Nutrient Management Plan Excel User Guide

Rev. October 2021

NMP Excel User Guide
Table of Contents and Description of Each Section

The NMP Standard Format utilizes two software formats: Microsoft Excel and Microsoft Word. This guide provides information for understanding how to use the Microsoft Excel planning tool.

NMP Excel User Guide
Table of Contents and Description of Each Section

Overview of the Excel NMP Version 8 Layout

Purpose:

This document provides an overview of the Nutrient Management Plan, (NMP) Excel spreadsheet.

It will cover the following aspects:

1. Compatibility with Excel Versions and Computers
2. Downloading the file
3. Setting up the file and computer for use
4. Navigating the NMP spreadsheet
5. Overview of the various worksheets
6. Helpful tips when completing worksheets

The Excel Nutrient Management Plan, (NMP) Excel spreadsheet is used to complete the following sections of the NMP.
NMP Summary and Summary Notes
Manure Spreader Calibration Table
Appendix 3 – Manure Group Information Section
Appendix 4 – Crop & Manure
Appendix 5 – Phosphorous Index
Appendix 10 – Supporting Information and Documentation

The following optional worksheets are available to help complete the sections mentioned above.
Rainfall Additions Worksheet
Winter Manure Application Matrix
5-year Manure Analysis Averaging Table
Manure N Residual Calculator Worksheet
Table 3 – Planner Added Crops
Table 4 – Planner Added Legume Residual Scenario
Animal-Type Manure Production Worksheet – Planner Added Animal Type
Grazing Calculator Worksheet

1. Compatibility with Excel Versions and Computers

The NMP Version 8 Excel file works on a PC but many functions don't work on a Mac. Please plan on using a PC. NMP Version 8 has been tested in Excel Versions 2013 and2016. The functionality should extend to Excel 2010 – Excel 2019 and Office 365.

2. Downloading the file

The most recent version of the NMP Version 8 will be available on the Penn State Nutrient Management website: https://extension.psu.edu/programs/nutrient-management

Overview of the Excel NMP Version 8 Layout

The most recent version of the NMP Version will be available on the Penn State Nutrient Management website:
https://extension.psu.edu/programs/nutrient-management

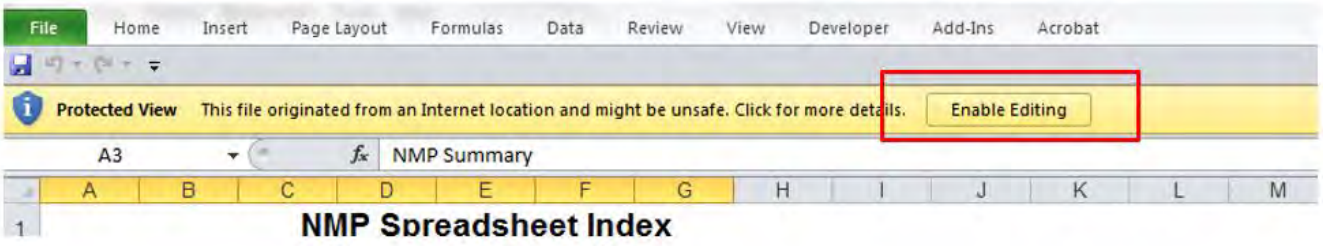
Remember to Download both the Excel and Word NMP documents to complete a Nutrient Management Plan

A notice is sent to all specialists when a new version or revision is released.

When a new major version is released you must use the new version for all future plans. When a minor revision is made to the NMP, it is recommended that you use the most recent revision. If the revision resolves a defect that directly affects a planning scenario affecting your plan, then you must use the newest revision. In other words, older revisions of plans cannot be submitted to the NMP technical team to have updates added to existing NMP's created in a previous version.

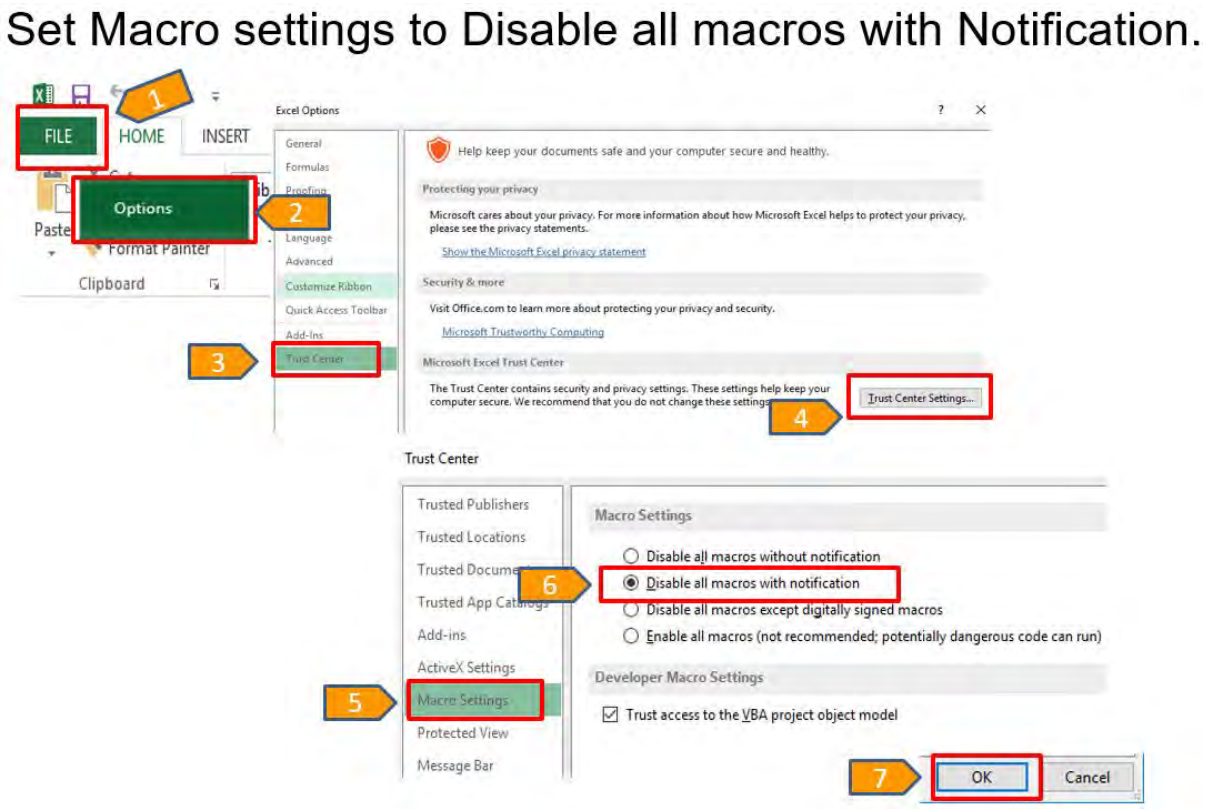
3. Setting up the file and your computer for use

3.1. After downloading the spreadsheet from the Nutrient Management website you need to enable editing and enable content of the file.



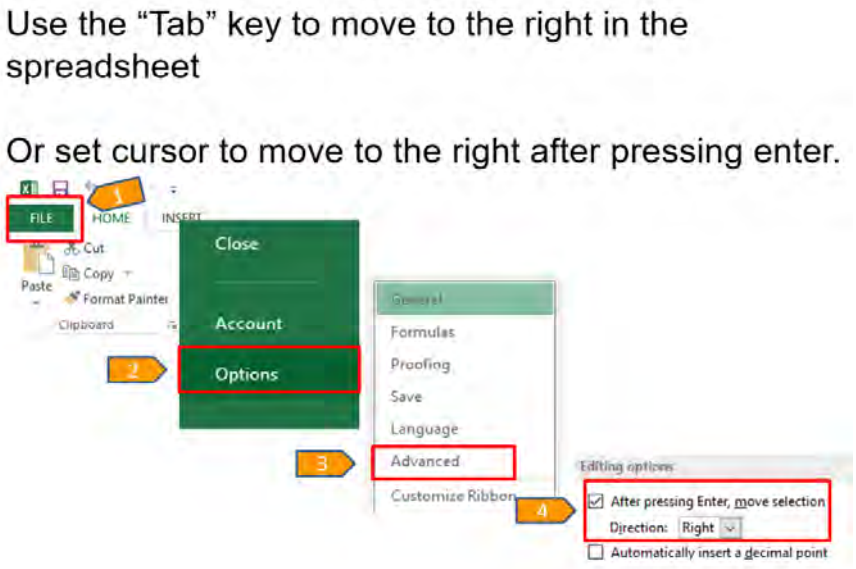
3.2. Set Macro settings to disable all macros with Notification

Some computers may need to be set up to use macros. You may need to set your computer following the screen shots below.



3.3. Navigating the worksheets will be easier if your cursor is set to move to the right after pressing enter.

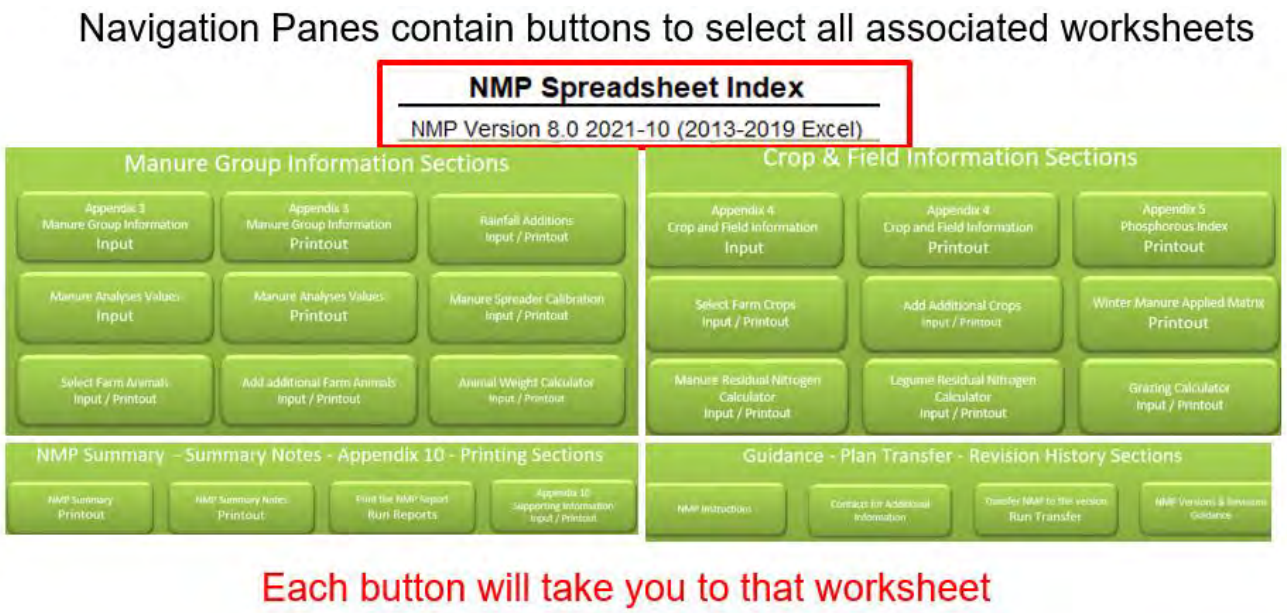
To set your cursor to move to the right. The following screenshots details how to set up your computer to do this.



4. Navigating the NMP Spreadsheet

4.1. NMP Index

The NMP Spreadsheet Index can be used for navigating the spreadsheet (workbook). All worksheet tabs are listed and are hyperlinks to each particular page. The NMP version is listed at the top of the index.



