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USDA Natural Resources Conservation Service
Science and Technology

2015 Conservation Webinars

Today's Webinar Presenter
Giulio Ferruzzi, Ph. D., Conservation Agronomist
West National Technology Support Center

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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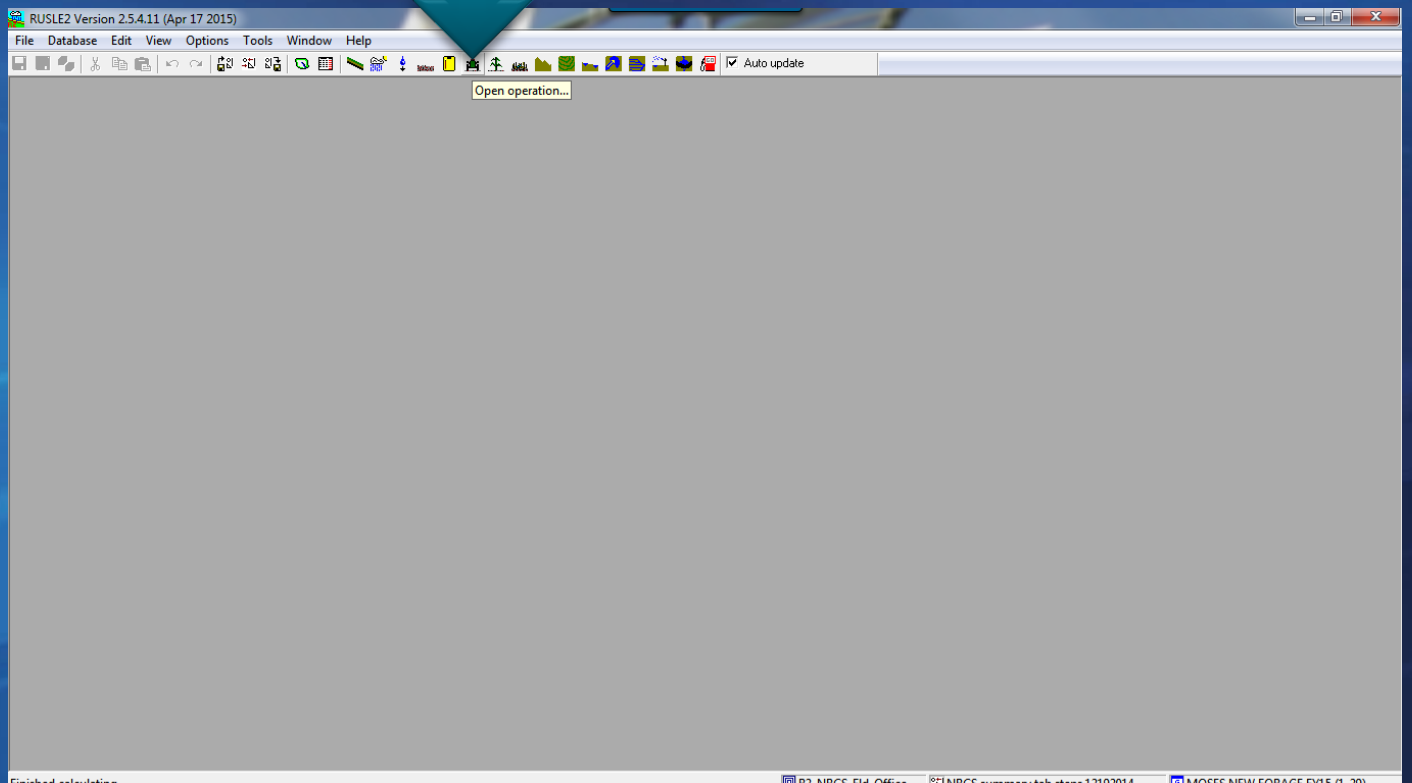
Overview of Tillage Implements for use in RUSLE2 Calculations:

Focus on New Implements and Manure Incorporation and Pesticide Application

Giulio Ferruzzi
Conservation Agronomist
USDA-NRCS
West National Technology Support Center (WNTSC)

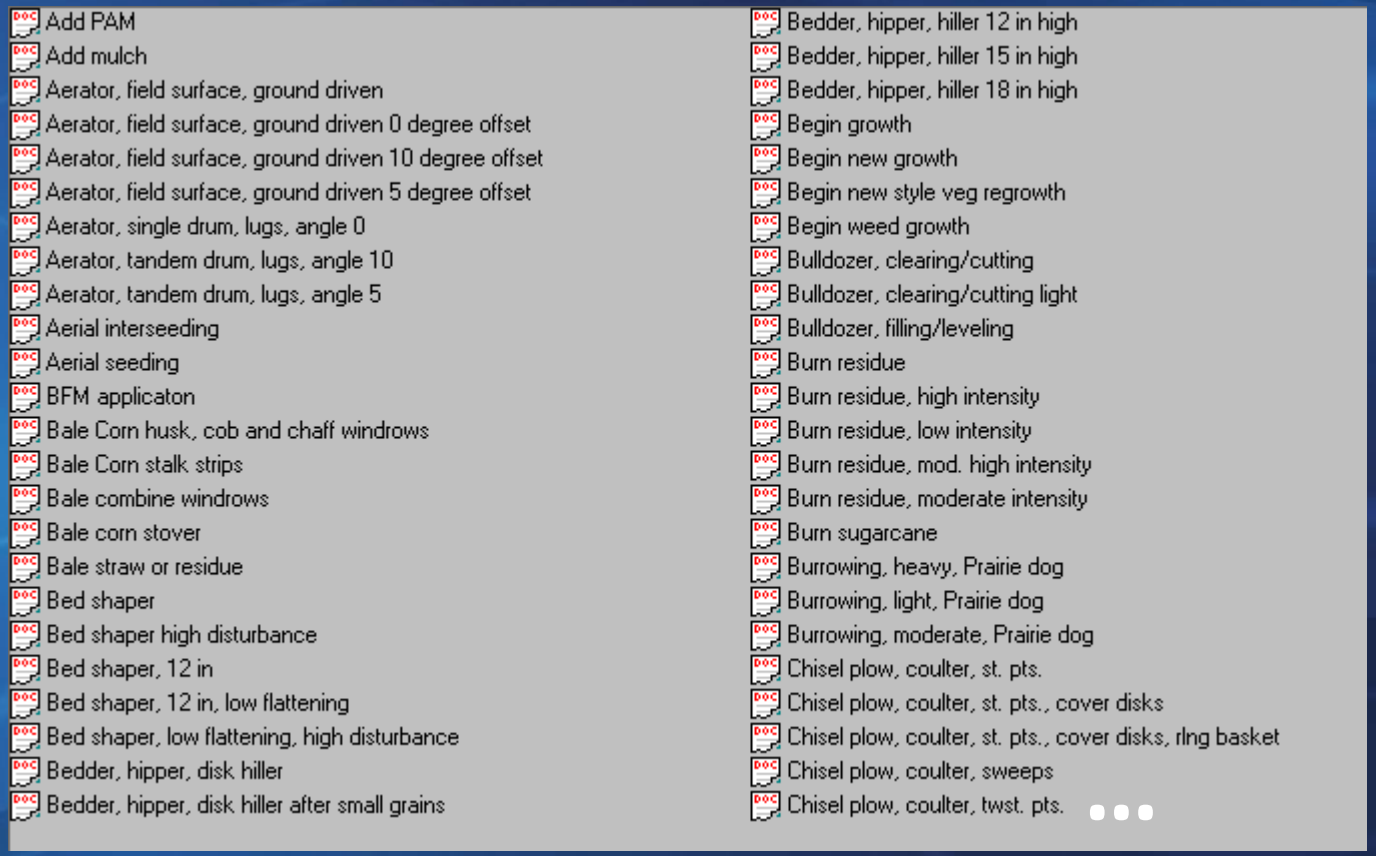
Tillage Implements are called "Operations" in RUSLE2

- 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.



