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## USDA Natural Resources Conservation Service Science and Technology

### 2015 Conservation Webinars



**Today's Webinar Presenter**  
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Date	2015 Conservation Webinars Topics
July 21	Overview of Tillage Implements for use in RUSLE2 Calculations: Focus on New Implements and Manure and Pesticide Incorporation
July 28	Silviculture for Non-foresters: Managing a Forest for Multiple Objectives
July 29	Technologies for Addressing Phosphorus Associated with Livestock Operations
Aug 4	Opportunities for Conservation in Organic Livestock Systems
Aug 11	Using the National Air Quality Site Assessment Tool for Air Quality Conservation Planning at Dairies
Aug 12	Using the National Air Quality Site Assessment Tool for Air Quality Conservation Planning at Swine Operations

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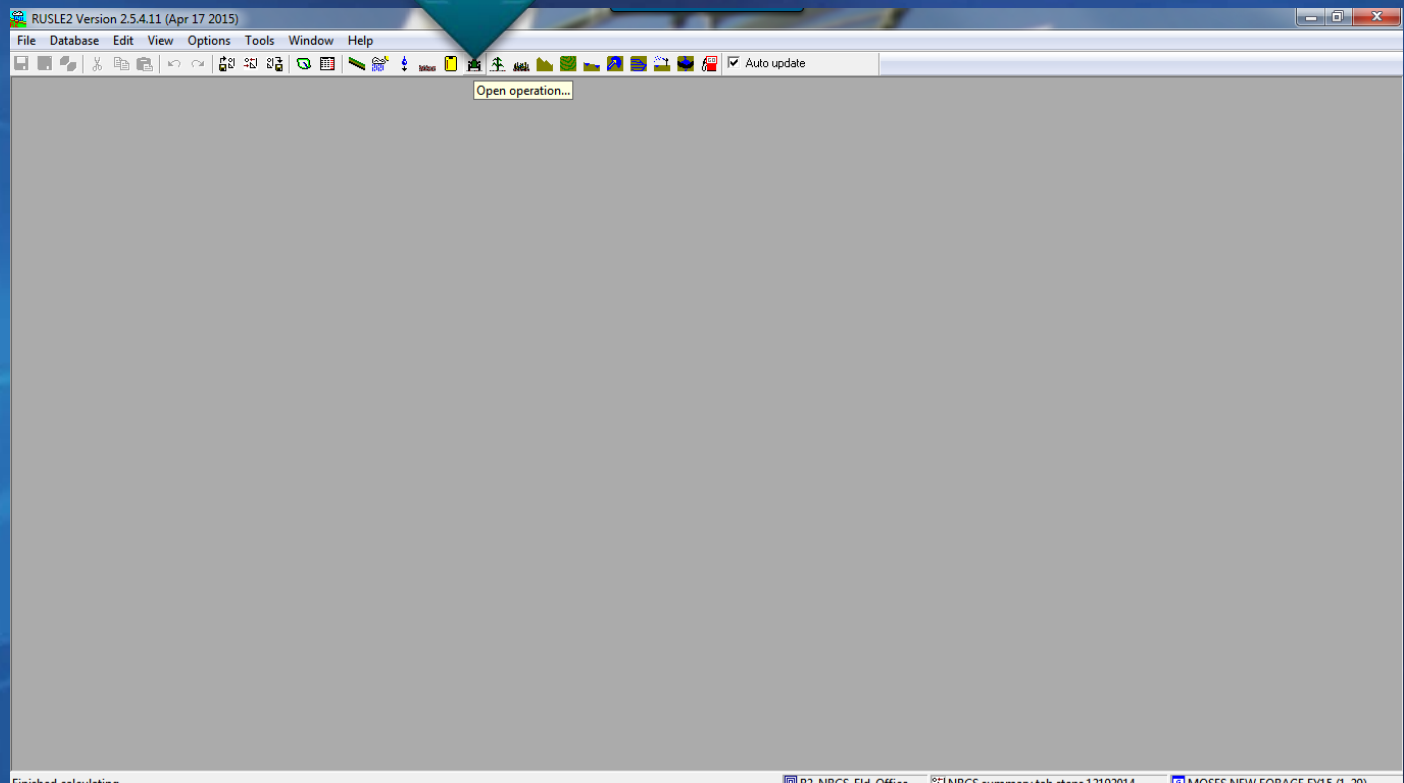
# Overview of Tillage Implements for use in RUSLE2 Calculations:

Focus on New Implements and Manure Incorporation  
and Pesticide Application

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# Tillage Implements are called “Operations” in RUSLE2

- In RUSLE2 you can click on the “tractor” icon to bring up the full list of operations available to the user.



# RUSLE2 Operation Records

- There are 579, and counting, operation records in RUSLE2.