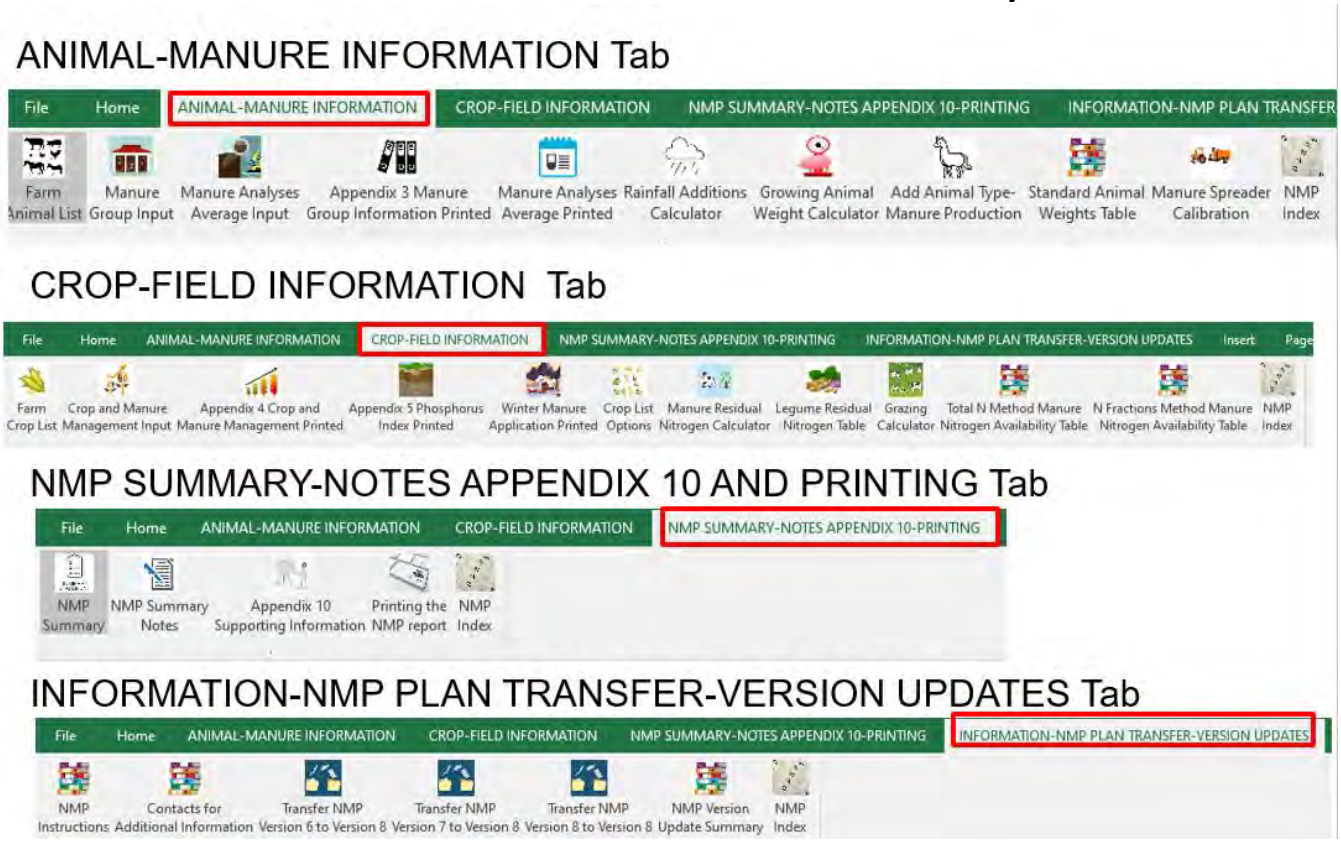
4.2. Use the ribbon tabs to navigate through the workbook

4.2.1. Each worksheet has an icon link at the top of the toolbar ribbon. With this feature you are two clicks away from any worksheet and one click away from the index. The ribbon icons are grouped by use to simplify planning. There are four main tabs:

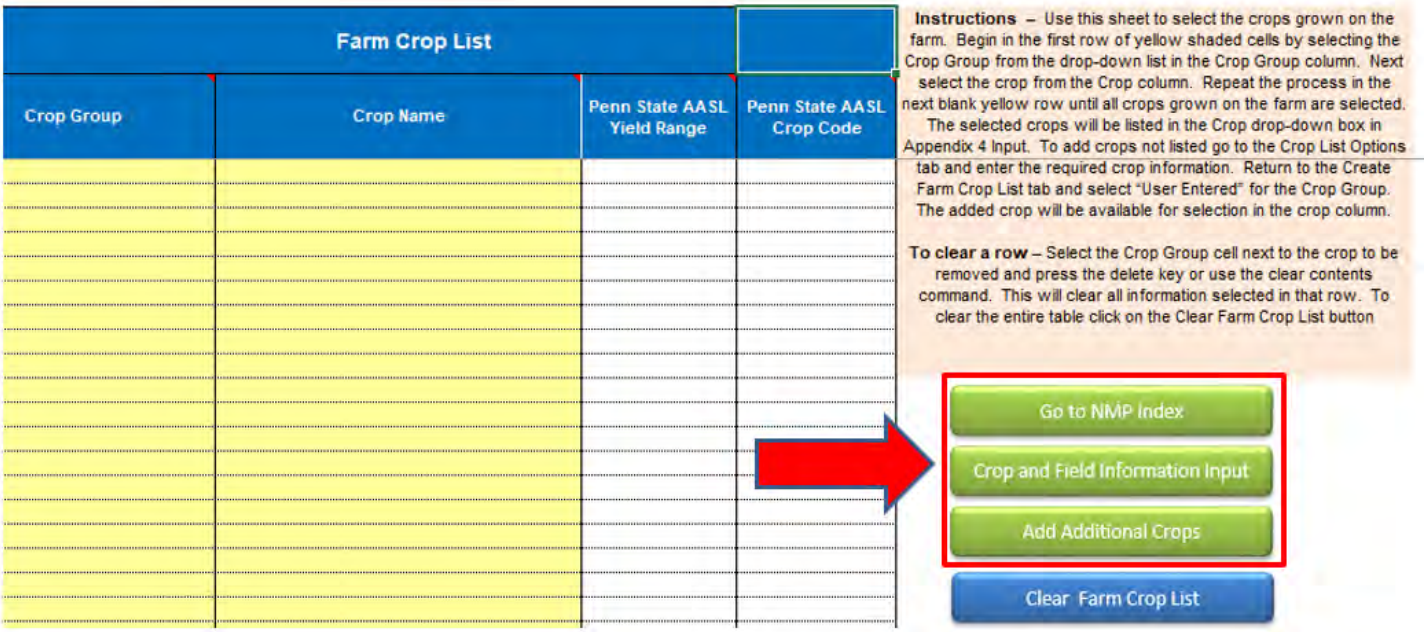
- Animal-Manure Information
- Crop-Field Information
- NMP Summary Notes-Appendix 10-Printing
- Information-NMP Plan Transfer-Version Updates

Each tab then contains icons links to the various worksheets associated with them. The NMP Index is always shown so you can find your way back to the beginning of the workbook.

Overview of the Excel NMP Version 8 Layout



Worksheet navigation buttons are listed on most pages throughout the spreadsheet



5. Overview of the various worksheets

There are many worksheets in the Excel planning tool. Some are for information or reference, others are for data entry, and some are simply printouts for submission. The following table briefly describes each worksheet in the Excel NMP workbook.

Worksheet Icon	Worksheet Tab Name	Worksheet Type	Worksheet Description
Farm Animal List	Farm Specific Animal List	Required data entry	Animals specific to the operation are selected here.
Manure Group Input	Appendix 3 Input	Required data entry	The manure group and animal group information is entered here.
Manure Analyses Average Input	Manure Average Input	Required data entry	The manure group analyses information is entered here (up to 5 years).
Appendix 3 Manure Group Information Printed	Appendix 3 Manure Group Info.	Required printout for submission	Appendix 3 Manure group information printout.
Manure Analyses Average Printed	Manure Avg Printed	Required printout for submission	Manure Group analyses information printout
Rainfall Additions Calculator	Rainfall Worksheet	Optional worksheet - printed if used	Used when a liquid manure group receives rainfall additions either from direct rainfall or rainfall runoff.
Growing Animal Weight Calculator	Animal Weight Calculator	Optional worksheet - printed if used	Determines a growing animal weight based on a production age range.
Add Animal Type-Manure Production	Animal Type-Manure Production	Optional worksheet - printed if used	Lists animal types and manure production and analyses book values. Planners can add additional animal types and required information not already listed.
Standard Animal Weights Table	Animal Weight Calculator	Information section	The standard animal weights table (Penn State Agronomy Facts 54 Table 1) is shown here.
Manure Spreader Calibration	Manure Spreader Calibration	Required printout for submission	Manure spreader calibration information
NMP Index	NMP Index	Navigation Tool	Navigation tool takes planner back to the NMP Index.

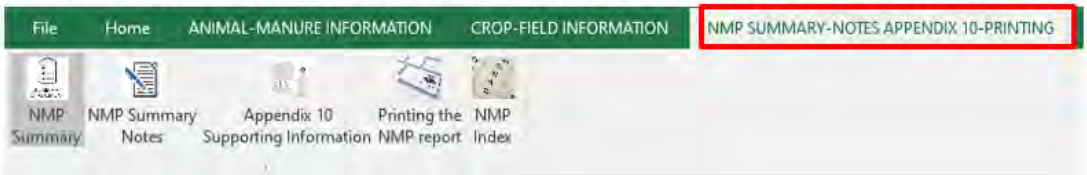
Overview of the Excel NMP Version 8 Layout

CROP-FIELD INFORMATION Tab

Worksheet Icon	Worksheet Tab Name	Worksheet Type	Worksheet Description
Farm Crop List	Farm Crop List	Required data entry	Select only the crops grown on the farm.
Crop and Manure Management Input	App4 Input	Required data entry	All Field, Crop, Nutrient, P Index, and Winter Application, and Field Note information is entered here.
Appendix 4 Crop and Manure Management Printed	Appendix 4 Crop & Manure Mgmt.	Required printout for submission	Appendix 4 Crop & Manure Management information printout.
Appendix 5 Phosphorus Index Printed	Appendix 5 P Index	Required printout for submission	Printout of P Index results for all Part B fields in the NMP. Transferred from Appendix 4 Input
Winter Manure Application Printed	Winter Application Matrix	Optional worksheet - printed if used	Printout of Winter Matrix results for all Part B fields in the NMP. Transferred from Appendix 4 Input
Crop List Options	Crop List Options	Optional worksheet - printed if used	Crops not currently listed in the NMP can be entered here as a user entered crop.
Manure Residual Nitrogen Calculator	Residual N Calculator	Optional worksheet - printed if used	Determines the residual organic nitrogen available based on the previous 5-year manure application history. Legumes not currently listed in the NMP can be entered here.
Legume Residual Nitrogen Table	Table 4	Optional worksheet - printed if used	Residual nitrogen contributions from legumes. A legume can
Grazing Calculator	Grazing Group Manure Calculator	Optional worksheet - printed if used	Determines an uncollected manure application rate and average nutrient content based on animal species, days, and hours/day of grazing for a field.
Total N Method Manure Nitrogen Availability Table	Table 5	Information	Penn State Agronomy Guide Tables 1.2-11-A and 1.2-11-B Shows the **Total Nitrogen availability factors** based season/ incorporation method, the residual manure nitrogen availability based on previous 5-year manure application history and double crop carryover availability factors.
N Fractions Method Manure Nitrogen Availability Table	Table 6	Information	Penn State Agronomy Guide Tables 1.2-11-A and 1.2-11-B Shows the **N Fractions availability factors** based season/ incorporation method, the residual organic manure nitrogen availability based on previous 5-year manure application history and double crop carryover availability factors.
NMP Index	NMP Index	Navigation Tool	Navigation tool takes planner back to the NMP Index.

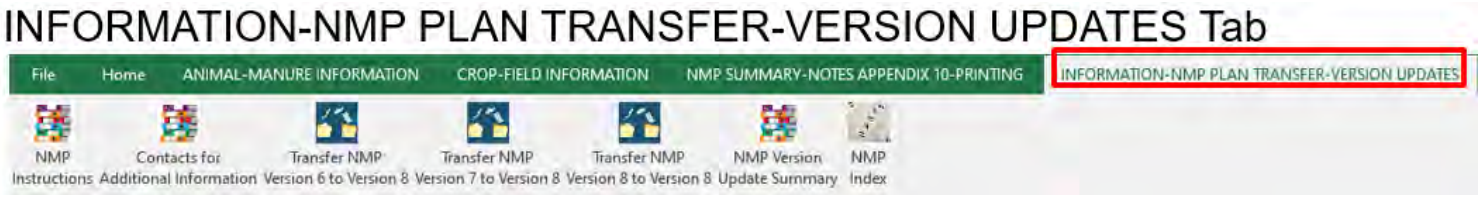
Overview of the Excel NMP Version 8 Layout

NMP SUMMARY-NOTES APPENDIX 10 AND PRINTING Tab



Worksheet Icon	Worksheet Tab Name	Worksheet Type	Worksheet Description
NMP Summary	NMP Summary	Required data entry and printout for submission	Printout summarizing the crop, manure application, and fertilizer application intentions for the crop year. List the Crop year(s), whole farm note, farm acreage, and Animal Equivalent Units values.
NMP Summary Notes	NMP Summary Notes	Required printout for submission	All field notes entered in Appendix 4 Crop & Manure Management input section are listed in this printout.
Appendix 10 Supporting Information	Appendix 10 Supporting Info	Required printout for submission	Used to record supplemental information, calculations, and worksheets.
Printing the NMP report	Print NMP Report	Used for printing the various worksheets	This worksheet is used to print the required Excel NMP pages.
NMP Index	NMP Index	Navigation Tool	Navigation tool takes planner back to the NMP Index.