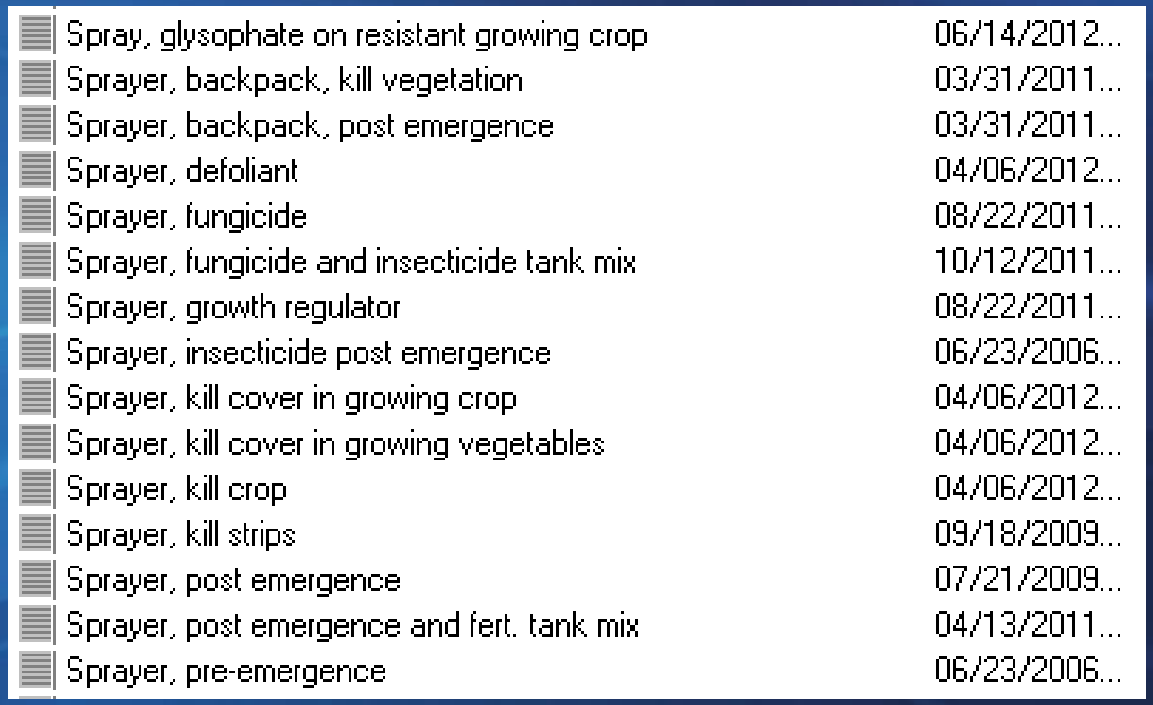
RUSLE2 Operation Records

There are many different kinds of operation records including:

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

Sprayer Records

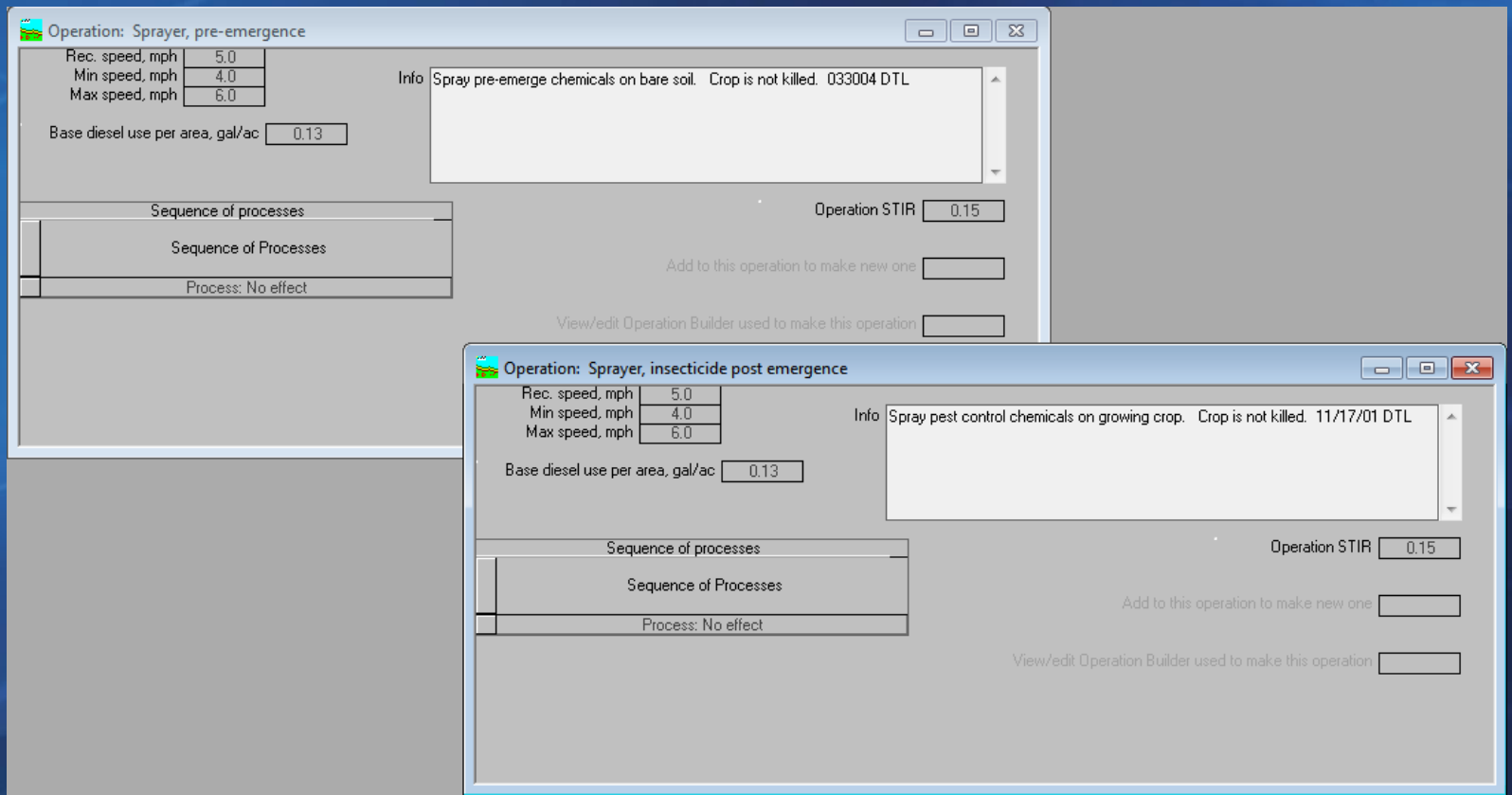
- First records were created in 2001-2004.
- Many more records created in 2011-2012 in response to the possibility of other tools using the RUSLE2 data.



Spray, glysophate 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...