 Add PAM	 Bedder, hipper, hiller 12 in high
 Add mulch	 Bedder, hipper, hiller 15 in high
 Aerator, field surface, ground driven	 Bedder, hipper, hiller 18 in high
 Aerator, field surface, ground driven 0 degree offset	 Begin growth
 Aerator, field surface, ground driven 10 degree offset	 Begin new growth
 Aerator, field surface, ground driven 5 degree offset	 Begin new style veg regrowth
 Aerator, single drum, lugs, angle 0	 Begin weed growth
 Aerator, tandem drum, lugs, angle 10	 Bulldozer, clearing/cutting
 Aerator, tandem drum, lugs, angle 5	 Bulldozer, clearing/cutting light
 Aerial interseeding	 Bulldozer, filling/leveling
 Aerial seeding	 Burn residue
 BFM applicator	 Burn residue, high intensity
 Bale Corn husk, cob and chaff windrows	 Burn residue, low intensity
 Bale Corn stalk strips	 Burn residue, mod. high intensity
 Bale combine windrows	 Burn residue, moderate intensity
 Bale corn stover	 Burn sugarcane
 Bale straw or residue	 Burrowing, heavy, Prairie dog
 Bed shaper	 Burrowing, light, Prairie dog
 Bed shaper high disturbance	 Burrowing, moderate, Prairie dog
 Bed shaper, 12 in	 Chisel plow, coulter, st. pts.
 Bed shaper, 12 in, low flattening	 Chisel plow, coulter, st. pts., cover disks
 Bed shaper, low flattening, high disturbance	 Chisel plow, coulter, st. pts., cover disks, ring basket
 Bedder, hipper, disk hiller	 Chisel plow, coulter, sweeps
 Bedder, hipper, disk hiller after small grains	 Chisel plow, coulter, twst. pts. ● ● ●

# RUSLE2 Operation Records

There are many different kinds of operation records including:

- Tillage
- Planters
- Sprayers
- Harvesters
- Grazing
- Mowers
- Others

# Sprayer Records

- First records were created in 2001-2004.
- Many more records created in 2011-2012 in response to the possibility of other tools using the RUSLE2 data.

▣ Spray, glyphosate on resistant growing crop	06/14/2012...
▣ Sprayer, backpack, kill vegetation	03/31/2011...
▣ Sprayer, backpack, post emergence	03/31/2011...
▣ Sprayer, defoliant	04/06/2012...
▣ Sprayer, fungicide	08/22/2011...
▣ Sprayer, fungicide and insecticide tank mix	10/12/2011...
▣ Sprayer, growth regulator	08/22/2011...
▣ Sprayer, insecticide post emergence	06/23/2006...
▣ Sprayer, kill cover in growing crop	04/06/2012...
▣ Sprayer, kill cover in growing vegetables	04/06/2012...
▣ Sprayer, kill crop	04/06/2012...
▣ Sprayer, kill strips	09/18/2009...
▣ Sprayer, post emergence	07/21/2009...
▣ Sprayer, post emergence and fert. tank mix	04/13/2011...
▣ Sprayer, pre-emergence	06/23/2006...

# Sprayer Records

- First records mainly focused on applications that had “no effect”.
- Choices were limited.

The image displays two screenshots of a software interface for sprayer records. The top window is titled "Operation: Sprayer, pre-emergence" and the bottom window is titled "Operation: Sprayer, insecticide post emergence". Both windows show a table of speed settings, a text area for information, and a "Sequence of processes" table.

**Operation: Sprayer, pre-emergence**

Rec. speed, mph	5.0
Min speed, mph	4.0
Max speed, mph	6.0

Info: Spray pre-emerge chemicals on bare soil. Crop is not killed. 033004 DTL

Base diesel use per area, gal/ac: 0.13

Operation STIR: 0.15

Sequence of processes:

Sequence of Processes
Process: No effect

Add to this operation to make new one:

View/edit Operation Builder used to make this operation:

**Operation: Sprayer, insecticide post emergence**

Rec. speed, mph	5.0
Min speed, mph	4.0
Max speed, mph	6.0

Info: Spray pest control chemicals on growing crop. Crop is not killed. 11/17/01 DTL

Base diesel use per area, gal/ac: 0.13

Operation STIR: 0.15

Sequence of processes:

Sequence of Processes
Process: No effect

Add to this operation to make new one:

View/edit Operation Builder used to make this operation:

# Sprayer Records

- Newer records attempt to capture what happens with agrichemical application.

The image displays three overlapping screenshots of a software interface for recording sprayer operations. Each window shows a different type of sprayer record with various parameters and information.

**Operation: Sprayer, defoliant**

Rec. speed, mph	5.0
Min speed, mph	4.0
Max speed, mph	6.0

Base diesel use per area, gal/ac:

Info: Sprayer, defoliant as used on cotton or other crops. Kills growing crop. Rev 043008  
DTL removed flatten standing residue process. rev 040612 los

Operation STIR:

Sequence of processes

Sequence of Processes
Process: Kill veg.

Add to this operation to make new one:

View/edit Operation Builder used to make this operation:

**Operation: Sprayer, post emergence**

Rec. speed, mph	5.0
Min speed, mph	4.0
Max speed, mph	6.0

Base diesel use per area, gal/ac:

Info: Spray pest control chemicals on growing crop. Crop is not killed. Residue type is set to weeds 3-6 months and 250 pounds but user can choose other residue type in the management screen. User must specify the amount of weed residue added in the "adjust external residue" box in the profile or worksheet screen when making the soil loss run. 080404 DTL

Operation STIR:

Sequence of processes

Sequence of Processes
Process: Add other cover

Add to this operation to make new one:

View/edit Operation Builder used to make this operation:

**Operation: Sprayer, backpack, kill vegetation**

Rec. speed, mph	1.0
Min speed, mph	1.0
Max speed, mph	1.0

Base diesel use per area, gal/ac:

Info: Hand Sprayer for pesticides on limited resource operations  
033111 DTL

Operation STIR:

Sequence of processes

Sequence of Processes
Process: Kill veg.