Overview of the Excel NMP Version 8 Layout

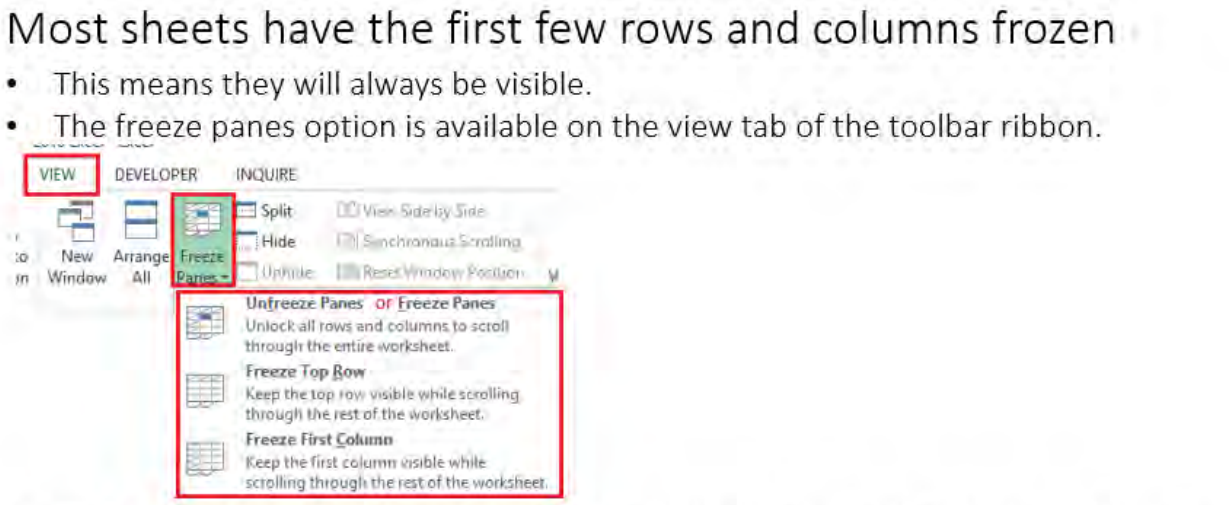


Worksheet Icon	Worksheet Tab Name	Worksheet Type	Worksheet Description
NMP Instructions	NMP Instructions	Information	Outline for completing the Excel NMP sections.
Contacts for Additional Information	Contacts for Additional Info.		PSU and SCC staff to contact for assistance when completing a plan.
Transfer NMP to Version 8	Transfer NMP to Version 8		Used to transfer a NMP from a previous version to the current version.
NMP Version Update Summary	Version Update		A list of historical updates for each NMP version.
NMP Index	NMP Index	Navigation Tool	NMP Excel workbook Table of Contents

6. Helpful tips when completing worksheets

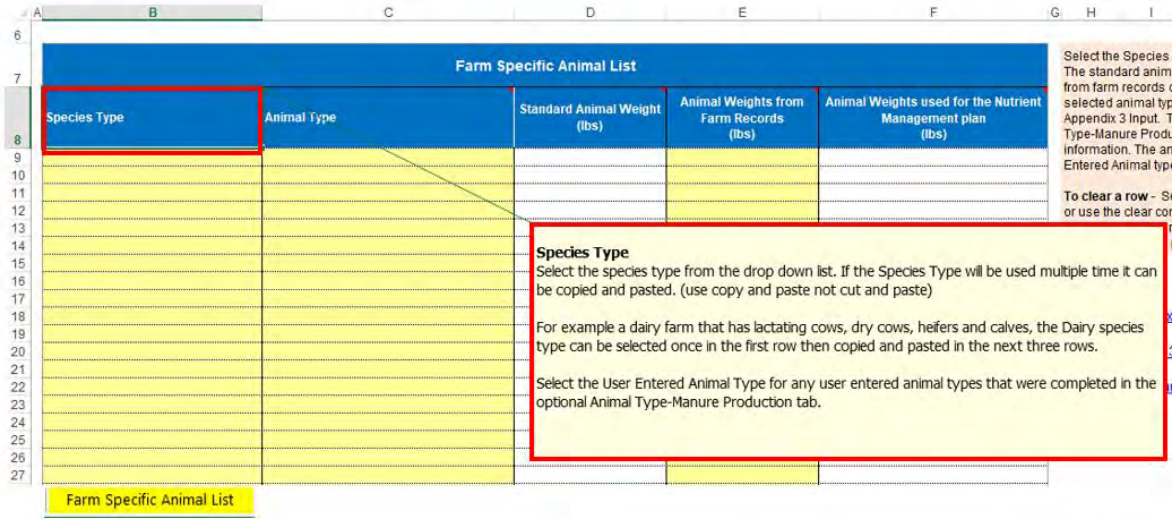
6.1. Freeze Panes

Most sheets have the first few rows and columns frozen so the row or column headings not move. This means they will always be visible as you scroll around the spreadsheet. The freeze panes option is available on the view tab of the toolbar ribbon.



6.2. Column Header Notes

The blue column headers cells with red triangles have helpful notes included to help you understand what needs to be entered or what the cell data is used for. Where you see a red triangle in the cell, there is a note to help explain what should be entered in that column. For example, when you click in the Species Type column header the following message will appear:



6.3. Color coding cells for data entry cells

- **Yellow cells** –are data entry cells.
- **White cells** – are generally formula cells used for calculations or showing displaying values form other cells. For example, the balance after manure is displayed in a white cell as it's a calculated value based on the crop nutrient needs, fertilizer, residual nitrogen history minus the planned manure application rate.
- **Grey** – some cells will be greyed out.

  For Example, the P Index manure application method will be greyed of it a field **is not** a Part B field.
  However, the P Index manure application method will be yellow if it **is** a Part B field.
- **Conditional Formatting** – some cells are programmed to change color based on a value.

  For example, if a field has a P Index score over 80 then the nitrogen based planned manure rate will be red indicating this rate can't be applied
  However, the P removal rate will be green indicating this manure rate can be applied to the field.

Color Coding Example:

A	O	Q	R	AF	AG	AH	AI	AJ	AK	AL	AM	AN	AO	AP
Field Information	Crop Information			Manure and Application					Manure Rate			Balance after Manure		
Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Season	Planned Application Management	P Index Application Method	Multiple Application	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance
1	Corn for Grain	175	bu/A	Beef Bedded Pack	Spring	Spring: Spring or summer utilization-Incorporation within 2–4 days	April - Oct: No incorp or incorp > 1 wk.		34.3	16.7	12	78	-56	-94
2	Corn for Grain	175	bu/A	Beef Bedded Pack	Spring	Spring: Spring or summer utilization-Incorporation within 2–4 days			41.4	16.7	12	103	-56	-94

How to Complete the Farm Specific Animal List Worksheet

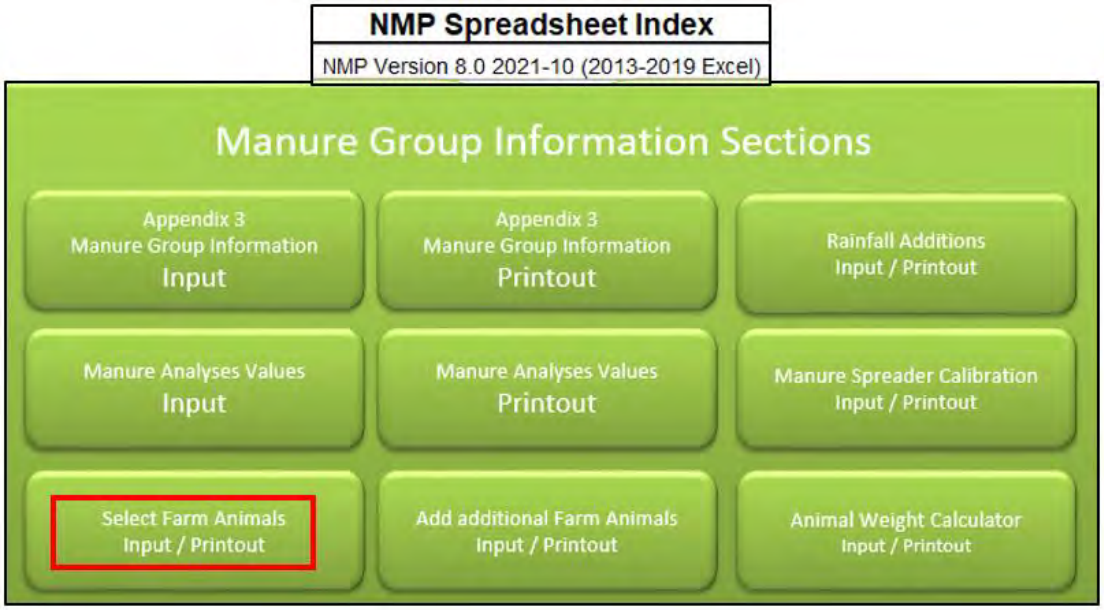
Purpose and Overview:
This procedure describes how to complete the Farm Specific Animal List Input sheet. All animal types in a Nutrient Management Plan, (NMP), are selected here. Most animal types listed in Agronomy Facts 54 are available for selection. To complete this page, select the Species Type then the Animal Type. The standard animal weight will be automatically listed. Animal weights from farm records can be added and used instead of book values in the NMP. The selected animal types will be available for selection in the Animal Type drop down box in Appendix 3 Input.

Associated worksheets

Growing Animal Weight Calculator – This worksheet is used to determine the weight of an animal during a specific age range. For example, the weight of heifers grouped from 4 to 20 months can easily be determined. See section 5 of this handout for instructions to use this worksheet.

Animal Type-Manure Production worksheet – This worksheet is used to add animals not listed in the Farm Specific Animal List tab. User entered animal types are entered along with their manure production values. They will then be available for selection in the Farm Animal List. See section 6 for instructions.

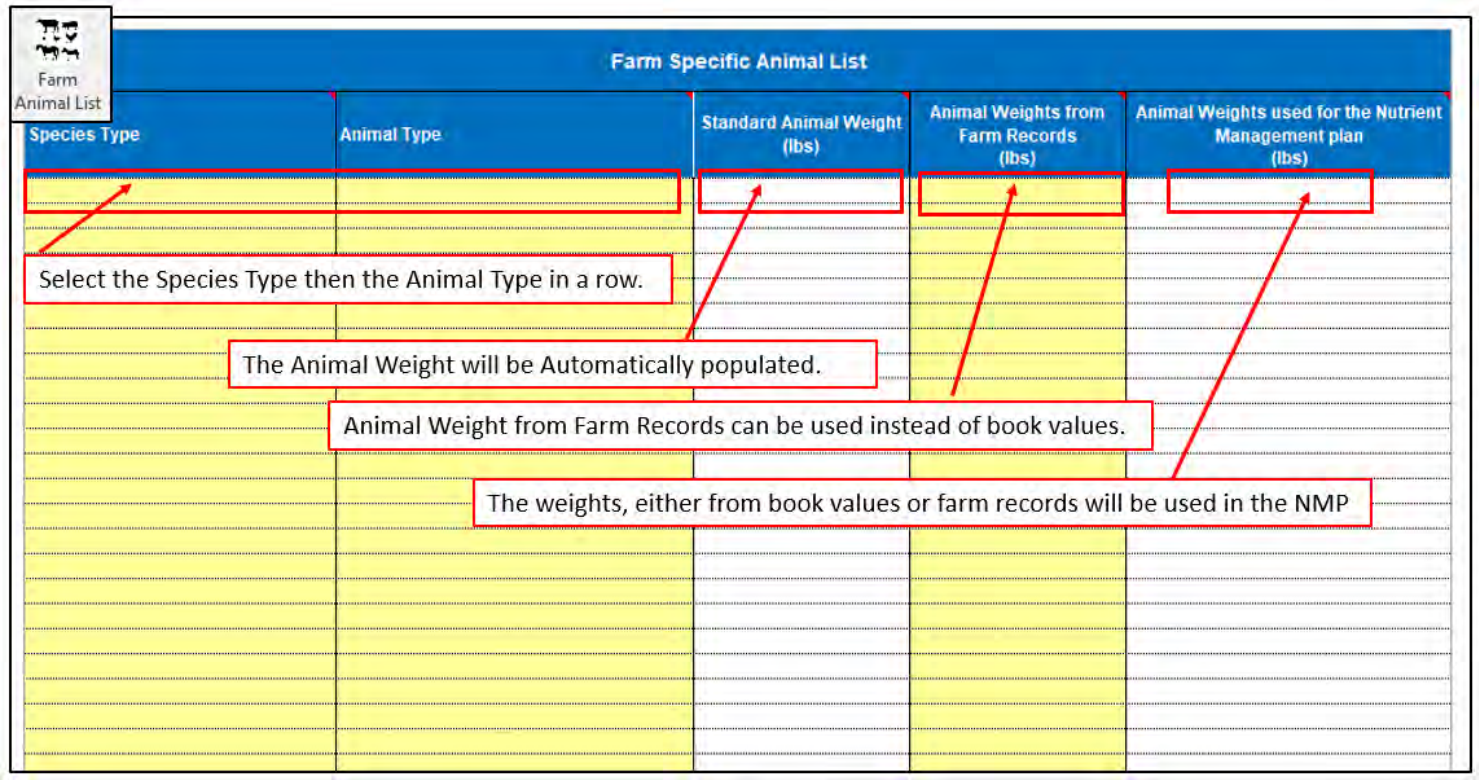
You can find the Farm Specific Animal List tab by clicking on the "Select Farm Animals" button in the NMP Spreadsheet Index