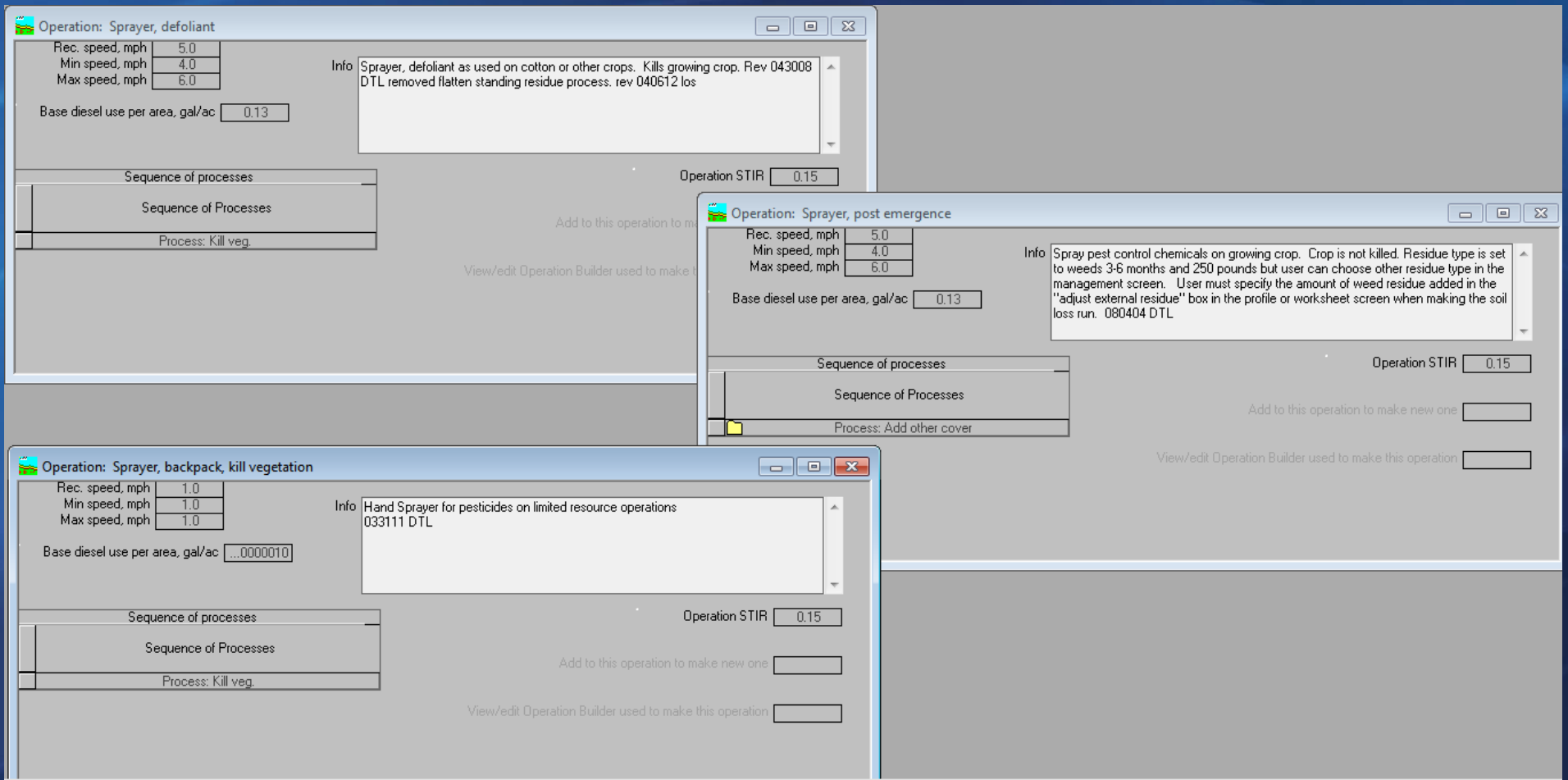
Sprayer Records

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



Sprayer Records

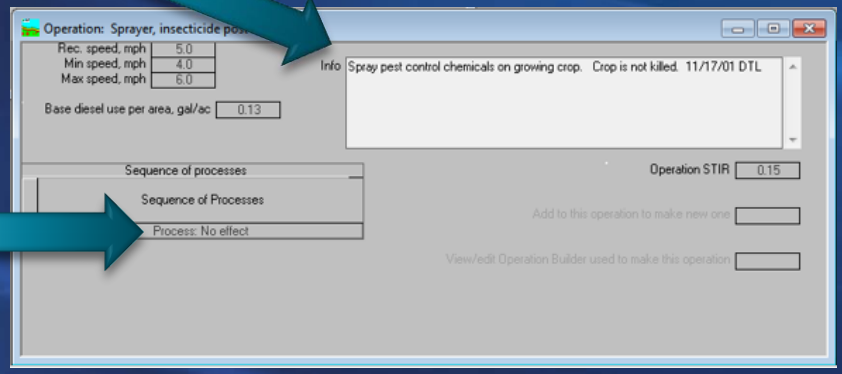
- Newer records attempt to capture what happens with agrichemical application.



Sprayer Records

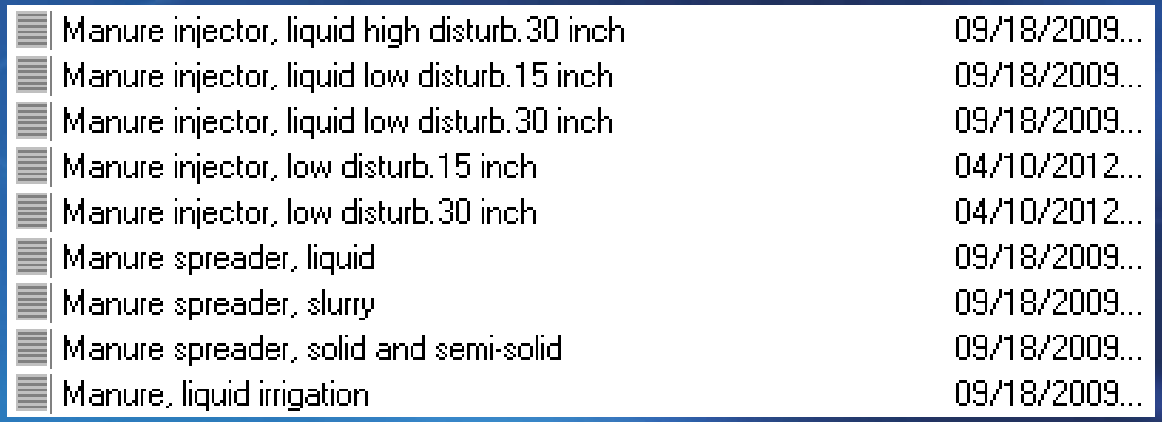
When selecting sprayer records:

- 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.



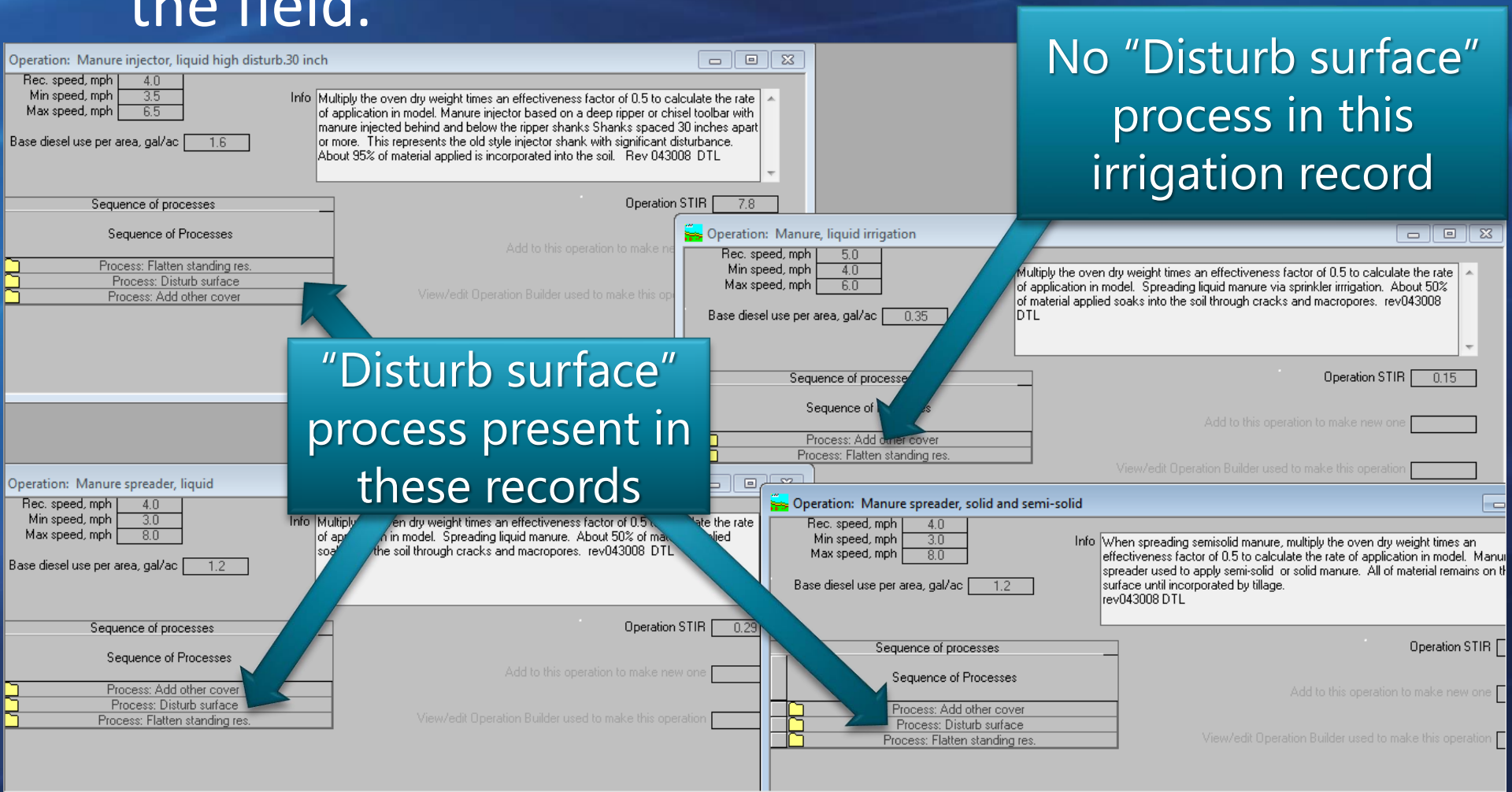
Manure Records

- Most records were created or revised in 2008.



