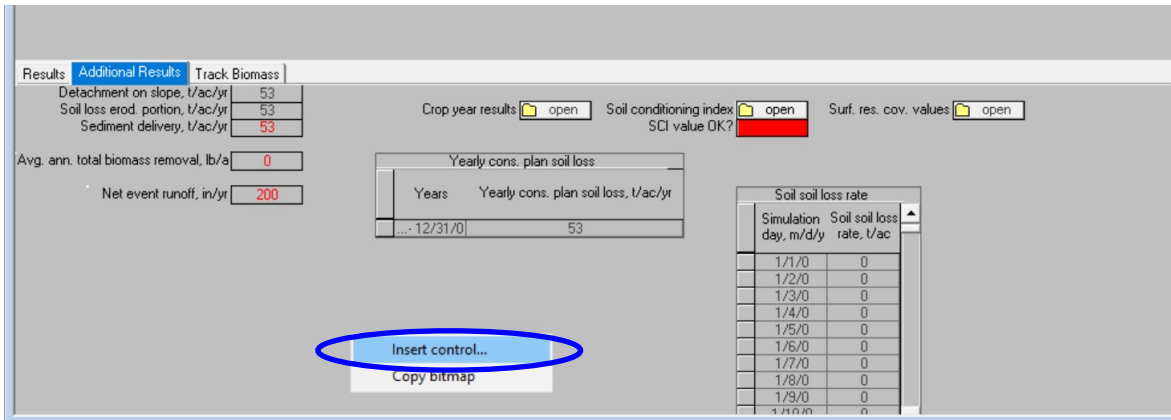
To permanently display the Nitrogen Leaching Index in the NRCS Simple 05132021 view, open a default profile screen.



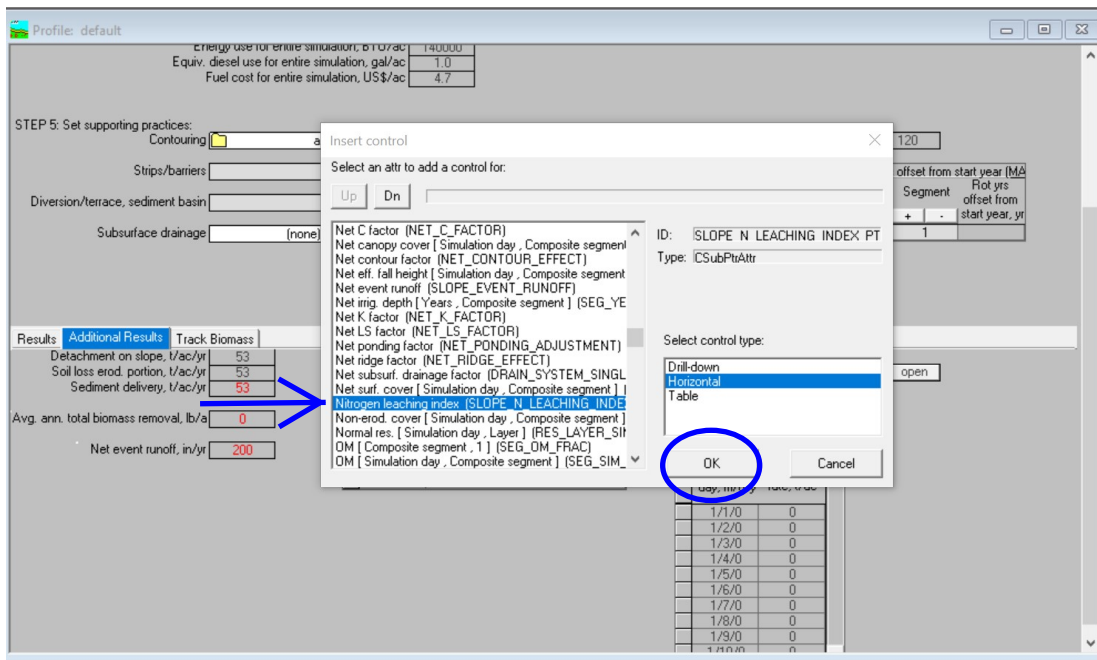
Next, select "Additional Results" at the bottom of the Profile screen.