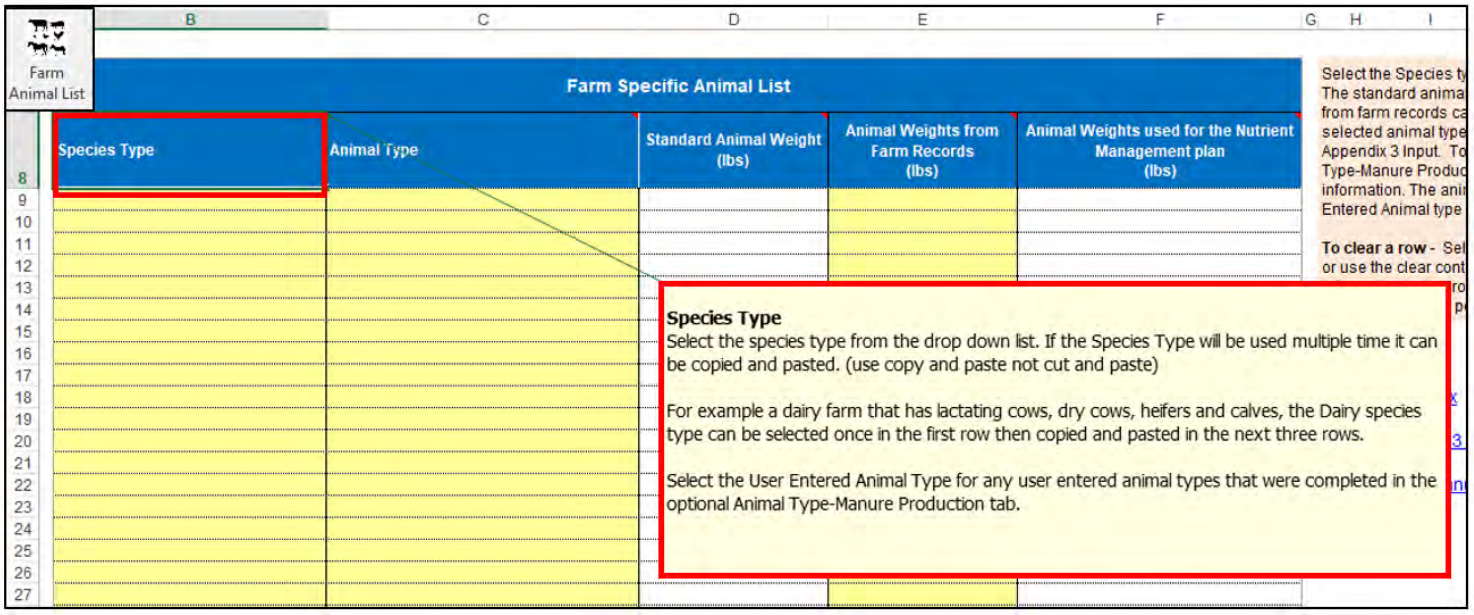
Or click on the Animal-Manure information tab. Select the Farm Animal List icon that looks like this:

Layout of the Farm Specific Animal List Tab

How to Complete the Farm Specific Animal List Worksheet



The blue column headers cells with red triangles have helpful notes included to help you understand what needs to be entered or what the cell data is used for. Where you see a red triangle in the cell, there is a note to help explain what should be entered in that column. For example when you click in the Species Type column header the following message will appear:



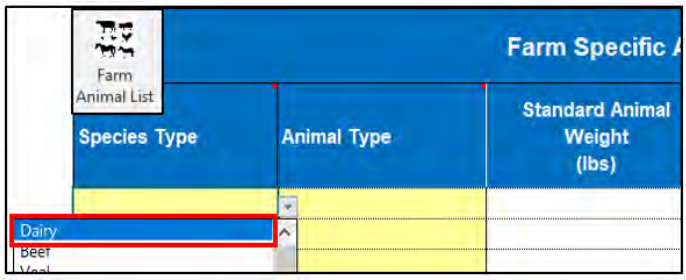
1. Procedure for completing the Farm Specific Animal List

1.1. Select the Species Type.

How to Complete the Farm Specific Animal List Worksheet

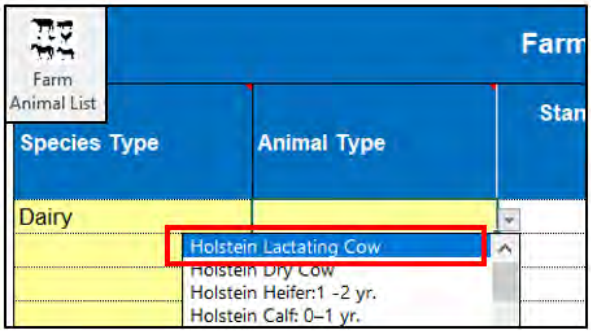
Select the species type from the drop down list. The species/production types are the same as those listed in Agronomy Facts 54. If the Species Type will be used multiple times it can be copied and pasted. (Use copy and paste not cut and paste). For example a dairy farm that has lactating cows, dry cows, heifers and calves, the "Dairy" selection can be selected once in the first row then copied and pasted in the next three rows.

Select User Entered Animal Type in the Species Type Column for any user entered animal types that were completed in the optional Animal Type-Manure Production tab.



1.2. Select The Animal Type

Select the animal type from the drop down list. The available selections are based on the species type that was selected. If you change the species type this column selection will be cleared. The animal types listed in this column will be the only animal types available for selection in Appendix 3 Input. Additional animal types can be added later if needed



1.3. Animal Weight

The standard animal weight listed in Agronomy Facts 54 for the animal type selected will automatically be populated and displayed. The animal weight cell is a white cell meaning it is populated by a formula and is locked.

Farm Animal List

Farm Specific Animal List

Species Type	Animal Type	Standard Animal Weight (lbs)	Animal Weights from Farm Records (lbs)	Animal Weights used for the Nutrient Management plan (lbs)
Dairy	Holstein Lactating Cow	1450		1450
Dairy	Holstein Dry Cow	1450		1450
Dairy	Holstein Heifer:1 -2 yr.	1000		1000
Dairy	Holstein Calf: 0–1 yr.	420		420
Beef	Beef Finishing: 8–24 mo	950	1150	1150

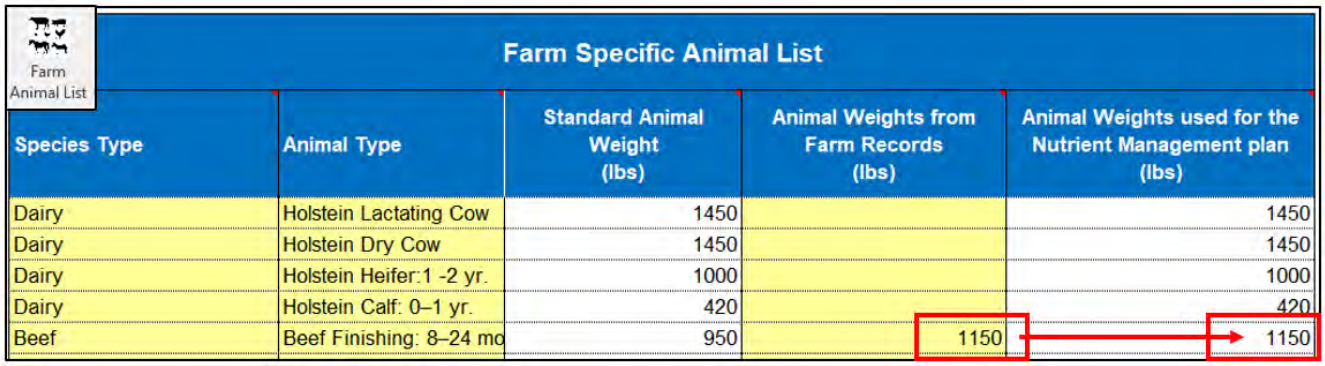
If no animal weights from farm records are available, then the standard animal weight will be used in the NMP.

1.4. Entering Animal Weights from Farm Records

How to Complete the Farm Specific Animal List Worksheet

If the farmer has animal weight records that differ from the standard animal weights, they can be entered here. The farm record weights will be used instead of standard animal weights when completing Appendix 3 Input sheet. Only enter the animal weight. Don't enter the units. For example, if the animal weight based on farm records is 1150 pounds then enter 1150. Don't enter the units of pounds or lbs. Animals weights that are updated here will automatically be updated in Appendix 3.

The Animal Weights used for the Nutrient Management plan is a white cell meaning it is populated by a formula and is locked.



Farm Specific Animal List

Species Type	Animal Type	Standard Animal Weight (lbs)	Animal Weights from Farm Records (lbs)	Animal Weights used for the Nutrient Management plan (lbs)
Dairy	Holstein Lactating Cow	1450		1450
Dairy	Holstein Dry Cow	1450		1450
Dairy	Holstein Heifer:1 -2 yr.	1000		1000
Dairy	Holstein Calf: 0–1 yr.	420		420
Beef	Beef Finishing: 8–24 mo	950	1150	1150

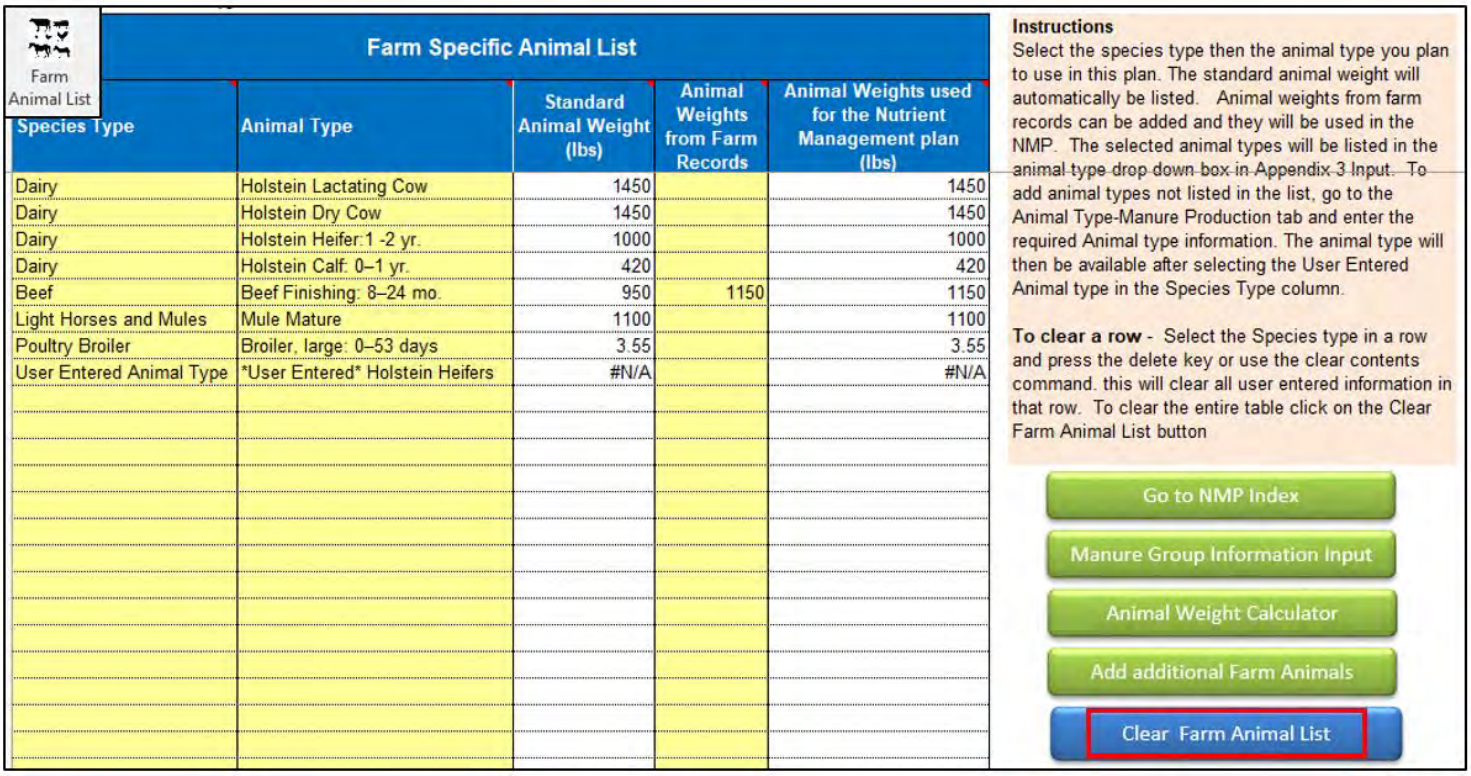
2. Enter the remaining Animal Types that will be listed in the NMP

Farm Specific Animal List

Species Type	Animal Type	Standard Animal Weight (lbs)	Animal Weights from Farm Records (lbs)	Animal Weights used for the Nutrient Management plan (lbs)
Dairy	Holstein Lactating Cow	1450		1450
Dairy	Holstein Dry Cow	1450		1450
Dairy	Holstein Heifer:1 -2 yr.	1000		1000
Dairy	Holstein Calf: 0–1 yr.	420		420
Beef	Beef Finishing: 8–24 mo	950	1150	1150
Light Horses and Mules	Mule Mature	1100		1100
Poultry Broiler	Broiler, large: 0–53 days	3.55		3.55

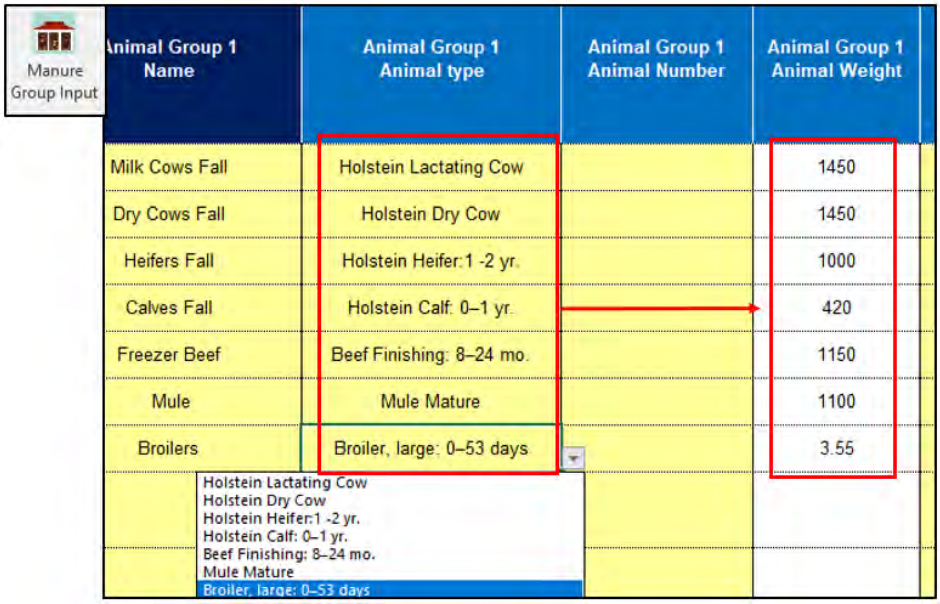
To clear a row, select the Species Type in a row to be deleted and press the delete key or use the clear contents command. This will clear all user entered information for that row.