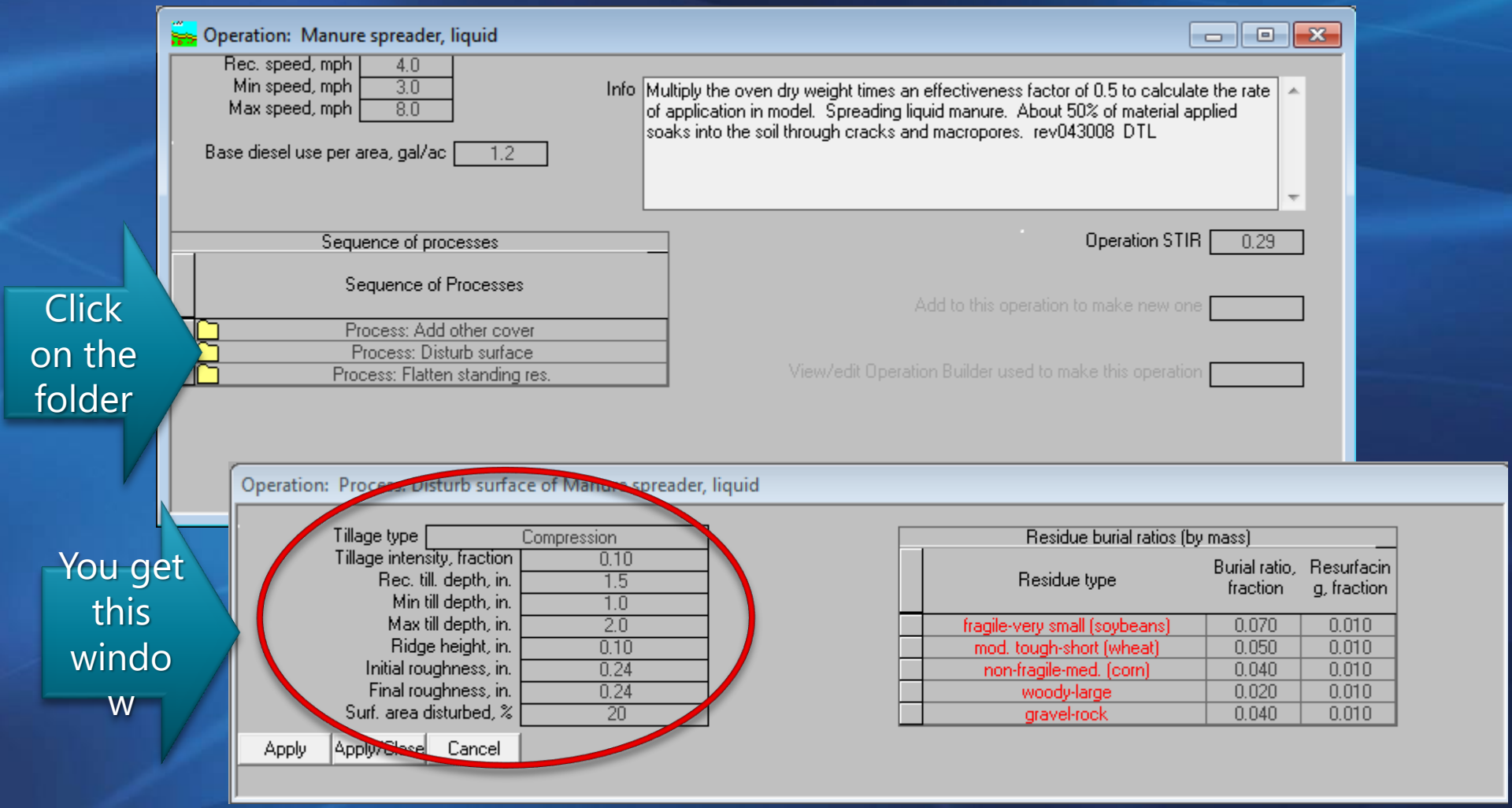
Manure Records

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



Manure Records

- Disturb Surface process for a manure spreader?



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

Apply | Apply/Close | Cancel

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

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

Apply | Apply/Close | Cancel

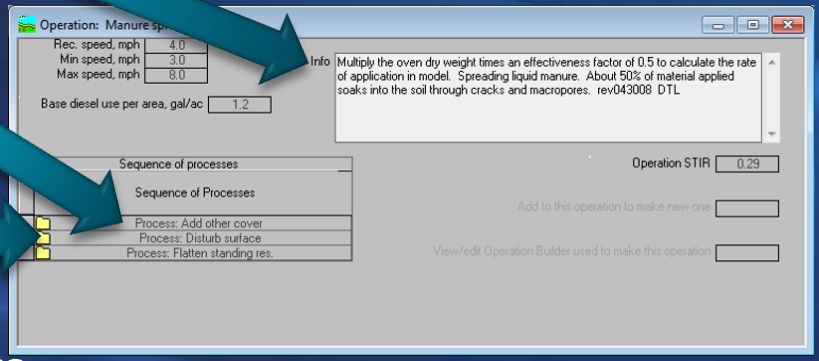
Residue burial ratios (by mass)

Residue type	Burial ratio, fraction	Resurfacing, 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

Manure Records

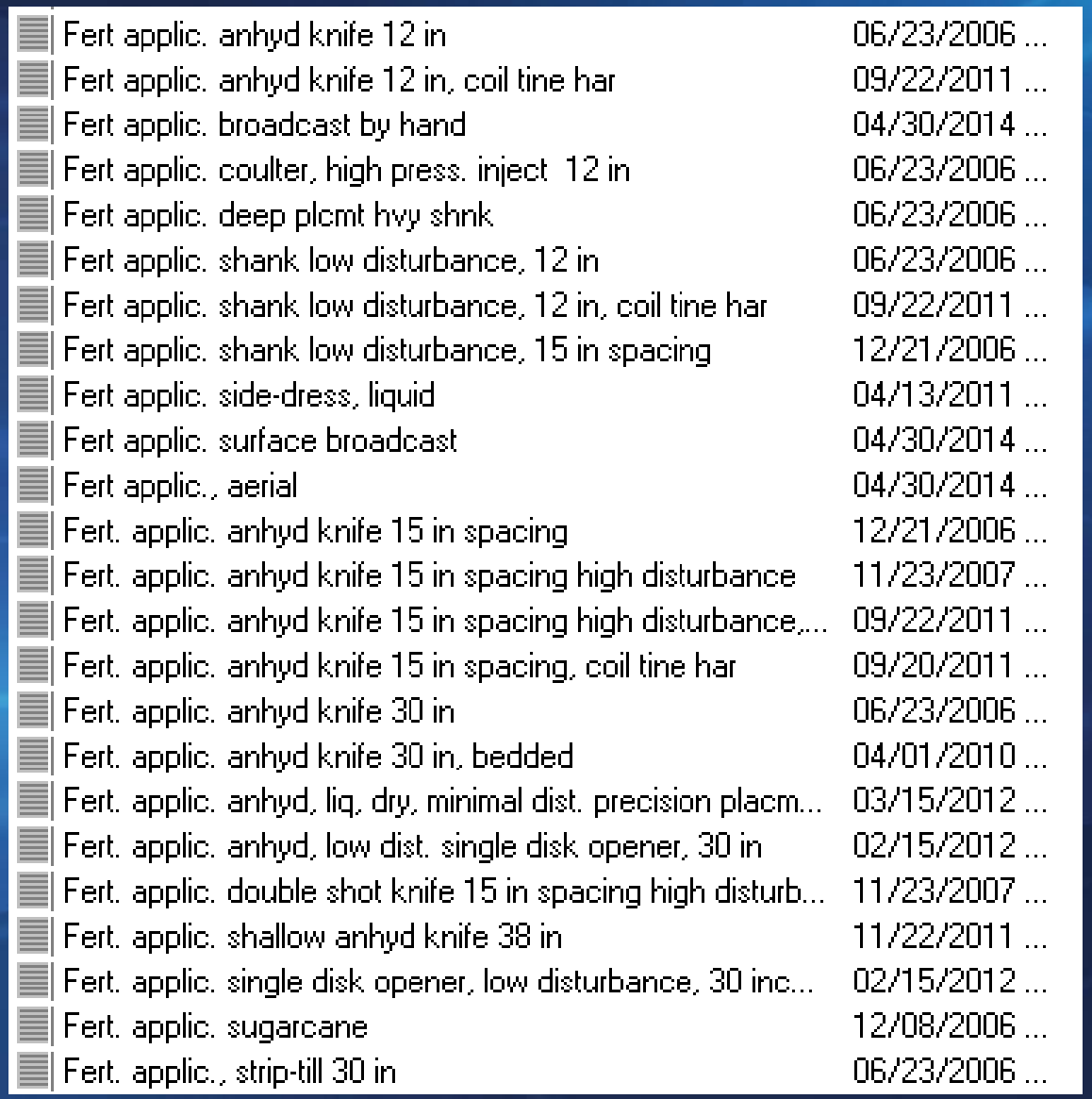
When selecting manure records:

- 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.