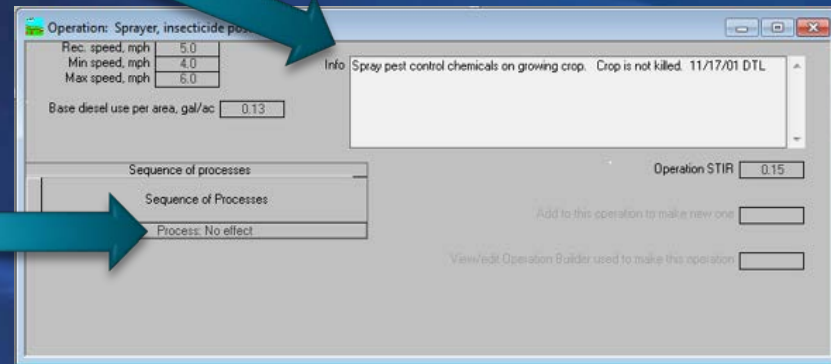
Add to this operation to make new one:

View/edit Operation Builder used to make this operation:

# Sprayer Records

When selecting sprayer records:

- Read the Information box to ensure that the operation is correct for your situation
- Verify the correct process is present for your situation
- If you cannot find what you need, contact your State/Regional Agronomist for elevating your request to the RUSLE2 team.



# Manure Records

- Most records were created or revised in 2008.

Manure injector, liquid high disturb.30 inch	09/18/2009...
Manure injector, liquid low disturb.15 inch	09/18/2009...
Manure injector, liquid low disturb.30 inch	09/18/2009...
Manure injector, low disturb.15 inch	04/10/2012...
Manure injector, low disturb.30 inch	04/10/2012...
Manure spreader, liquid	09/18/2009...
Manure spreader, slurry	09/18/2009...
Manure spreader, solid and semi-solid	09/18/2009...
Manure, liquid irrigation	09/18/2009...

# Manure Records

- Records attempt to capture the effects of running manure application equipment through the field.

**No “Disturb surface” process in this irrigation record**

**“Disturb surface” process present in these records**

**“Disturb surface” process present in these records**

**“Disturb surface” process present in these records**

**“Disturb surface” process present in these records**

# Manure Records

- Disturb Surface process for a manure spreader?

Operation: Manure spreader, liquid

Rec. speed, mph	4.0
Min speed, mph	3.0
Max speed, mph	8.0

Base diesel use per area, gal/ac

Info: Multiply the oven dry weight times an effectiveness factor of 0.5 to calculate the rate of application in model. Spreading liquid manure. About 50% of material applied soaks into the soil through cracks and macropores. rev043008 DTL

Sequence of processes

Process: Add other cover
Process: Disturb surface
Process: Flatten standing res.

Operation STIR

Add to this operation to make new one

View/edit Operation Builder used to make this operation

Click on the folder

Operation: Process: Disturb surface of Manure spreader, liquid

Tillage type	Compression
Tillage intensity, fraction	0.10
Rec. till. depth, in.	1.5
Min till depth, in.	1.0
Max till depth, in.	2.0
Ridge height, in.	0.10
Initial roughness, in.	0.24
Final roughness, in.	0.24
Surf. area disturbed, %	20

Residue burial ratios (by mass)		
Residue type	Burial ratio, fraction	Resurfacing, fraction
fragile-very small (soybeans)	0.070	0.010
mod. tough-short (wheat)	0.050	0.010
non-fragile-med. (corn)	0.040	0.010
woody-large	0.020	0.010
gravel-rock	0.040	0.010

Apply Apply/Close Cancel

You get this window

# Manure Records

## Manure spreader, liquid

Operation: Process: Disturb surface of Manure spreader, liquid

Tillage type	Compression
Tillage intensity, fraction	0.10
Rec. till. depth, in.	1.5
Min till depth, in.	1.0
Max till depth, in.	2.0
Ridge height, in.	0.10
Initial roughness, in.	0.24
Final roughness, in.	0.24
Surf. area disturbed, %	20

Residue burial ratios (by mass)		
Residue type	Burial ratio, fraction	Resurfacing, g. fraction
fragile-very small (soybeans)	0.070	0.010
mod. tough-short (wheat)	0.050	0.010
non-fragile-med. (corn)	0.040	0.010
woody-large	0.020	0.010
gravel-rock	0.040	0.010

Apply Apply/Close Cancel

## Manure injector, liquid high disturb.30 inch

Operation: Process: Disturb surface of Manure injector, liquid high disturb.30 inch

Tillage type	Lifting, fracturing
Tillage intensity, fraction	0.80
Rec. till. depth, in.	6.0
Min till depth, in.	4.0
Max till depth, in.	10
Ridge height, in.	4.0
Initial roughness, in.	1.5
Final roughness, in.	0.24
Surf. area disturbed, %	50