To clear the entire table, click on the Clear Farm Animal List.



3. The Animal Types selected will be available in Appendix 3 Input

The Animal Types selected will be available in the dropdown lists for the animal types in Appendix 3 Input and the corresponding weights will be automatically populated.



4. The Animal Types selected will be listed in the printed in Appendix 3 Manure Group Information printout

Appendix 3 Manure Group Information Printed	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
Animal Group 1	Milk Cows Fall		Dry Cows Fall		Heifers Fall		Calves Fall	
Animal Type	Holstein Lactating Cow		Holstein Dry Cow		Holstein Heifer:1 -2 yr.		Holstein Calf: 0–1 yr.	
Animal Number	55		20		5		50	
Animal Weight	1450 lbs		1450 lbs		1000 lbs		420 lbs	
Animal Group AUs	79.75 AUs		29.00 AUs		5.00 AUs		21.00 AUs	

	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group
Animal Group 1	Freezer Beef		Mule		Broilers
Animal Type	Beef Finishing: 8–24 mo.		Mule Mature		Broiler, large: 0–53 days
Animal Number	2		2		100
Animal Weight	1150 lbs		1100 lbs		3.55 lbs
Animal Group AUs	2.30 AUs		2.20 AUs		0.36 AUs

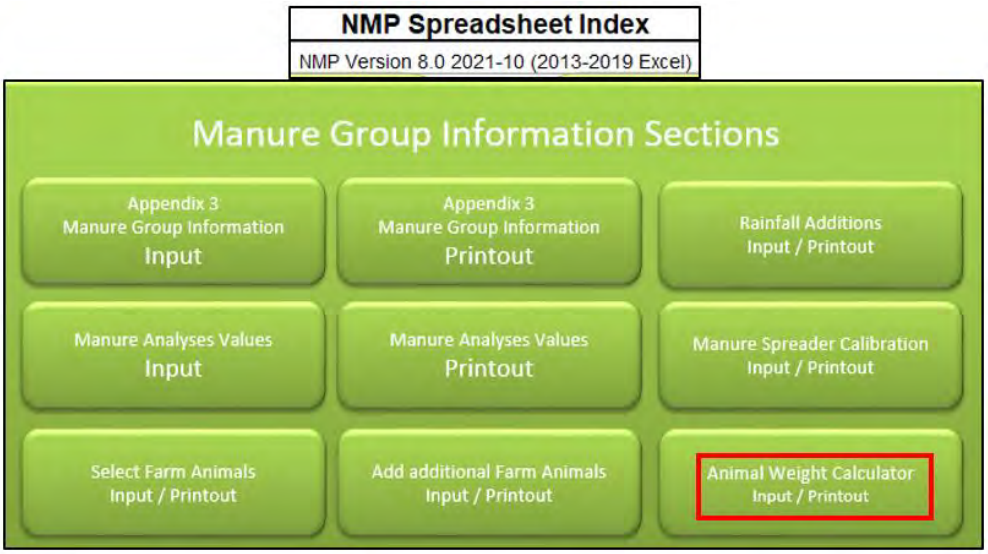
5. Additional Associated Worksheet – Growing Animal Weight Calculator

Animal weights during a specific age range can be calculated using the growing animal weight calculator. The weights will be based on the animal weight listed in Agronomy Facts 54 (Supplement 5 in the Technical Manual)

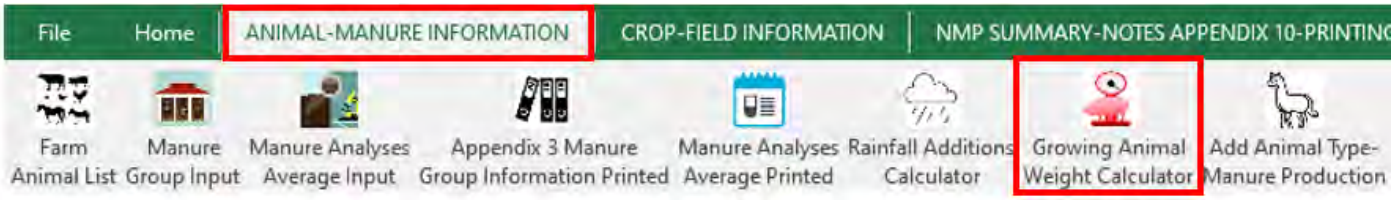
This task can be completed in the growing animal weight calculator by simply entering the animal type, beginning age, and ending age in the calculator.

When this optional worksheet is used it must be printed and included in Appendix 10.

The worksheet in the NMP sheet is labeled "Animal Weight Calculator" in the Excel NMP workbook. This particular worksheet is an optional worksheet. You can find it in the NMP Spreadsheet Index:

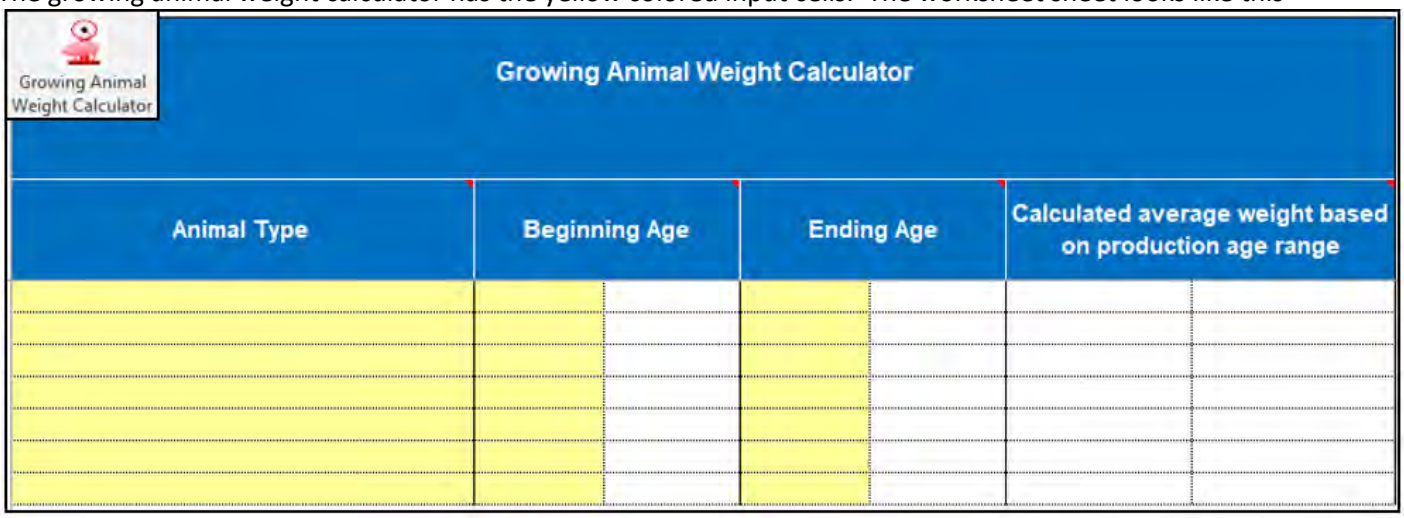


Or use the toolbar ribbon Icon:

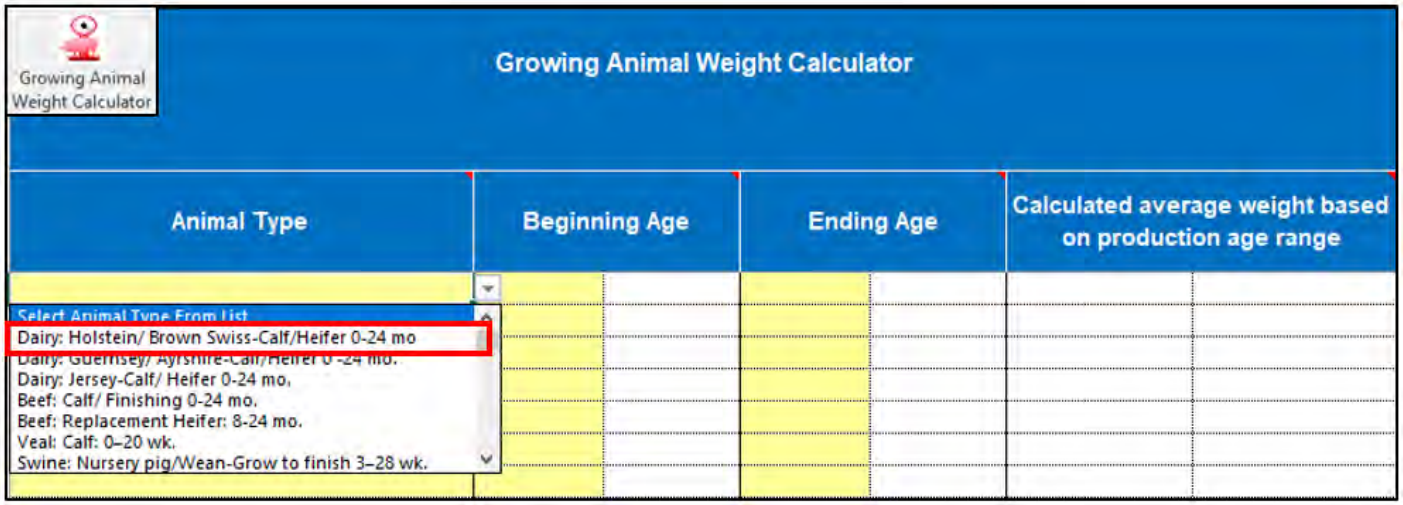


How to Complete the Farm Specific Animal List Worksheet

The growing animal weight calculator has the yellow colored input cells. The worksheet sheet looks like this



5.1. Beginning in the first row, select the animal type from the drop down list.



5.2. Select the beginning and ending ages

Enter the beginning animal production age. The age units will be in days, weeks, or months and will populate automatically based on the animal type selected.

5.3. The average weight based on production age range is calculated automatically

Growing Animal Weight Calculator

Animal Type	Beginning Age	Ending Age	Calculated average weight based on production age range
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	0 Months	4 Months	200.00 lbs.
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	4 Months	20 Months	697.00 lbs.

The calculated average weight based on production age range will be displayed. The average weight is based on weights listed in Agronomy Facts 54.

NOTE: Ending ages that exceed values listed in Agronomy Facts 54 by more than ten percent, the calculator will display a **"Date Out of Range"** error message.

Growing Animal Weight Calculator

Animal Type	Beginning Age	Ending Age	Calculated average weight based on production age range
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	0 Months	4 Months	200.00 lbs.
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	4 Months	26.5 Months	Date Out of Range

The example calculation below shows how this is completed by hand.

The weight of a Holstein heifer from 4 to 20 months can be calculated based on the animal weights in Agronomy Facts 54

1. Determine the beginning age weight.
2. Determine the ending age weight.
3. Add the beginning weight and ending weight and divide by two.

1. Calculate the calf weight at 4 months
Calculate the weight gained per month based on the age /weight range
Calf: 0 - 12 months. (90 – 750lbs.) 750 - 90 = 660lbs / 12 months. = 55.0 lbs. / month
90 lbs. initial weight (0 months) + 4 months weight gain 220.0 lbs. (4 months X 55.0 lbs. /month) = 310.0 lbs.

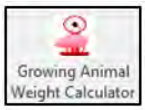
2. Calculate the heifer weight at 20 months
Calculate the weight gained per month based on the age /weight range
Heifer: 12 - 24 months. (750 – 1,250 lbs.) 1250 - 750 = 500 lbs. / 12 months = 41.7 lbs. / month
750 lbs. initial weight (12 months) + 8 months weight gain 333.6 lbs. (8 months X 41.7 lbs. /month) = 1083.6 lbs.

3. Sum the beginning and ending weight and divide by 2
310 lbs. beginning weight (4mos.) + 1083.6 lbs. ending weight (20 mos.) ÷ 2 = **697 lbs. Average Production Weight of Heifers from 4-20 months**

5.4. Printout of the Growing Animal Weight Calculator

How to Complete the Farm Specific Animal List Worksheet

When this optional worksheet is used it is to be printed and submitted in Appendix 10.



Growing Animal Weight Calculator

Animal Type	Beginning Age		Ending Age		Calculated average weight based on production age range	
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	0	Months	4	Months	200.00	lbs.
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	4	Months	20	Months	697.00	lbs.

Version 8.0 - October 2021 Animal Weight Calculator Page - 1

5.5. The growing animal group weight and associated manure production values can be entered in the optional worksheet for adding Animal types. It is called Add Animal Type-Manure Production worksheet. See Section 6 for details how to complete the section.