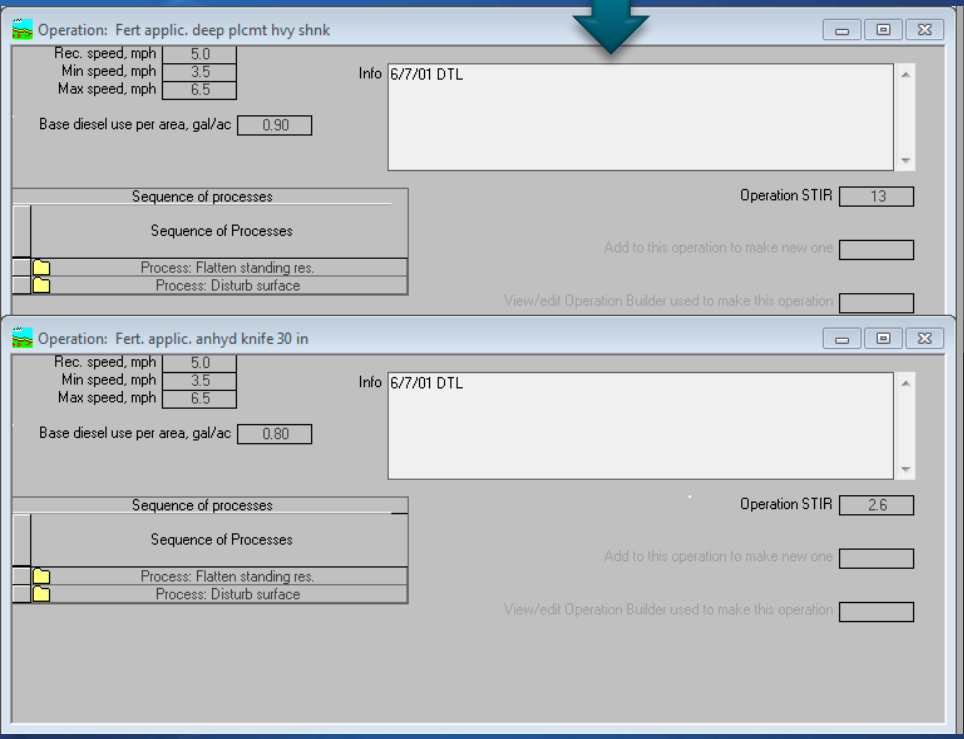
Fert applic. anhyd knife 12 in	06/23/2006 ...
Fert applic. anhyd knife 12 in, coil tine har	09/22/2011 ...
Fert applic. broadcast by hand	04/30/2014 ...
Fert applic. coulter, high press. inject 12 in	06/23/2006 ...
Fert applic. deep plcmt hvy shnk	06/23/2006 ...
Fert applic. shank low disturbance, 12 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 ...

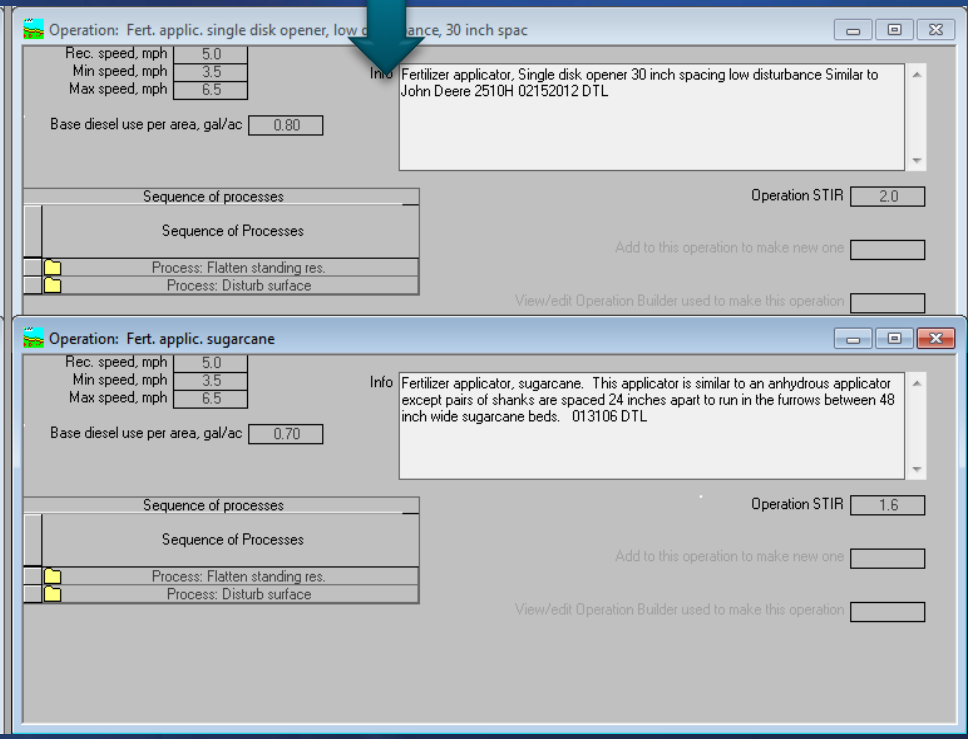
Fertilizer Records

- 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



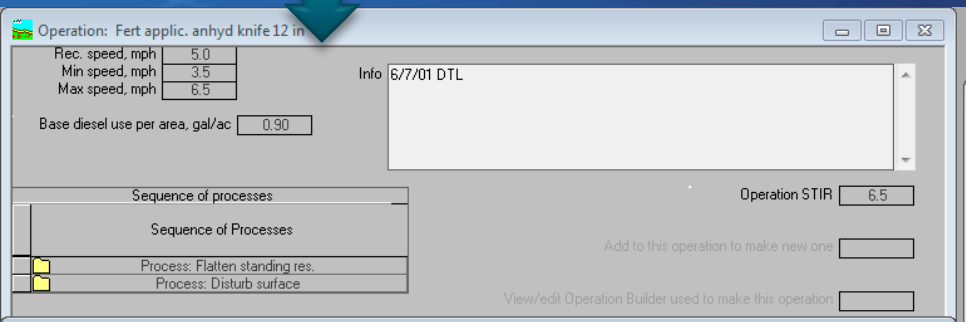


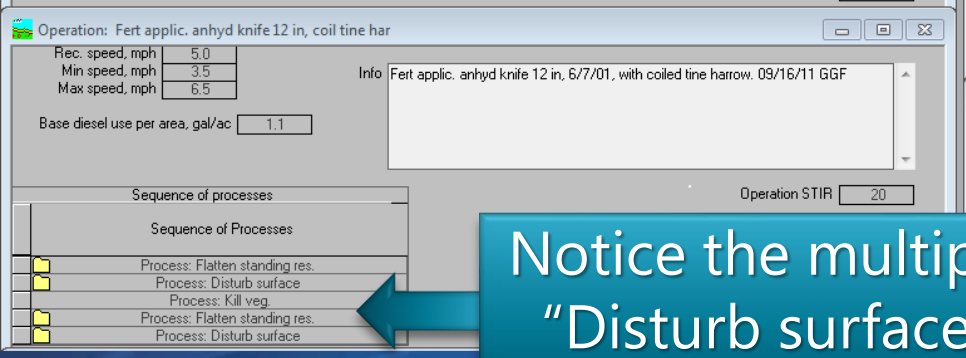
Fertilizer Records

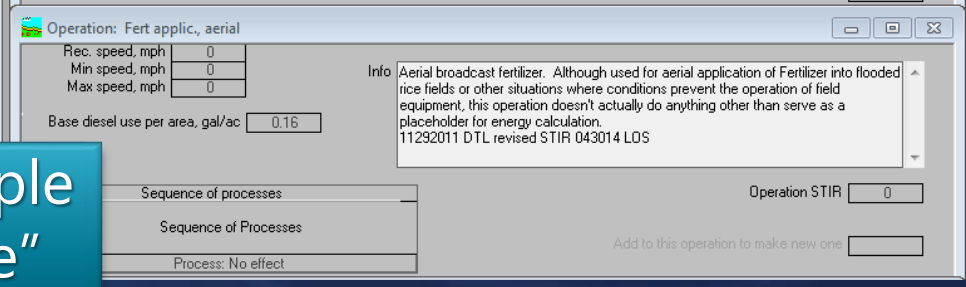
- Records attempt to capture the effects of running fertilizer equipment through the field.