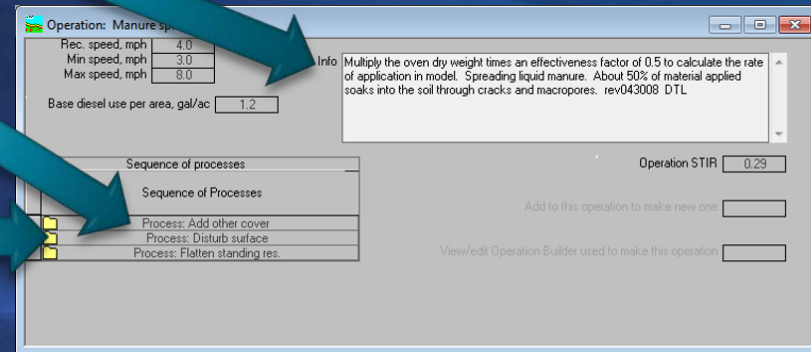
Residue burial ratios (by mass)		
Residue type	Burial ratio, fraction	Resurfacing, g. fraction
fragile-very small (soybeans)	0.38	0.050
mod. tough-short (wheat)	0.34	0.050
non-fragile-med. (corn)	0.29	0.050
woody-large	0.22	0.10
gravel-rock	0.43	0.050

Apply Apply/Close Cancel

# Manure Records

When selecting manure records:

- Read the Information box
- Verify that the correct process(es) is/are present
- Check the disturb surface process(es) to ensure applicability for your situation
- If you cannot find what you need, contact your State/Regional Agronomist for elevating your request to the RUSLE2 team.



# Fertilizer Records

- Many records were created or revised throughout the years as requests come into the RUSLE2 team.

Fert applic. anhyd knife 12 in	06/23/2006 ...
Fert applic. anhyd knife 12 in, coil tine har	09/22/2011 ...
Fert applic. broadcast by hand	04/30/2014 ...
Fert applic. coulter, high press. inject 12 in	06/23/2006 ...
Fert applic. deep plcmt hvy shnk	06/23/2006 ...
Fert applic. shank low disturbance, 12 in	06/23/2006 ...
Fert applic. shank low disturbance, 12 in, coil tine har	09/22/2011 ...
Fert applic. shank low disturbance, 15 in spacing	12/21/2006 ...
Fert applic. side-dress, liquid	04/13/2011 ...
Fert applic. surface broadcast	04/30/2014 ...
Fert applic., aerial	04/30/2014 ...
Fert. applic. anhyd knife 15 in spacing	12/21/2006 ...
Fert. applic. anhyd knife 15 in spacing high disturbance	11/23/2007 ...
Fert. applic. anhyd knife 15 in spacing high disturbance...	09/22/2011 ...
Fert. applic. anhyd knife 15 in spacing, coil tine har	09/20/2011 ...
Fert. applic. anhyd knife 30 in	06/23/2006 ...
Fert. applic. anhyd knife 30 in, bedded	04/01/2010 ...
Fert. applic. anhyd, liq, dry, minimal dist. precision placm...	03/15/2012 ...
Fert. applic. anhyd, low dist. single disk opener, 30 in	02/15/2012 ...
Fert. applic. double shot knife 15 in spacing high disturb...	11/23/2007 ...
Fert. applic. shallow anhyd knife 38 in	11/22/2011 ...
Fert. applic. single disk opener, low disturbance, 30 inc...	02/15/2012 ...
Fert. applic. sugarcane	12/08/2006 ...
Fert. applic., strip-till 30 in	06/23/2006 ...

# Fertilizer Records

- Records attempt to capture the effects of running fertilizer equipment through the field.

Older records typically have less information

Newer records typically have more details in the information box

Operation: Fert. applic. deep plcmnt hvy shnk

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info 6/7/01 DTL

Base diesel use per area, gal/ac

Sequence of processes

Operation STIR

Sequence of Processes

Add to this operation to make new one

Process: Flatten standing res.

Process: Disturb surface

View/edit Operation Builder used to make this operation

Operation: Fert. applic. single disk opener, low disturbance, 30 inch spac

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info Fertilizer applicator, Single disk opener 30 inch spacing low disturbance Similar to John Deere 2510H 02152012 DTL

Base diesel use per area, gal/ac

Sequence of processes

Operation STIR

Sequence of Processes

Add to this operation to make new one

Process: Flatten standing res.

Process: Disturb surface

View/edit Operation Builder used to make this operation

Operation: Fert. applic. anhyd knife 30 in

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info 6/7/01 DTL

Base diesel use per area, gal/ac

Sequence of processes

Operation STIR

Sequence of Processes

Add to this operation to make new one

Process: Flatten standing res.

Process: Disturb surface

View/edit Operation Builder used to make this operation

Operation: Fert. applic. sugarcane

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info Fertilizer applicator, sugarcane. This applicator is similar to an anhydrous applicator except pairs of shanks are spaced 24 inches apart to run in the furrows between 48 inch wide sugarcane beds. 013106 DTL

Base diesel use per area, gal/ac

Sequence of processes

Operation STIR

Sequence of Processes

Add to this operation to make new one

Process: Flatten standing res.

Process: Disturb surface

View/edit Operation Builder used to make this operation

# Fertilizer Records

- Records attempt to capture the effects of running fertilizer equipment through the field.