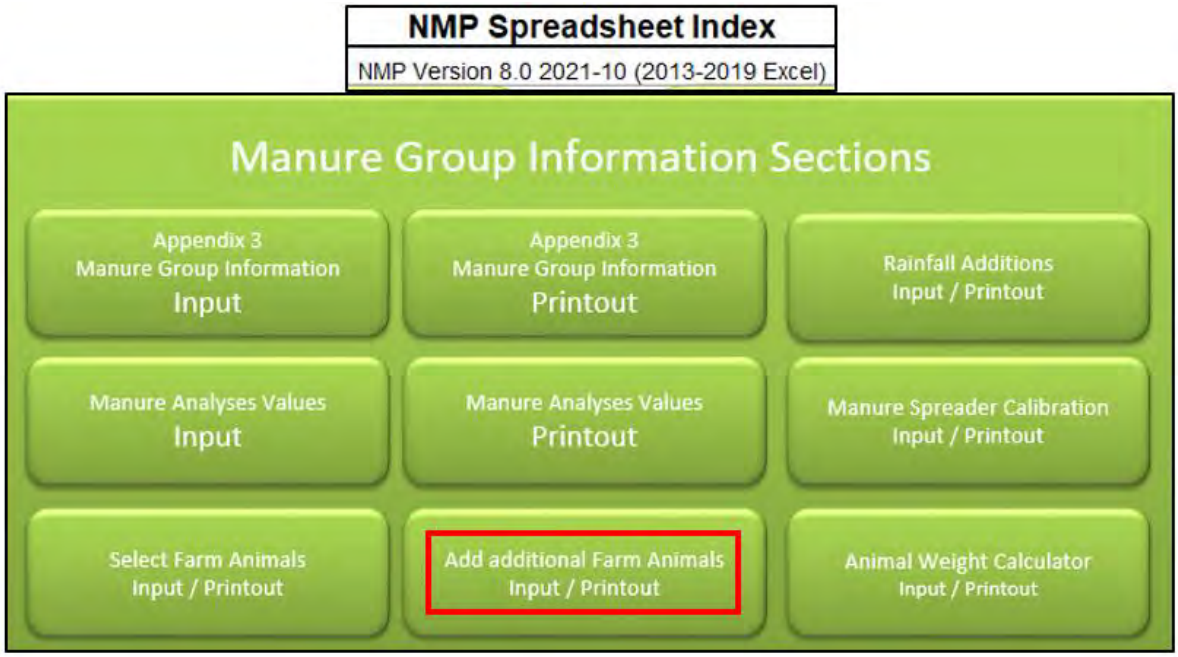
6. Additional Associated Worksheet – Animal Type Manure Production

Animal types not currently available for selection in the Farm Animal List can be added in the Animal Type Manure-Production worksheet. Growing animal groups described in section 5 above will be added here to assign manure production values. Animal types not listed in the spreadsheet, for example Llamas, would be added here since they are not available for selection in the Farm Animal List. After an animal and manure production values are added to this worksheet, they will be available in the user entered animal type selection.

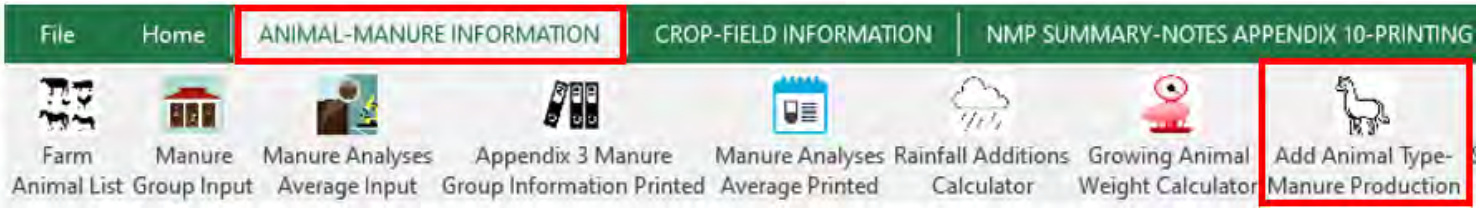
Animal types not currently listed in the spreadsheet will need to have the manure production values approved by the SCC Commission. For example, Llama manure production values would ne approval.

When this optional worksheet is used it must be printed and included in Appendix 10.

The worksheet in the NMP sheet is labeled "Animal Type Manure-Production worksheet" in the Excel NMP workbook. You can find it in the NMP Spreadsheet Index:

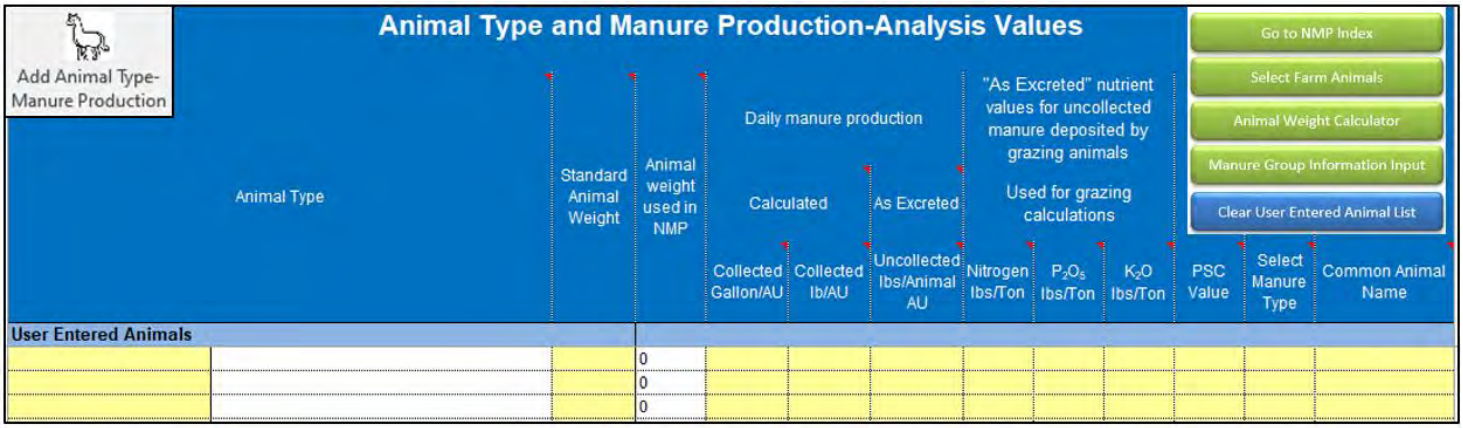


Or use the toolbar ribbon Icon:



The growing animal weight calculator has the yellow colored input cells. The worksheet sheet looks like this

How to Complete the Farm Specific Animal List Worksheet



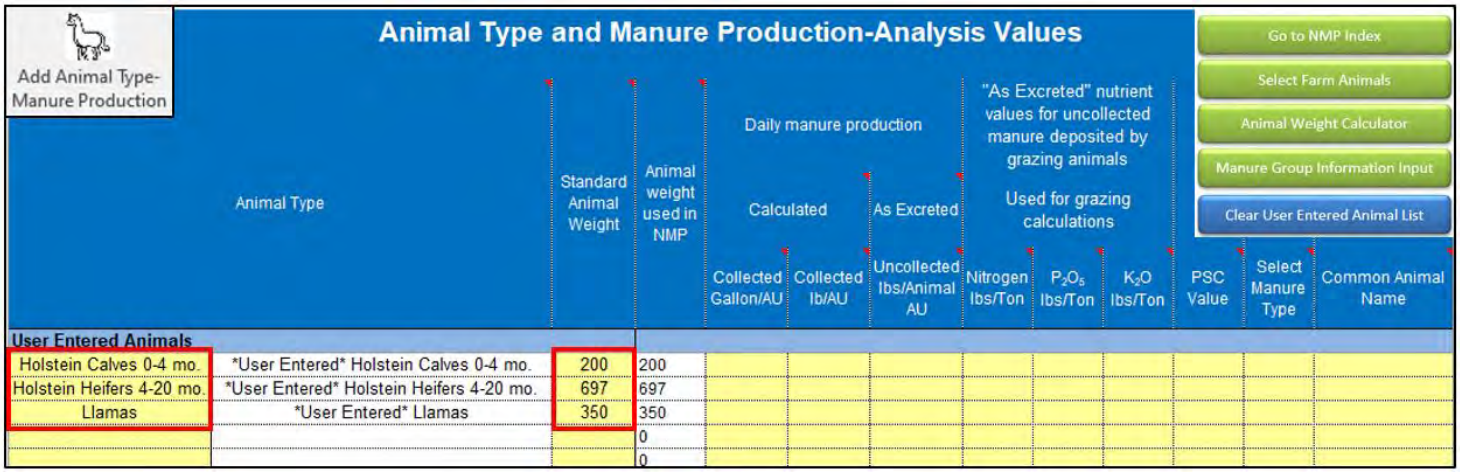
Add Animal Type-Manure Production

Animal Type and Manure Production-Analysis Values

Go to NMP Index | Select Farm Animals | Animal Weight Calculator | Manure Group Information Input | Clear User Entered Animal List

Animal Type	Standard Animal Weight	Animal weight used in NMP	Daily manure production: Calculated – Collected Gallon/AU	Daily manure production: Calculated – Collected lb/AU	Daily manure production: As Excreted – Uncollected lbs/Animal AU	"As Excreted" nutrient values for uncollected manure deposited by grazing animals: Used for grazing calculations – Nitrogen lbs/Ton	P_2O_5 lbs/Ton	K_2O lbs/Ton	PSC Value	Select Manure Type	Common Animal Name
User Entered Animals											
		0									
		0									
		0									

6.1. Enter the Animal type and weight.



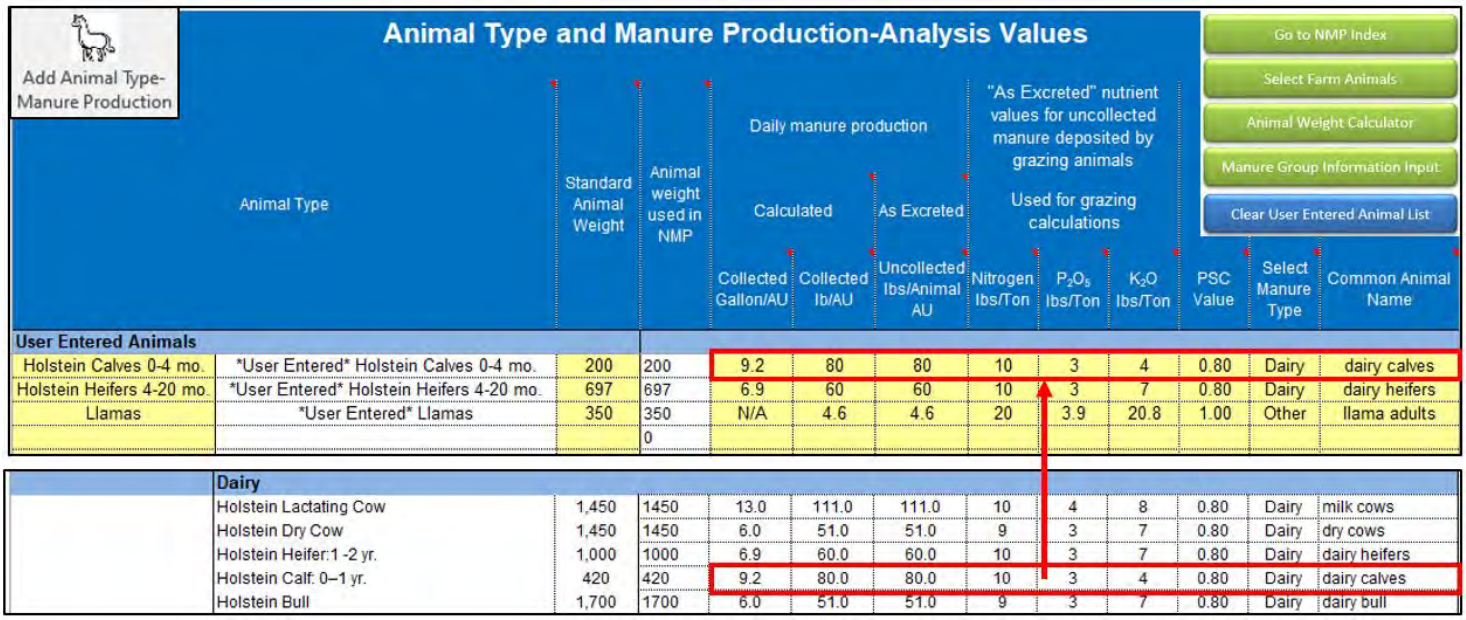
Add Animal Type-Manure Production

Animal Type and Manure Production-Analysis Values

Go to NMP Index | Select Farm Animals | Animal Weight Calculator | Manure Group Information Input | Clear User Entered Animal List

Animal Type	Standard Animal Weight	Animal weight used in NMP	Daily manure production: Calculated – Collected Gallon/AU	Daily manure production: Calculated – Collected lb/AU	Daily manure production: As Excreted – Uncollected lbs/Animal AU	"As Excreted" nutrient values for uncollected manure deposited by grazing animals: Used for grazing calculations – Nitrogen lbs/Ton	P_2O_5 lbs/Ton	K_2O lbs/Ton	PSC Value	Select Manure Type	Common Animal Name
User Entered Animals											
Holstein Calves 0-4 mo.	*User Entered* Holstein Calves 0-4 mo.	200	200								
Holstein Heifers 4-20 mo.	*User Entered* Holstein Heifers 4-20 mo.	697	697								
Llamas	*User Entered* Llamas	350	350								
			0								
			0								