"Disturb surface" process present in these records

No "Disturb surface" process in these records



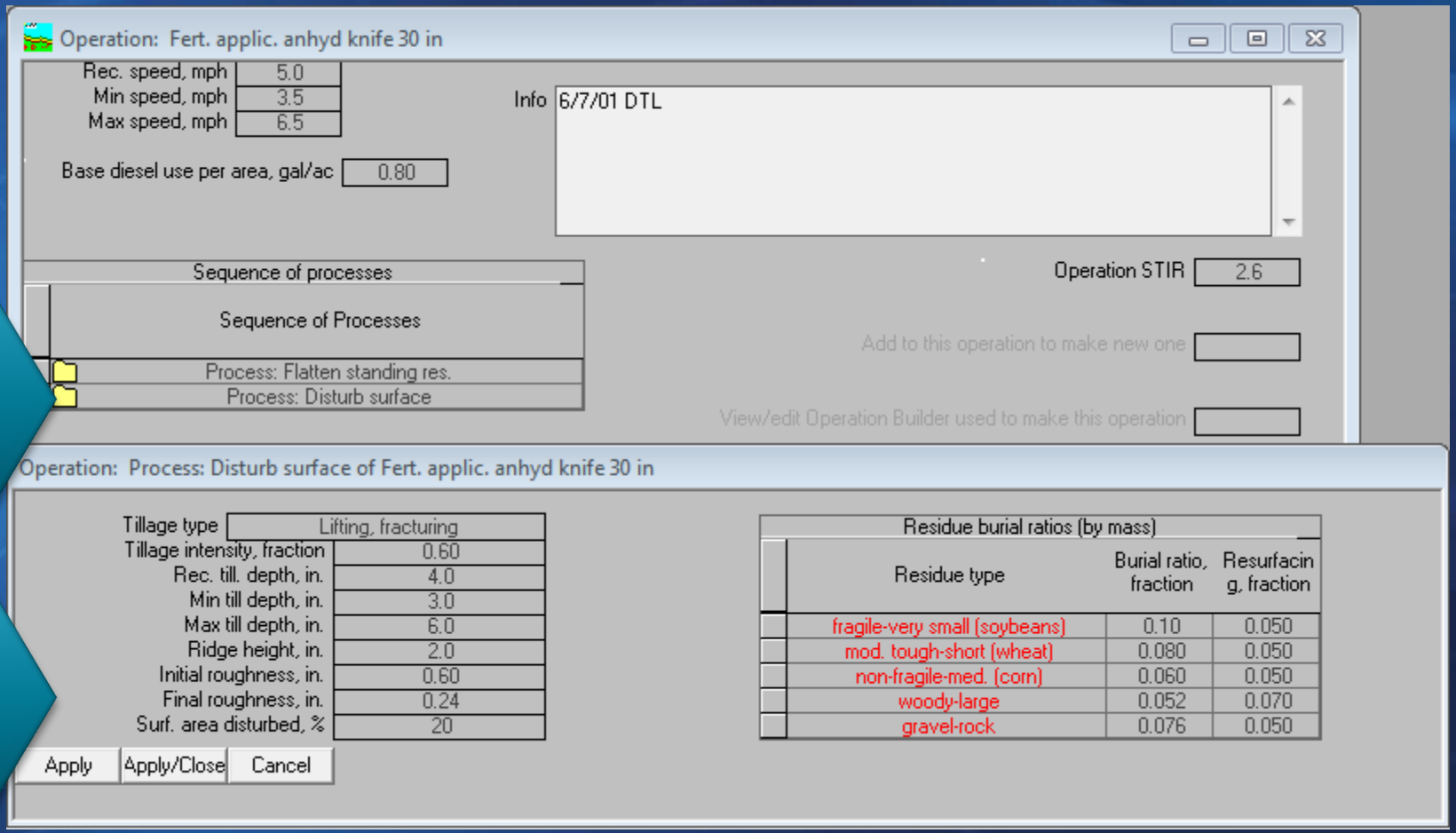




Notice the multiple "Disturb surface" processes here

Fertilizer Records

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

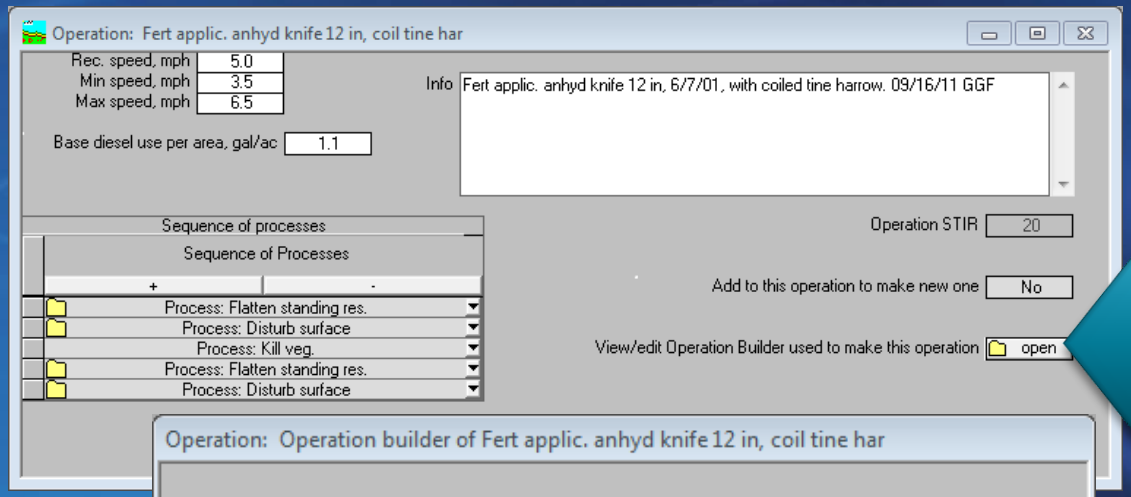


Click on the folder

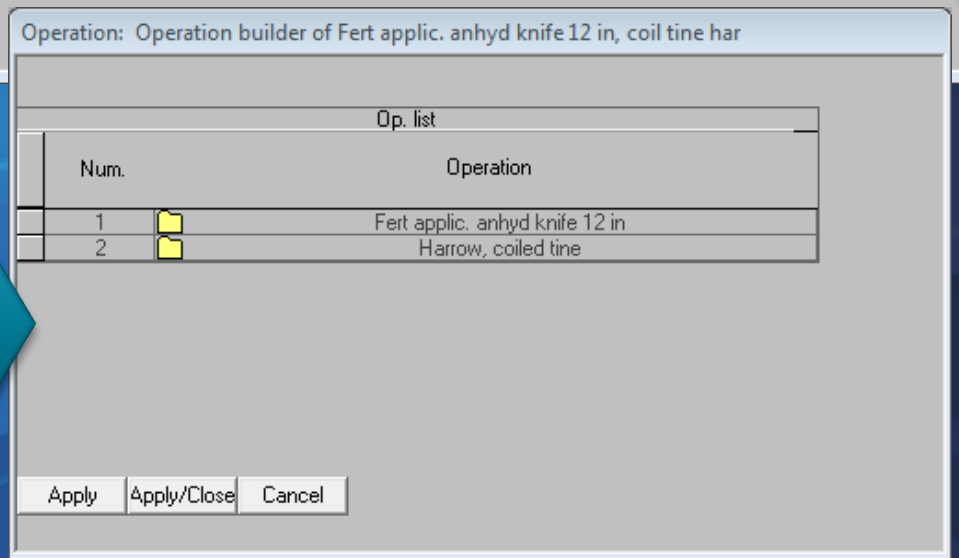
You get this window

Fertilizer Records

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



Click on the button

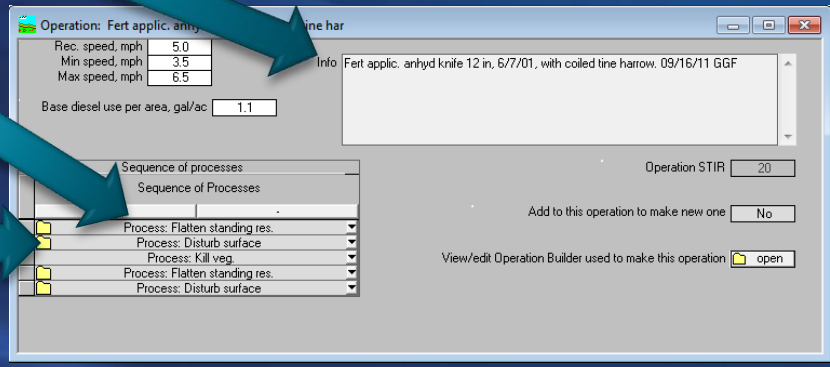


You get this window

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, rollng bskt	09/22/2011
Seedbed finisher, fld cult, mlch trdr	11/01/2007
Seedbed finisher, fld cult, rtry har	11/01/2007
Seedbed finisher, sngl disk, fld cult, coil tine har, rollng bskt	07/02/2008
Seedbed finisher, sngl disk, rotry har	07/02/2008
Seedbed finisher, sngl 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