“Disturb surface” process present in these records

No “Disturb surface” process in these records

Operation: Fert applic. anhyd knife 12 in

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info 6/7/01 DTL

Base diesel use per area, gal/ac 0.90

Operation STIR 6.5

Sequence of processes

Process: Flatten standing res.
Process: Disturb surface

Operation: Fert applic. broadcast by hand

Rec. speed, mph	0
Min speed, mph	0
Max speed, mph	0

Info Broadcast fertilizer by hand 033111 DTL revised STIR 04302014 LOS

Base diesel use per area, gal/ac ...0000010

Operation STIR 0

Sequence of processes

Process: No effect
--------------------

Operation: Fert applic. anhyd knife 12 in, coil tine har

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info Fert applic. anhyd knife 12 in, 6/7/01, with coiled tine harrow. 09/16/11 GGF

Base diesel use per area, gal/ac 1.1

Operation STIR 20

Sequence of processes

Process: Flatten standing res.
Process: Disturb surface
Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface

Operation: Fert applic., aerial

Rec. speed, mph	0
Min speed, mph	0
Max speed, mph	0

Info Aerial broadcast fertilizer. Although used for aerial application of Fertilizer into flooded rice fields or other situations where conditions prevent the operation of field equipment, this operation doesn't actually do anything other than serve as a placeholder for energy calculation. 11292011 DTL revised STIR 043014 LOS

Base diesel use per area, gal/ac 0.16

Operation STIR 0

Sequence of processes

Process: No effect
--------------------

Notice the multiple “Disturb surface” processes here

# Fertilizer Records

- As with the manure records, check the “Disturb Surface” process(es) to ensure applicability for your situation.

Operation: Fert. applic. anhyd knife 30 in

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info 6/7/01 DTL

Base diesel use per area, gal/ac

Sequence of processes

Process: Flatten standing res.
Process: Disturb surface

Operation STIR

Add to this operation to make new one

View/edit Operation Builder used to make this operation

Operation: Process: Disturb surface of Fert. applic. anhyd knife 30 in

Tillage type	Lifting, fracturing
Tillage intensity, fraction	0.60
Rec. till. depth, in.	4.0
Min till depth, in.	3.0
Max till depth, in.	6.0
Ridge height, in.	2.0
Initial roughness, in.	0.60
Final roughness, in.	0.24
Surf. area disturbed, %	20

Residue burial ratios (by mass)		
Residue type	Burial ratio, fraction	Resurfacing, g, fraction
fragile-very small (soybeans)	0.10	0.050
mod. tough-short (wheat)	0.080	0.050
non-fragile-med. (corn)	0.060	0.050
woody-large	0.052	0.070
gravel-rock	0.076	0.050

Apply Apply/Close Cancel

Click on the folder

You get this window

# Fertilizer Records

- For records with multiple “Disturb Surface” processes State Agronomist can see which implements were used to create the record.

Operation: Fert applic. anhyd knife 12 in, coil tine har

Rec. speed, mph 5.0  
Min speed, mph 3.5  
Max speed, mph 6.5

Base diesel use per area, gal/ac 1.1

Info Fert applic. anhyd knife 12 in, 6/7/01, with coiled tine harrow. 09/16/11 GGF

Sequence of processes

Sequence of Processes	
+	-
<input type="checkbox"/>	Process: Flatten standing res.
<input type="checkbox"/>	Process: Disturb surface
<input type="checkbox"/>	Process: Kill veg.
<input type="checkbox"/>	Process: Flatten standing res.
<input type="checkbox"/>	Process: Disturb surface

Operation STIR 20

Add to this operation to make new one No

View/edit Operation Builder used to make this operation open

Click on the button

You get this window

Operation: Operation builder of Fert applic. anhyd knife 12 in, coil tine har

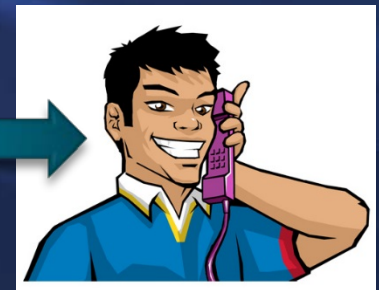
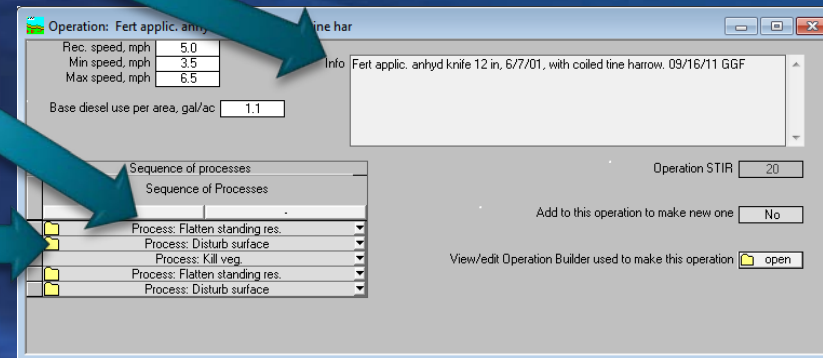
Op. list	
Num.	Operation
1	Fert applic. anhyd knife 12 in
2	Harrow, coiled tine

Apply Apply/Close Cancel

# Fertilizer Records

When selecting fertilizer records:

- Read the Information box
- Verify that the correct process(es) is/are present
- Check the disturb surface process(es) to ensure applicability for your situation
- If you cannot find what you need, contact your State/Regional Agronomist for elevating your request to the RUSLE2 team.