6.2. Complete the manure production values, manure type, and common animal name. Values for animals listed in the spreadsheet can be used from the list below. For example, dairy Holstein calves. Values not already in the spreadsheet need to be approved by the Commission



Add Animal Type-Manure Production

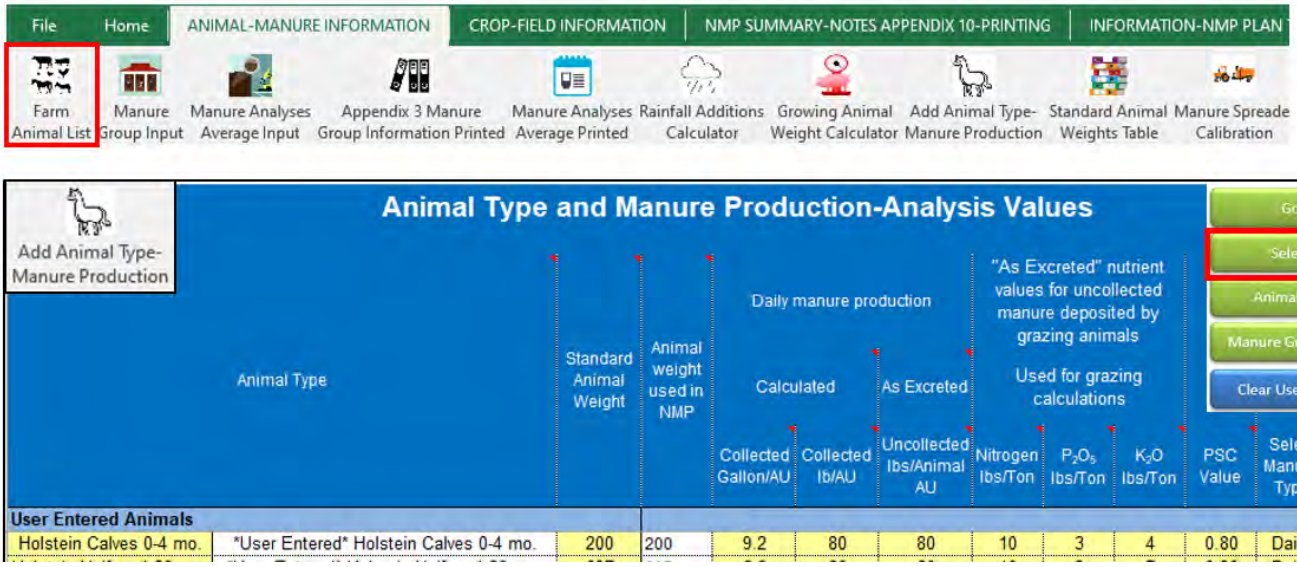
Animal Type and Manure Production-Analysis Values

Go to NMP Index | Select Farm Animals | Animal Weight Calculator | Manure Group Information Input | Clear User Entered Animal List

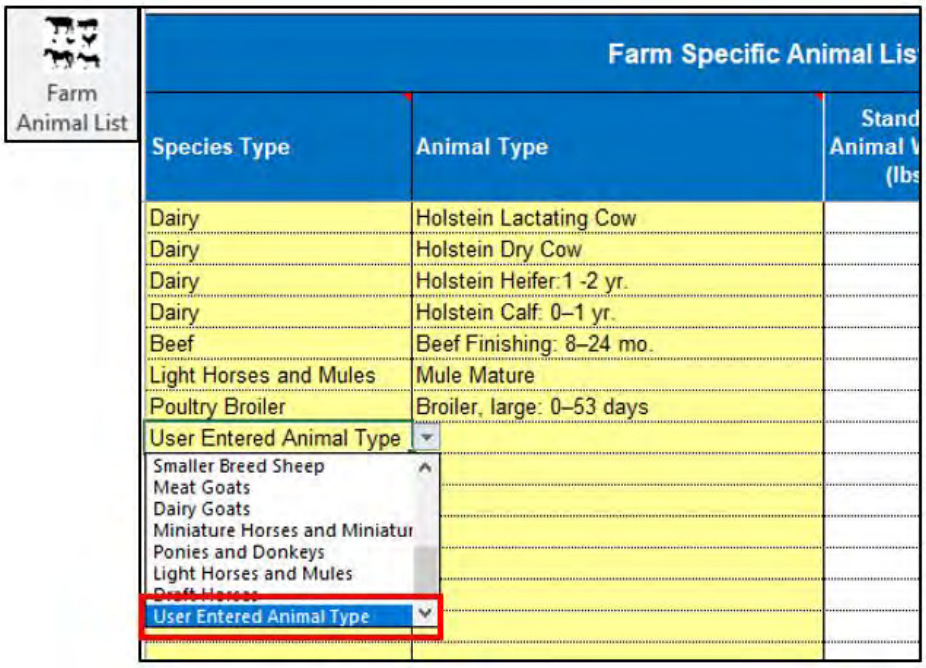
Animal Type	Standard Animal Weight	Animal weight used in NMP	Daily manure production: Calculated – Collected Gallon/AU	Daily manure production: Calculated – Collected lb/AU	Daily manure production: As Excreted – Uncollected lbs/Animal AU	"As Excreted" nutrient values for uncollected manure deposited by grazing animals: Used for grazing calculations – Nitrogen lbs/Ton	P_2O_5 lbs/Ton	K_2O lbs/Ton	PSC Value	Select Manure Type	Common Animal Name
User Entered Animals											
Holstein Calves 0-4 mo.	*User Entered* Holstein Calves 0-4 mo.	200	200	9.2	80	80	10	3	4	0.80	Dairy	dairy calves
Holstein Heifers 4-20 mo.	*User Entered* Holstein Heifers 4-20 mo.	697	697	6.9	60	60	10	3	7	0.80	Dairy	dairy heifers
Llamas	*User Entered* Llamas	350	350	N/A	4.6	4.6	20	3.9	20.8	1.00	Other	llama adults
			0								
	Dairy										
	Holstein Lactating Cow	1,450	1450	13.0	111.0	111.0	10	4	8	0.80	Dairy	milk cows
	Holstein Dry Cow	1,450	1450	6.0	51.0	51.0	9	3	7	0.80	Dairy	dry cows
	Holstein Heifer:1 -2 yr.	1,000	1000	6.9	60.0	60.0	10	3	7	0.80	Dairy	dairy heifers
	Holstein Calf: 0–1 yr.	420	420	9.2	80.0	80.0	10	3	4	0.80	Dairy	dairy calves
	Holstein Bull	1,700	1700	6.0	51.0	51.0	9	3	7	0.80	Dairy	dairy bull

How to Complete the Farm Specific Animal List Worksheet

6.3. User added animal types can be select in the Farm Animal List.



6.4. In the Farm Specific Animal List, select the User Entered Animal Type selection from the dropdown box.



How to Complete the Farm Specific Animal List Worksheet

6.5. Then Select the user entered Animal Types created in the dropdown list. The animal weight will transfer from the values entered in the Animal Type-Manure Production tab.

Farm Animal List

Farm Specific Animal List

Species Type	Animal Type	Standard Animal Weight (lbs)	Animal Weights from Farm Records	Animal Weights used for the Nutrient Management plan (lbs)
Dairy	Holstein Lactating Cow	1450		1450
Dairy	Holstein Dry Cow	1450		1450
Dairy	Holstein Heifer:1 -2 yr.	1000		1000
Dairy	Holstein Calf: 0–1 yr.	420		420
Beef	Beef Finishing: 8–24 mo.	950	1150	1150
Light Horses and Mules	Mule Mature	1100		1100
Poultry Broiler	Broiler, large: 0–53 days	3.55		3.55
User Entered Animal Type	*User Entered* Holstein Calves 0-4 mo.	200		200
	User Entered Holstein Calves 0-4 mo.			
	User Entered Holstein Heifers 4-20 mo.			
	User Entered Llamas			

6.6. The animal groups can now be added to the manure groups. Below is an example of how the user added animal group will appear in Appendix 3 Printout.

Appendix 3 Manure Group Information Printed

Appendix 3 Manure Group Information	Calves Fall Bedded Pack		Heifer Fall Liquid		4H Animals	
	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
Animal Group 1	Calves Fall		Heifers Fall	Heifers Fall - uncollected	Llamas	Llamas - uncollected
Animal Type	*User Entered* Holstein Calves 0-4 mo.		*User Entered* Holstein Heifers 4-20 mo.	Total Nitrogen (N) lbs/ton	*User Entered* Llamas	Total Nitrogen (N) lbs/ton
Animal Number	20		20	10.00	3	20.00
Animal Weight	200 lbs		697 lbs	Total Phosphate (P2O5) lbs/ton	350 lbs	Total Phosphate (P2O5) lbs/ton
Animal Group AUs	4.00 AUs		13.94 AUs	3.00	1.05 AUs	3.90
Animal Group AEUs	1.97 AEUs		6.87 AEUs	Total Potash (K2O) lbs/ton	0.52 AEUs	Total Potash (K2O) lbs/ton
Daily Manure Production per AU	80.0 lb		6.9 gal	7.00	4.6 lb	20.80
Total Days Manure Produced	180 days		180 days	PSC Value	180 days	PSC Value
Total Manure Produced	28.80 tons		17,313.48 gal	0.80	0.43 tons	1.00
Days On Pasture	0 days		180 days		180 days	
Hours Per Day On Pasture	0 hrs		12 hrs		18 hrs	
Total Bedding	1.00 tons		5,000.00 gal		0.50 tons	
Total Washwater	0.00 tons		0.00 gal		0.00 tons	
CALCULATED - Total Uncollected Manure Per Animal Group			8,656.74 gal	37.64 - Tons	0.33 tons	0.33 - Tons
CALCULATED-Total Manure Collected Per Animal Group	29.80 tons		13,656.74 gal		0.61 tons	

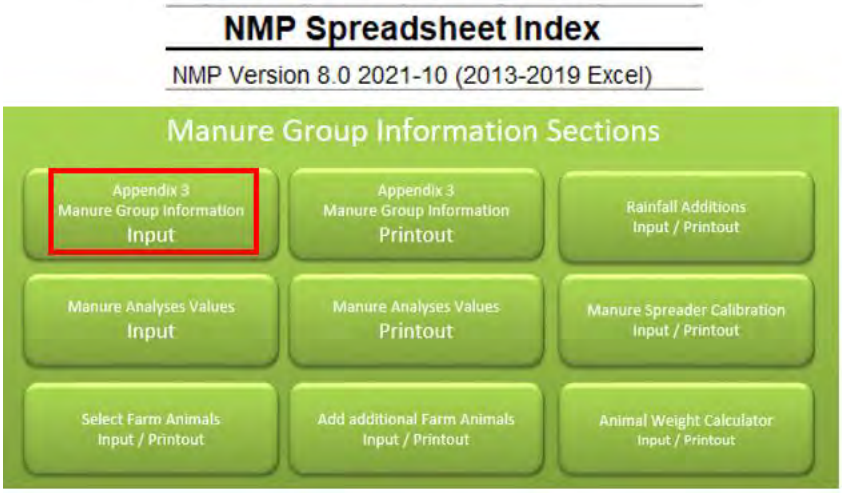
Prepared by Don Orner | Research Technologist | Penn State Extension – Nutrient Management

How to Complete the NMP Appendix 3 Input (Manure Group Information) Worksheet

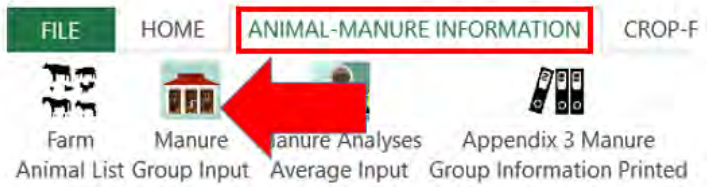
Purpose:

This procedure describes how to complete the Manure Group Information Input sheet. The sheet is labeled Appendix 3 Input in the Excel NMP workbook. All of the Manure Group information is entered here. This particular worksheet requires data entry so it has a yellow colored sheet tab in the NMP workbook.

You can find it by looking for the hyper link in the NMP Spreadsheet Index



Or click on the Animal-Manure Information tab. Select the Manure Group Input icon that looks like this:



All the information to complete a Manure Group is entered in a single row.