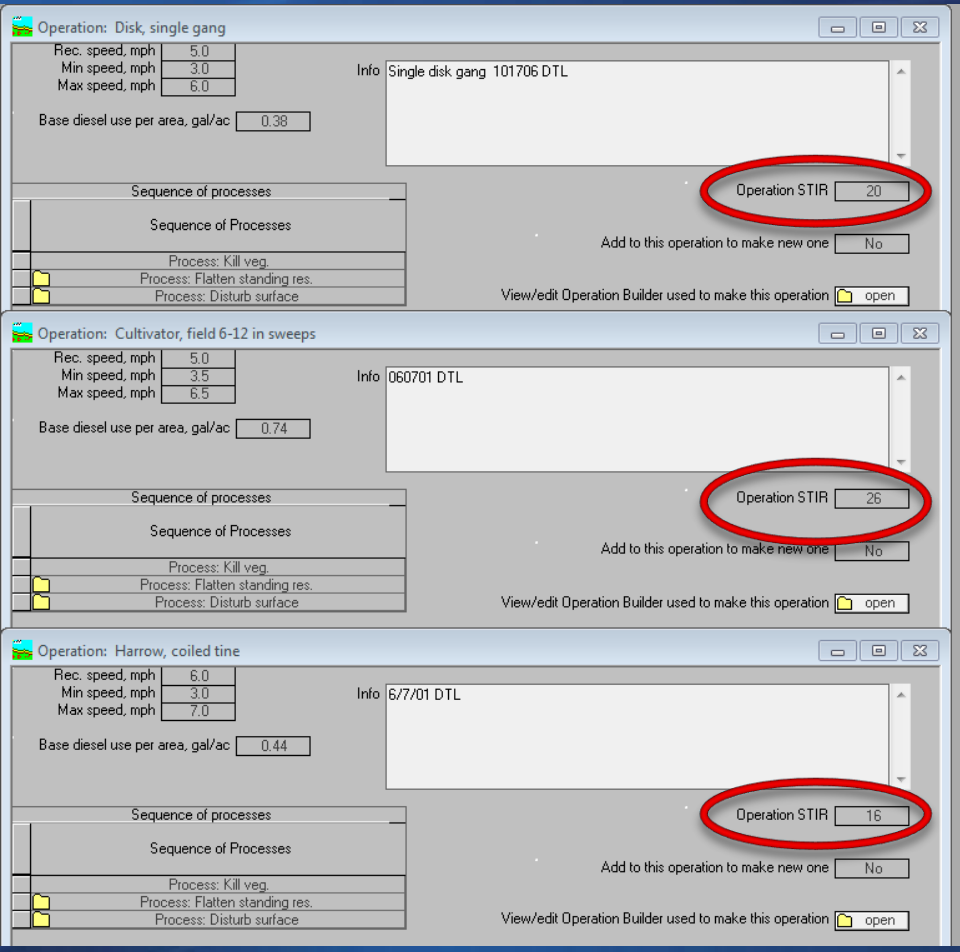
Subsoil disk ripper, coulter smooth, rlng bskt

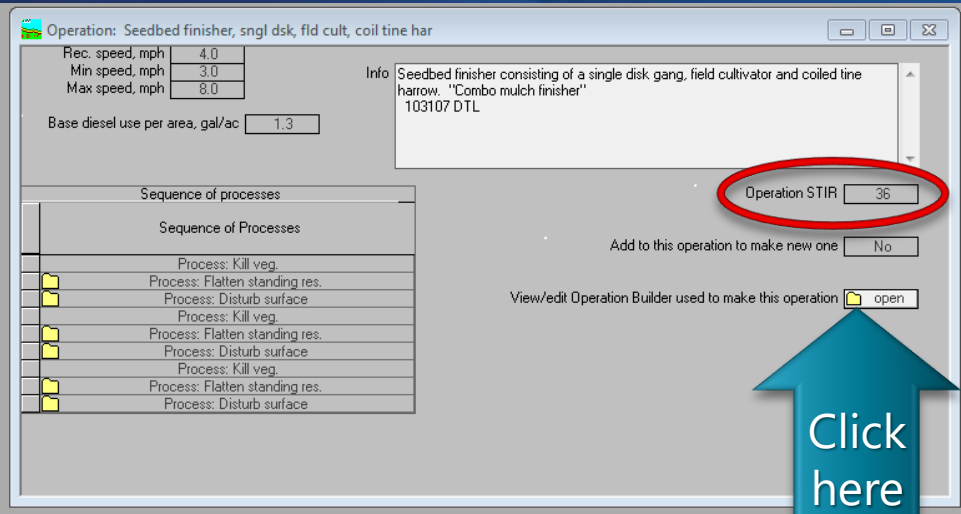
“Multi-Gang” Tillage Records

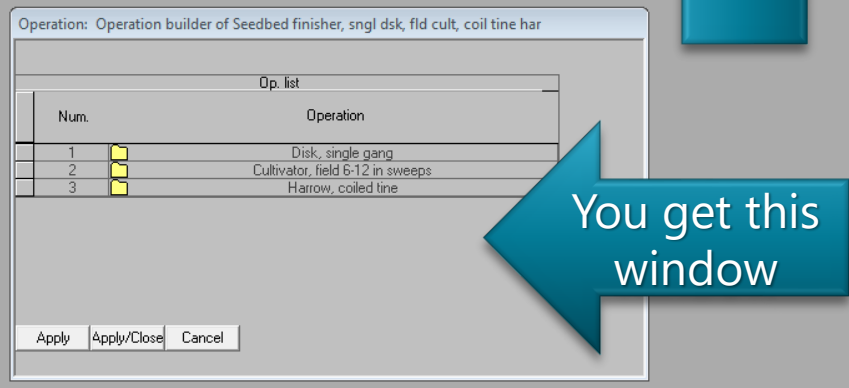
- However, not every combination of tillage tools are available.

“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.