# “Multi-Gang” Tillage Records

- Many records were created or revised throughout the years as requests come into the RUSLE2 team. These are just a few:

Seedbed conditioner, coil tine har, rlng bskt	11/01/2007
Seedbed conditioner, coulter caddy, coil tine har	11/28/2007
Seedbed conditioner, coulter caddy, coil tine har, rlng bskt	11/28/2007
Seedbed conditioner, coulter caddy, field cult, spike harrow	11/28/2007
Seedbed conditioner, coulter caddy, rtry har	11/28/2007
Seedbed conditioner, coulter caddy, rtry har, rlng bskt	11/28/2007
Seedbed conditioner, coulter caddy, spk har	11/28/2007
Seedbed conditioner, coulter caddy, spk har, rlng bskt	11/28/2007
Seedbed finisher	01/05/2012
Seedbed finisher, fld cult, chop, spk har, rlng bskt	11/01/2007
Seedbed finisher, fld cult, coil tine har, rolling bskt	09/22/2011
Seedbed finisher, fld cult, mlch trdr	11/01/2007
Seedbed finisher, fld cult, rtry har	11/01/2007
Seedbed finisher, snl disk, fld cult, coil tine har, rolling bskt	07/02/2008
Seedbed finisher, snl disk, rotry har	07/02/2008
Seedbed finisher, snl dsk, fld cult, coil tine har	07/02/2008

# “Multi-Gang” Tillage Records

- We’ve attempted to capture some of the diversity.



Subsoil disk ripper



Cultivator, field w/ spike points, coil tine har



Subsoil disk ripper, coulter  
smooth, rlng bskt

# “Multi-Gang” Tillage Records

- However, not every combination of tillage tools are available.



# “Multi-Gang” Tillage Records

- You can view the individual operations used to create the “multi-gang” tillage records as a State Agronomist and soon as a general user.

Operation: Disk, single gang

Rec. speed, mph	5.0
Min speed, mph	3.0
Max speed, mph	6.0

Info: Single disk gang 101706 DTL

Base diesel use per area, gal/ac: 0.38

Operation STIR: 20

Sequence of processes

Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface

Add to this operation to make new one: No

View/edit Operation Builder used to make this operation: open

Operation: Cultivator, field 6-12 in sweeps

Rec. speed, mph	5.0
Min speed, mph	3.5
Max speed, mph	6.5

Info: 060701 DTL

Base diesel use per area, gal/ac: 0.74

Operation STIR: 26

Sequence of processes

Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface

Add to this operation to make new one: No

View/edit Operation Builder used to make this operation: open

Operation: Harrow, coiled tine

Rec. speed, mph	6.0
Min speed, mph	3.0
Max speed, mph	7.0

Info: 6/7/01 DTL

Base diesel use per area, gal/ac: 0.44

Operation STIR: 16

Sequence of processes

Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface

Add to this operation to make new one: No

View/edit Operation Builder used to make this operation: open

Operation: Seedbed finisher, snl dsk, fld cult, coil tine har

Rec. speed, mph	4.0
Min speed, mph	3.0
Max speed, mph	8.0

Info: Seedbed finisher consisting of a single disk gang, field cultivator and coiled tine harrow. "Combo mulch finisher" 103107 DTL

Base diesel use per area, gal/ac: 1.3

Operation STIR: 36

Sequence of processes

Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface
Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface
Process: Kill veg.
Process: Flatten standing res.
Process: Disturb surface

Add to this operation to make new one: No

View/edit Operation Builder used to make this operation: open

Operation: Operation builder of Seedbed finisher, snl dsk, fld cult, coil tine har

Num.	Op. list
1	Disk, single gang
2	Cultivator, field 6-12 in sweeps
3	Harrow, coiled tine

Apply Apply/Close Cancel

Click here

You get this window

# “Multi-Gang” Tillage Records

- Again, you can see soil disturbance by clicking on any disturb surface folder.

The screenshot displays four 'Operation' windows and one 'Operation builder' window. Each window shows a 'Sequence of processes' list with folders for different stages of the operation. Blue arrows point to these folders, indicating where to click to view soil disturbance records.

**Operation: Disk, single gang**  
Rec. speed, mph: 5.0  
Min speed, mph: 3.0  
Max speed, mph: 6.0  
Base diesel use per area, gal/ac: 0.38  
Info: Single disk gang 101706 DTL  
Operation STIR: 20  
Sequence of processes:  
Process: Kill veg.  
Process: Flatten standing res.  
Process: Disturb surface

**Operation: Cultivator, field 6-12 in sweeps**  
Rec. speed, mph: 5.0  
Min speed, mph: 3.5  
Max speed, mph: 6.5  
Base diesel use per area, gal/ac: 0.74  
Info: 060701 DTL  
Operation STIR: 26  
Sequence of processes:  
Process: Kill veg.  
Process: Flatten standing res.  
Process: Disturb surface

**Operation: Harrow, coiled tine**  
Rec. speed, mph: 6.0  
Min speed, mph: 3.0  
Max speed, mph: 7.0  
Base diesel use per area, gal/ac: 0.44  
Info: 6/7/01 DTL  
Operation STIR: 16  
Sequence of processes:  
Process: Kill veg.  
Process: Flatten standing res.  
Process: Disturb surface