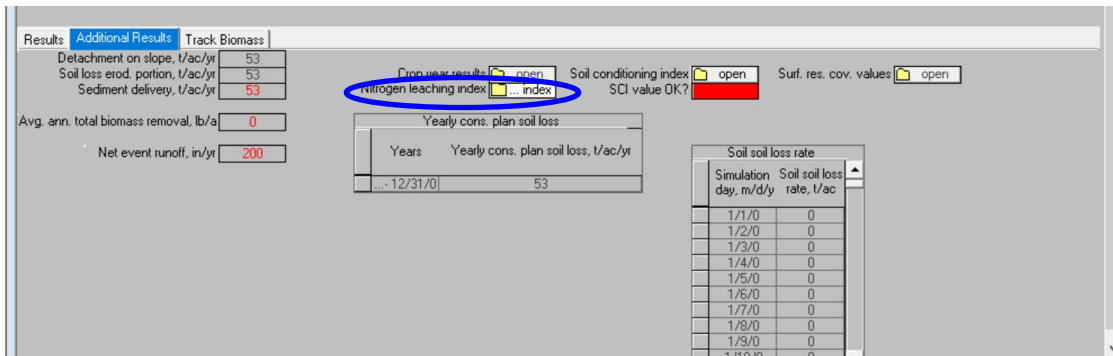
Move your cursor near the "Crop year results" and right click in the gray area of the screen. A command menu will appear on the screen. Select Insert control.



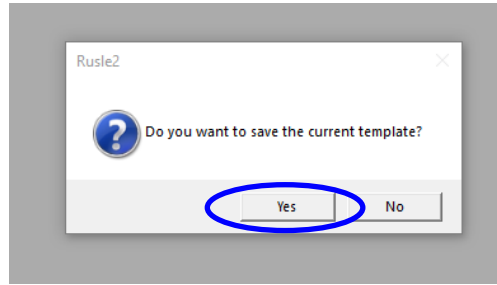
This will bring up the Insert control menu. Scroll down the list to Nitrogen Leaching Index and select with cursor (will be highlighted in blue once selected), keep the Select control type as "Horizontal", and hit OK.



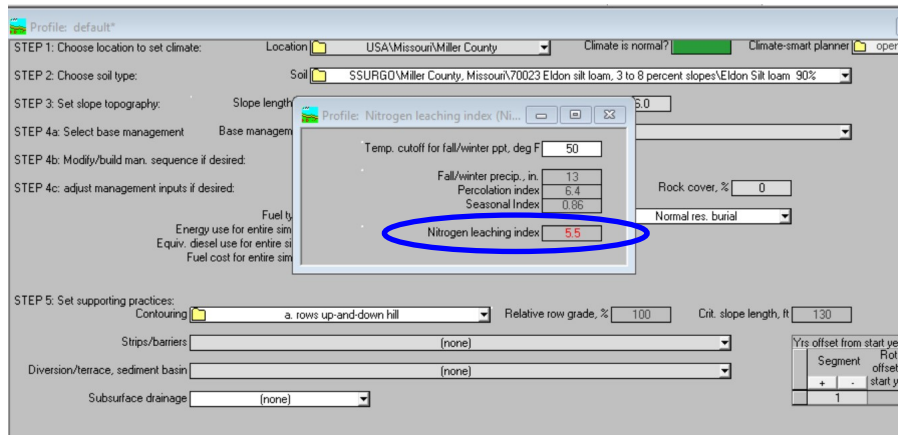
The "Nitrogen leaching index" should now be included on the Additional Results window.



Next, the Profile needs to be saved so that you will not need to do these steps again. In order to save the change, close out of the Profile and then close RUSLE2. A RUSLE2 window will appear asking "Do you want to save the current template?", select Yes.



To view the Nitrogen Leaching Index rating, re-open RUSLE2 and select Profile. Enter the location (county) and dominate soil type for the site. Once entered, select "Additional Results" and then select the yellow folder to the right of "Nitrogen leaching index". A window will appear providing the rating information.



Step 2: Interpreting your Nitrogen Leaching Index Rating.

The leaching index rating score will determine whether the field has a high, medium or low risk of nitrate leaching. Use the table below to determine if the field is at a low, medium or high risk of nitrate leaching.

Index Rating	Risk of Leaching
< 5	Low
5 to 10	Medium
> 10	High

If the risk score is greater than 10; or the field has karst topography; or is furrow irrigated, the field has a high risk of leaching nitrate. Implement best management practices that are appropriate for the specific field operations to minimize soil nitrate leaching losses.

Step 3: Select Best Management Practices to reduce nitrate leaching for medium and high risk fields.