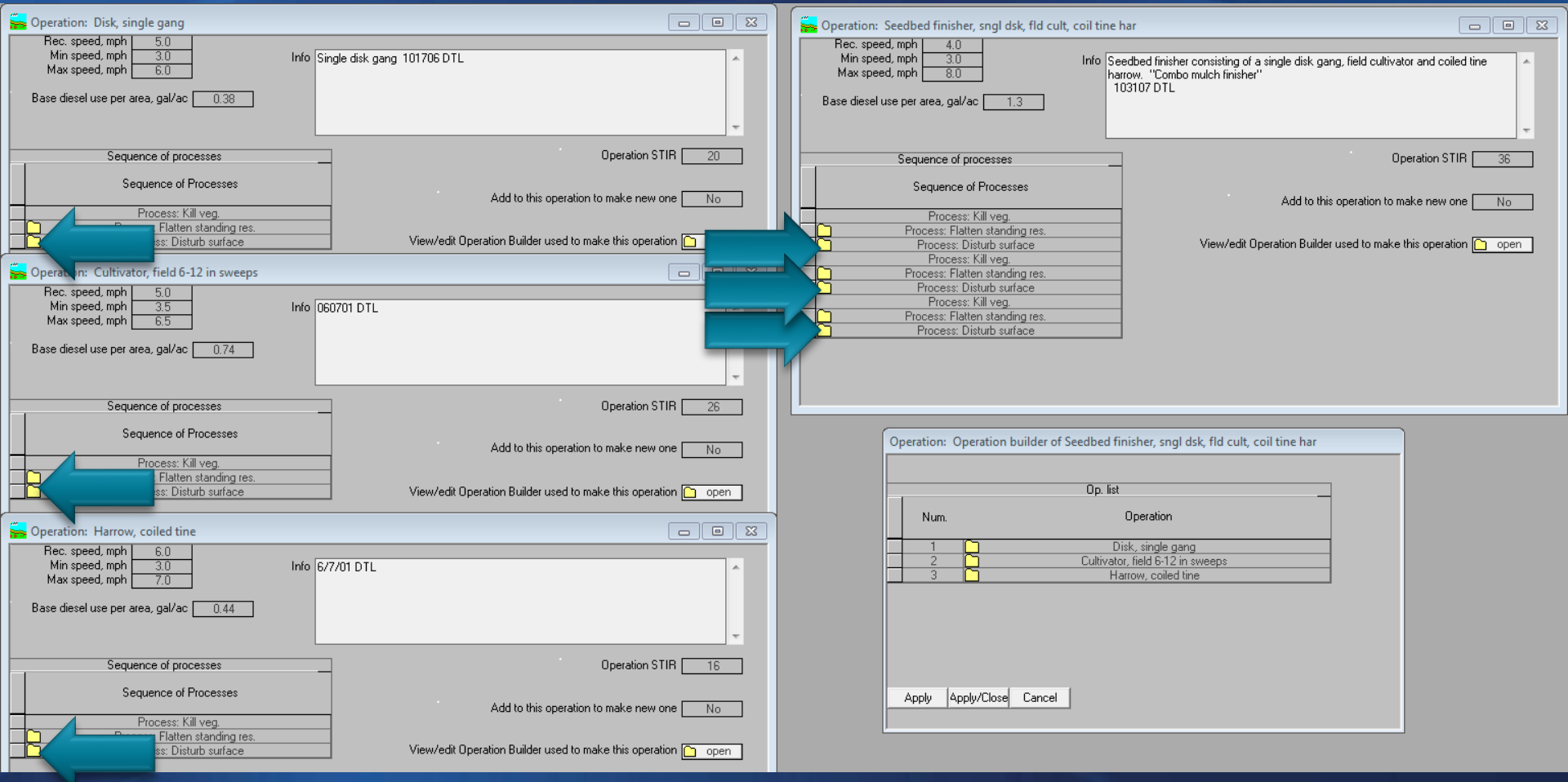






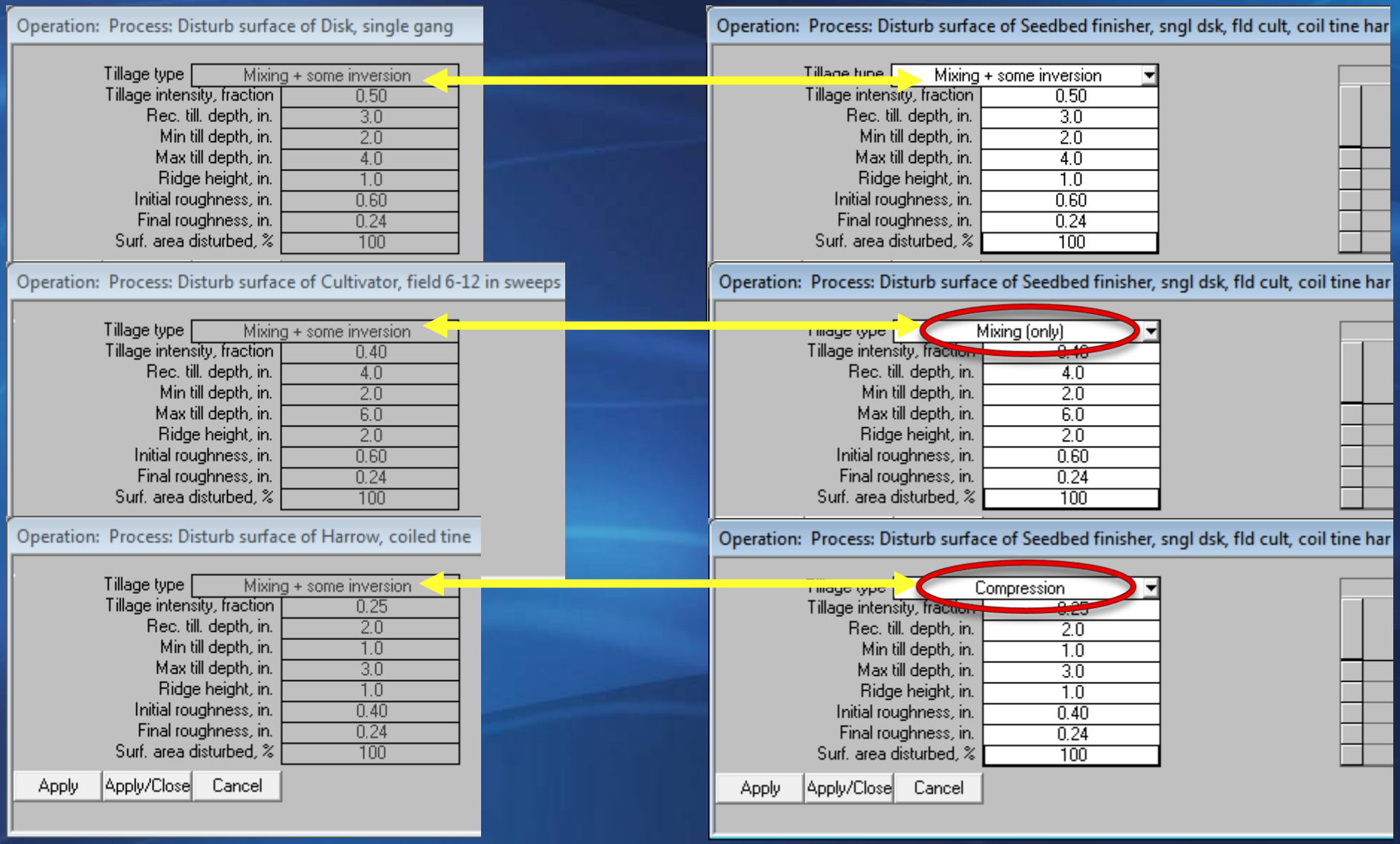
“Multi-Gang” Tillage Records

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



“Multi-Gang” Tillage Records

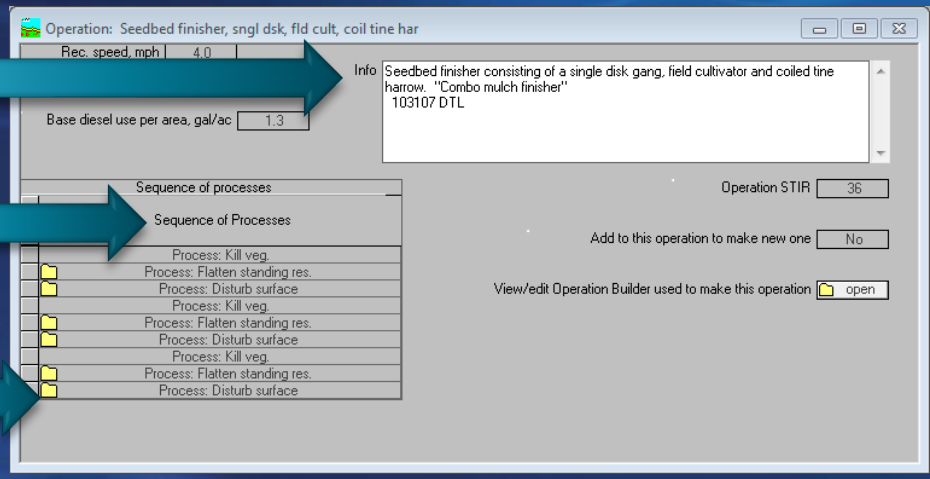
- Comparing soil disturbance effect:



“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

Subsoilers

Coulters associated with the subsoilers

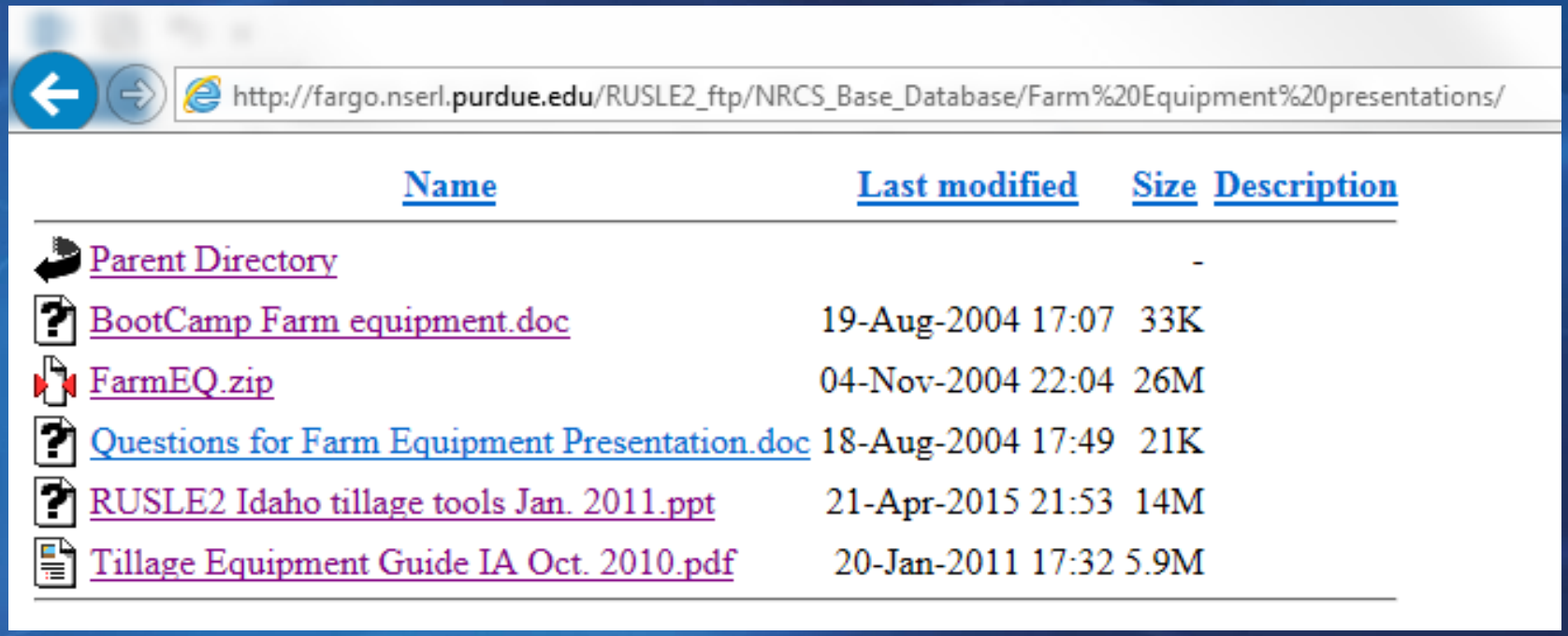
Rolling Baskets to smoothen the surface

- 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/



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?