**Operation: Seedbed finisher, sngl dsk, fld cult, coil tine har**  
Rec. speed, mph: 4.0  
Min speed, mph: 3.0  
Max speed, mph: 8.0  
Base diesel use per area, gal/ac: 1.3  
Info: Seedbed finisher consisting of a single disk gang, field cultivator and coiled tine harrow. "Combo mulch finisher" 103107 DTL  
Operation STIR: 36  
Sequence of processes:  
Process: Kill veg.  
Process: Flatten standing res.  
Process: Disturb surface  
Process: Kill veg.  
Process: Flatten standing res.  
Process: Disturb surface  
Process: Kill veg.  
Process: Flatten standing res.  
Process: Disturb surface

**Operation: Operation builder of Seedbed finisher, sngl dsk, fld cult, coil tine har**

Num.	Op. list
1	Disk, single gang
2	Cultivator, field 6-12 in sweeps
3	Harrow, coiled tine

Buttons: Apply, Apply/Close, Cancel

# “Multi-Gang” Tillage Records

- Comparing soil disturbance effect:

Operation: Process: Disturb surface of Disk, single gang

Tillage type	Mixing + some inversion
Tillage intensity, fraction	0.50
Rec. till. depth, in.	3.0
Min till depth, in.	2.0
Max till depth, in.	4.0
Ridge height, in.	1.0
Initial roughness, in.	0.60
Final roughness, in.	0.24
Surf. area disturbed, %	100

Operation: Process: Disturb surface of Seedbed finisher, sngl dsk, fld cult, coil tine har

Tillage type	Mixing + some inversion
Tillage intensity, fraction	0.50
Rec. till. depth, in.	3.0
Min till depth, in.	2.0
Max till depth, in.	4.0
Ridge height, in.	1.0
Initial roughness, in.	0.60
Final roughness, in.	0.24
Surf. area disturbed, %	100

Operation: Process: Disturb surface of Cultivator, field 6-12 in sweeps

Tillage type	Mixing + some inversion
Tillage intensity, fraction	0.40
Rec. till. depth, in.	4.0
Min till depth, in.	2.0
Max till depth, in.	6.0
Ridge height, in.	2.0
Initial roughness, in.	0.60
Final roughness, in.	0.24
Surf. area disturbed, %	100

Operation: Process: Disturb surface of Seedbed finisher, sngl dsk, fld cult, coil tine har

Tillage type	Mixing (only)
Tillage intensity, fraction	0.40
Rec. till. depth, in.	4.0
Min till depth, in.	2.0
Max till depth, in.	6.0
Ridge height, in.	2.0
Initial roughness, in.	0.60
Final roughness, in.	0.24
Surf. area disturbed, %	100

Operation: Process: Disturb surface of Harrow, coiled tine

Tillage type	Mixing + some inversion
Tillage intensity, fraction	0.25
Rec. till. depth, in.	2.0
Min till depth, in.	1.0
Max till depth, in.	3.0
Ridge height, in.	1.0
Initial roughness, in.	0.40
Final roughness, in.	0.24
Surf. area disturbed, %	100

Operation: Process: Disturb surface of Seedbed finisher, sngl dsk, fld cult, coil tine har

Tillage type	Compression
Tillage intensity, fraction	0.25
Rec. till. depth, in.	2.0
Min till depth, in.	1.0
Max till depth, in.	3.0
Ridge height, in.	1.0
Initial roughness, in.	0.40
Final roughness, in.	0.24
Surf. area disturbed, %	100

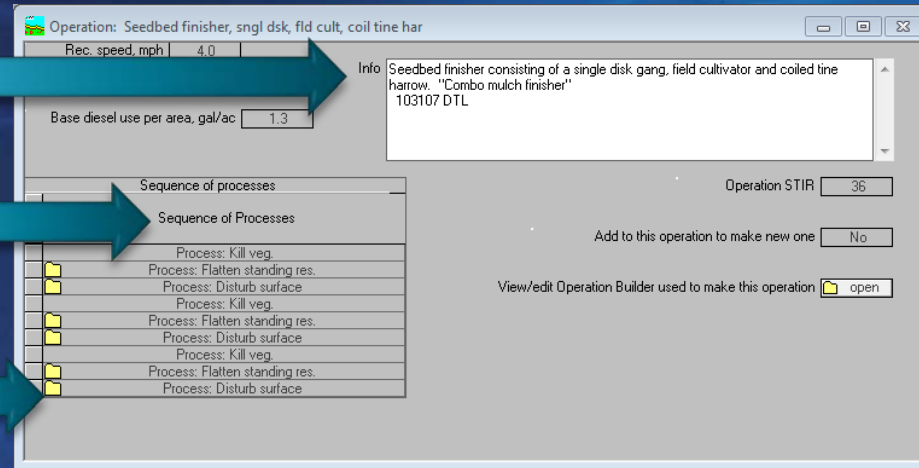
Apply Apply/Close Cancel

Apply Apply/Close Cancel

# “Multi-Gang” Tillage Records

When selecting tillage records:

- Read the Information box
- Verify that the correct processes are present
- Check the disturb surface process(es) to ensure applicability for your situation
- If you cannot find what you need, contact your State/Regional Agronomist for elevating your request to the RUSLE2 team.



What to do if you need a new  
record immediately?