For fields with a **medium** risk of nitrate leaching (risk score 5 to 10), implement a Nutrient Management Plan (Code 590) **AND** one or more management techniques **OR** conservation practices listed below to reduce the amount of nitrogen that could be leached as nitrate.

For fields with a **high** risk of nitrate leaching (risk score >10), implement a Nutrient Management Plan (Code 590), **AND** one or more management techniques, **AND** one or more of Conservation Practice Standards (CPS) listed below.

Management Techniques:

- Apply nitrogen fertilizer close to plant uptake, ideally within a few days of planting, or if possible, after germination and crop emergence.
- Utilize a pre-plant soil nitrate testing (PPNT) to adjust corn nitrogen recommendation. Guidance for PPNT is provided in MU Extension Guide Sheet G9177 *Preplant Nitrogen Test for Adjusting Corn Nitrogen Recommendations*. Soil samples taken to the 2-ft depth are used as a credit to a nitrogen fertilizer recommendation when soil test nitrate is greater than 50 pounds nitrogen/acre.
- Utilize split application of nitrogen when growing such crops as corn, grain sorghum, wheat, cotton, and rice. For split nitrogen applications, apply no more than 50% of the annual nitrogen recommendation pre-plant or at-planting with the remainder applied any time after the crop is established. **For wheat only**, apply no more than 40 pounds of the annual nitrogen pre-plant or at-planting with the remainder of nitrogen applied before jointing. See Practice Specification (PS) titled "590 PS Nutrient Management" for defined crop establishment periods by crop.
- When applying urea fertilizer, consider using a urease inhibitor. Apply at planting or no earlier than 30 days prior to the anticipated planting date.
- Consider applying controlled- or slow-release nitrogen fertilizer to reduce nitrogen losses. Apply at planting or no earlier than 45 days prior to anticipated planting date.
- When fall applying anhydrous ammonia, use a nitrification inhibitor when the 6-inch depth soil temperature falls below the desired temperature of 40°F. NOTE: Do not apply anhydrous ammonia with a nitrification inhibitor before 6-inch depth temperature reaches the minimum temperature of 50°F.

Conservation Practices:

- Alley Cropping (Code 311)
- Conservation Cover (Code 327) - when converting annual crop to perennial cover
- Conservation Crop Rotation (Code 328)
- Cover Crop (Code 340) - select species that will scavenge residual nitrogen
- Drainage Water Management (Code 554)
- Irrigation Water Management (Code 449)
- Pasture and Hay Planting (Code 512)
- Prescribed Grazing (Code 528)

MO Nitrogen Leaching Index

GD001- MO NLI - 6

Landowner:	Tract/Field Number:	
County:		
Predominate Soil Map Unit:		
Nitrogen Leaching Index Score:		
Low (< 5)	Medium (5 to 10)	High (> 10)
<p>For a Medium Nitrogen Leaching Index Score: implementation a Nutrient Management Plan (Code 590) AND at least one of the following management techniques OR conservation practices listed below (check all that apply).</p> <p>For a High Nitrogen Leaching Index Score: implementation a Nutrient Management Plan (Code 590), AND at least one of the management techniques listed, AND at least one of the Conservation Practice Standards (CPS) listed below (check all that apply).</p> <p><u>Management Techniques:</u></p> <ul style="list-style-type: none"> Apply nitrogen fertilizer close to plant uptake, ideally within a few days of planting, or if possible, after germination and crop emergence. Use a pre-plant soil nitrate testing (PPNT) to adjust corn nitrogen recommendation. Split apply nitrogen when growing such crops as corn, grain sorghum, and wheat. Use a controlled- or slow-release nitrogen fertilizer at planting or no earlier than 45 days prior to anticipated planting date. Use an urease inhibitor when applying urea or urea ammonium nitrate (UAN). Apply at planting or no earlier than 30 days prior to the anticipated planting date. Use a nitrification inhibitor when fall applying anhydrous ammonia (when 6 inch soil depth temperature reaches the minimum temperature of 50°F). <p><u>Conservation Practices:</u></p> <ul style="list-style-type: none"> Alley Cropping (Code 311) Conservation Cover (Code 327) Conservation Crop Rotation (Code 328) Cover Crop (Code 340) to scavenge residual nitrogen Drainage Water Management (Code 554) Irrigation Water Management (Code 449) Pasture and Hay Planting (Code 512) Prescribed Grazing (Code 528) Other conservation practice standard(s) that meet the quality criteria for reducing nitrogen leaching (list): 		