**Improvise!**

# Example

Coulters used to close depressions left by subsoilers

Coulters associated with the subsoilers

Subsoilers



Rolling Baskets to smoothen the surface

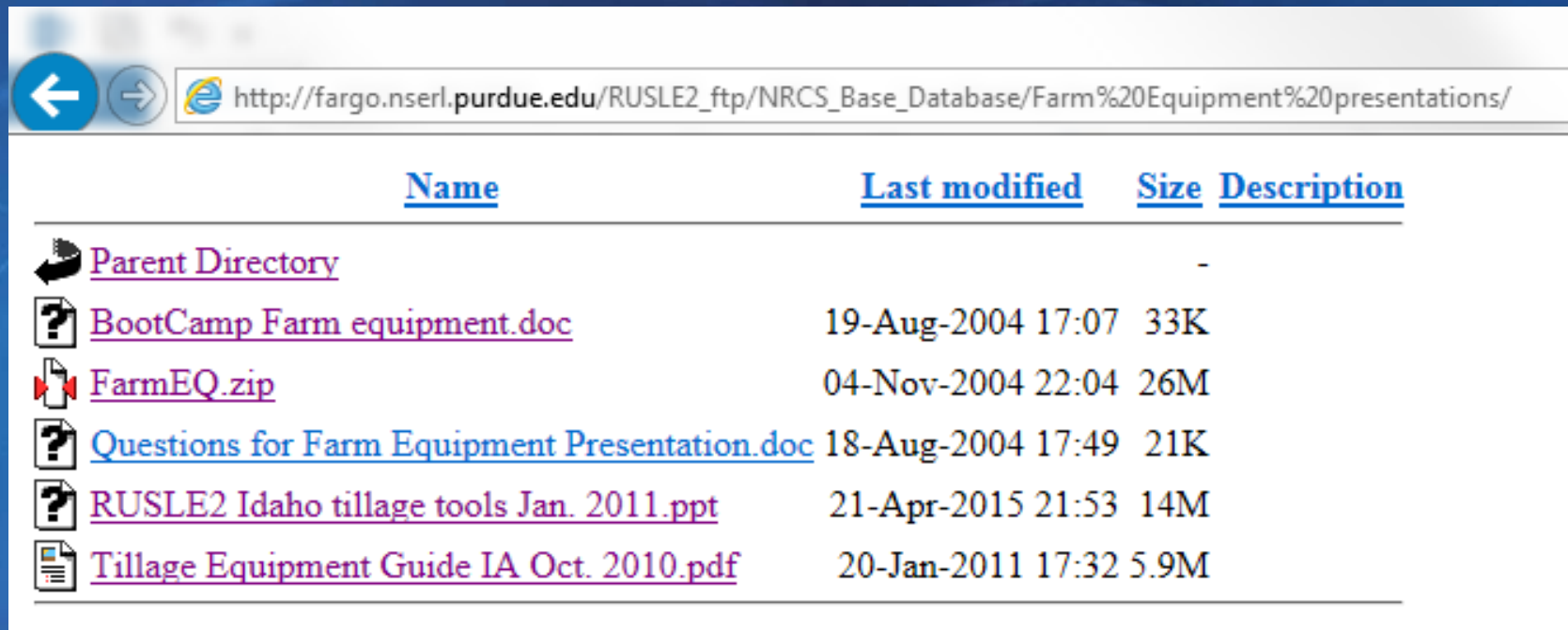
- May look something like this (STIR=22):

Date, m/d/y		End/Start crop year?	Operation	
+	-			
10/1/0	▼	No	📁	Subsoiler, in row
10/1/0	▼	No	📁	Coulter caddy, with smooth coulters
10/1/0	▼	No	📁	Rolling basket incorporator







# Resources

## ● Pictures of equipment at

[http://fargo.nserl.purdue.edu/RUSLE2\\_ftp/NRCS\\_Base\\_Database/Farm%20Equipment%20presentations/](http://fargo.nserl.purdue.edu/RUSLE2_ftp/NRCS_Base_Database/Farm%20Equipment%20presentations/)



The screenshot shows a web browser window with the address bar containing the URL: [http://fargo.nserl.purdue.edu/RUSLE2\\_ftp/NRCS\\_Base\\_Database/Farm%20Equipment%20presentations/](http://fargo.nserl.purdue.edu/RUSLE2_ftp/NRCS_Base_Database/Farm%20Equipment%20presentations/). Below the address bar is a table listing files and directories. The table has four columns: Name, Last modified, Size, and Description. The files listed are: Parent Directory, BootCamp Farm equipment.doc, FarmEQ.zip, Questions for Farm Equipment Presentation.doc, RUSLE2 Idaho tillage tools Jan. 2011.ppt, and Tillage Equipment Guide IA Oct. 2010.pdf.

<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 <a href="#">Parent Directory</a>		-	
 <a href="#">BootCamp Farm equipment.doc</a>	19-Aug-2004 17:07	33K	
 <a href="#">FarmEQ.zip</a>	04-Nov-2004 22:04	26M	
 <a href="#">Questions for Farm Equipment Presentation.doc</a>	18-Aug-2004 17:49	21K	
 <a href="#">RUSLE2 Idaho tillage tools Jan. 2011.ppt</a>	21-Apr-2015 21:53	14M	
 <a href="#">Tillage Equipment Guide IA Oct. 2010.pdf</a>	20-Jan-2011 17:32	5.9M	

# Finally

- Remember to always check soil disturbance between what is happening in the field and the RUSLE2 record that you have selected to ensure accuracy!

## Questions?