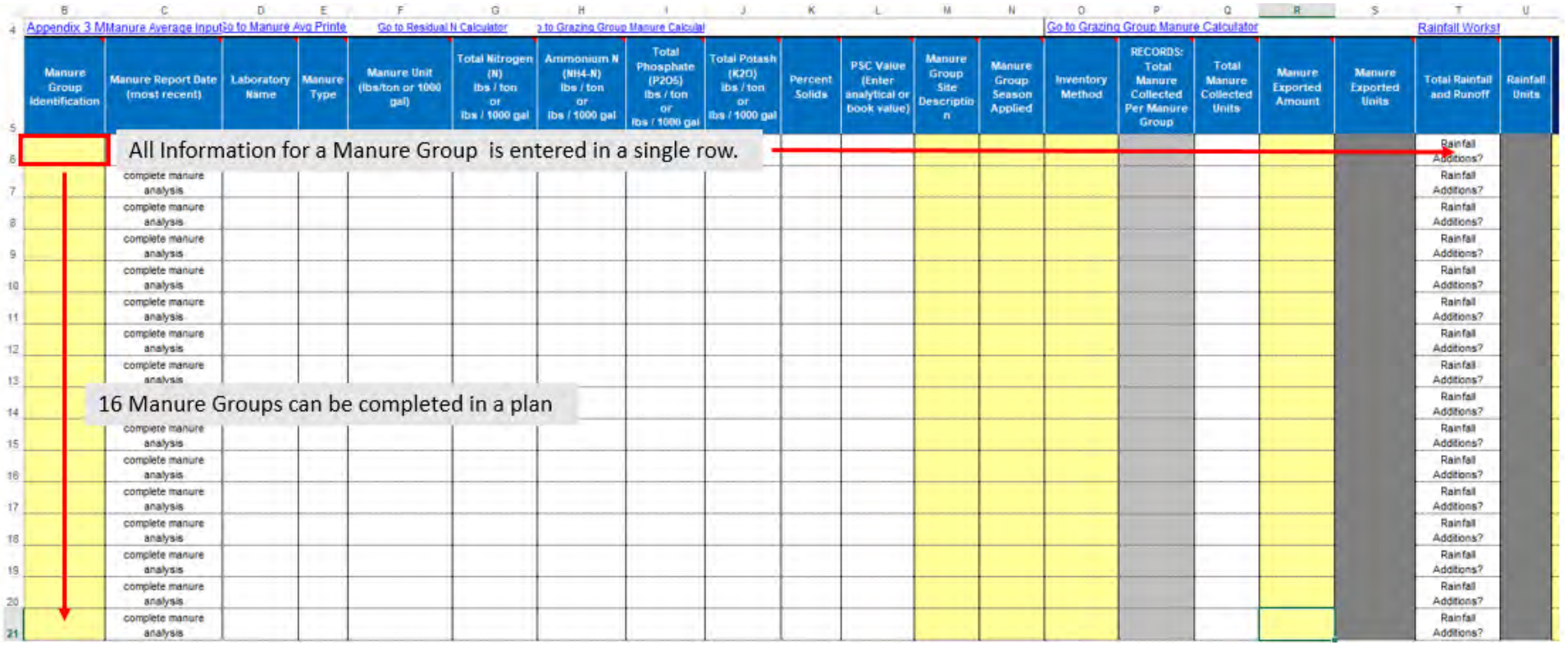
A maximum of 16 Manure Groups can be entered. Each Manure Group can have a maximum of 6 Animal Groups.

If the farm has more than 16 manure groups or more than 6 animal groups in a manure group, then contact the SCC regional coordinator on a case by case basis and report in Appendix 10 how they were combined.

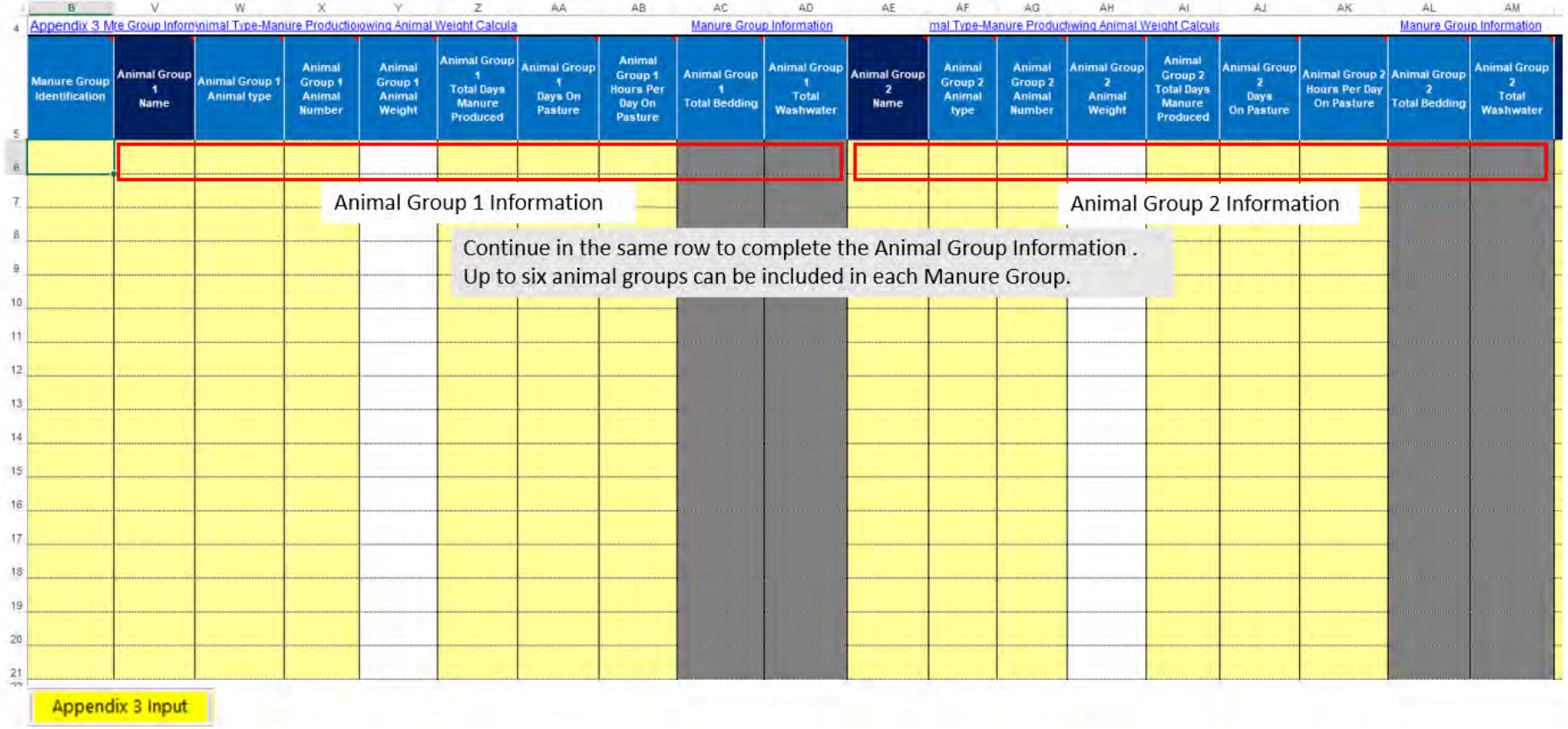
The following information entered in a single a row of Appendix 3 Input to complete a manure group.

- Manure Group Name
- Manure Group Analysis Results (This information is completed in the Manure Average Input worksheet and transferred here)
- Manure Group Site Description and Season Applied
- Inventory Method
- Exported Manure Amount
- Rainfall Additions (This information is completed in the Rainfall worksheet and transferred here)
- Animal Groups 1 – 6 Information

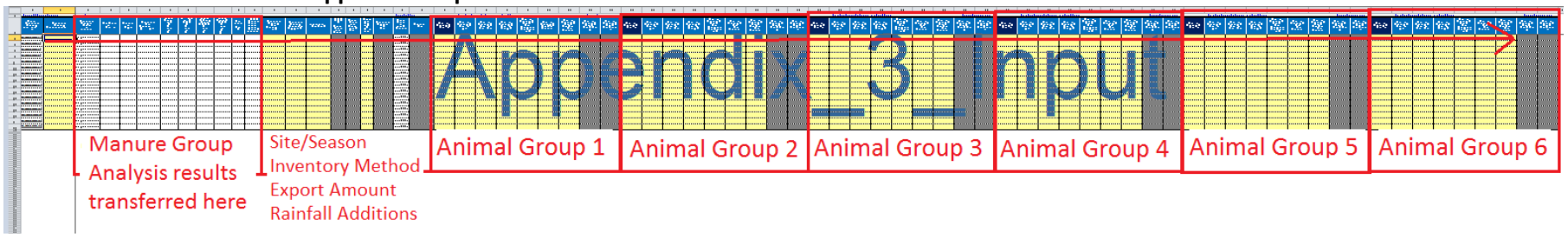
Layout of the Manure Group Information (Appendix 3 Input) sections up to the rainfall additions



Layout of the Manure Group Information (Appendix 3 Input) for Animal Groups 1 and 2



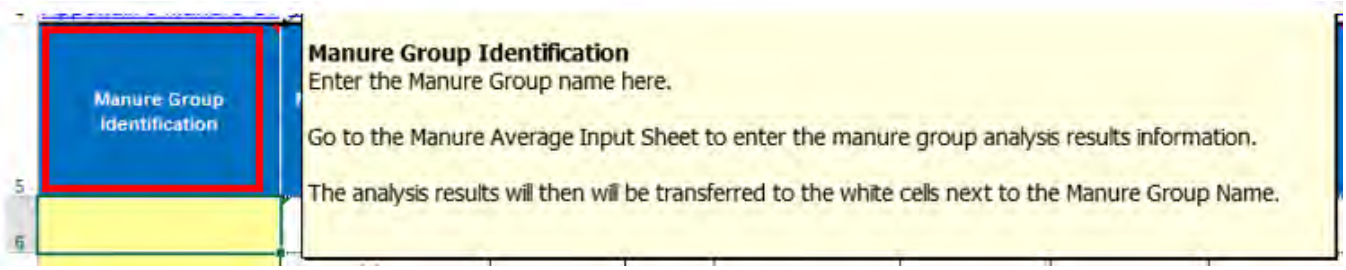
Below is a view of the entire Appendix 3 Input worksheet



How to Complete the NMP Appendix 3 Input (Manure Group Information) Worksheet

The blue column headers cells have notes included to help you understand what needs to be entered or what the cell data is used for.

For example when you click in the blue column header “Manure Group Identification”, the following pop-up box will appear:



In each row of the worksheet there are yellow, white, and grey cells.

- Yellow cells: are for data entry.
- White cells: contain information that’s returned from a database look up. Don’t enter data into the white cells.
- Grey cells: are conditionally formatted to turn yellow if you need to enter data. For example the “Records” column is grey. If you selected “Records” for the inventory method, the Records cell would change to yellow indicating you need to complete it. You can make a selection in a grey cell but if it’s grey, you don’t need to enter the information and it should be blank.

The App 3 Input is only used for data entry and is not printed for submission.

Once you complete the appropriate sections in a Manure Group row, the information is transferred to the printed Appendix 3 Manure Group Information worksheet that will be submitted for review and approval.

The printed Appendix 3 Manure Group Information worksheet is a grey colored tab in the workbook.

There is no data entry required in this worksheet since all information is transferred from the App 3 Input sheet.

You can click on the Printed Appendix 3 icon or scroll to the worksheet to review it.

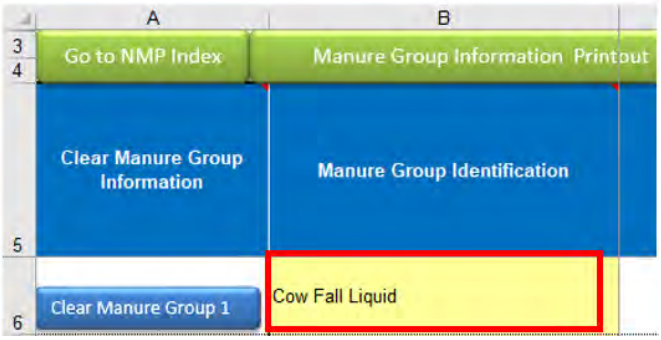
How to Complete the NMP Appendix 3 Input (Manure Group Information) Worksheet

1. Procedure

1.1. Select the "App 3 Input" worksheet tab

1.2. Enter the Manure Group Name

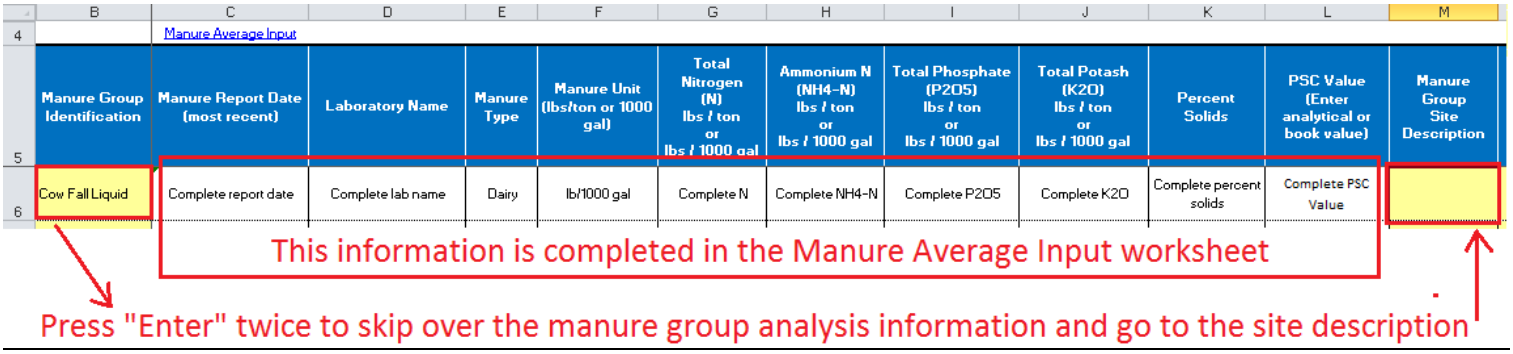
Enter a manure group name in the first available manure group cell.



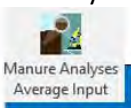
After you type a name and press enter, the manure group analysis information cells will ask you to complete the information. This is completed in the Manure Average Input worksheet.

If you're not sure how to do this, read the guidance document: "How to complete the Manure Average Input worksheet".

If you have the manure analysis information and know how to enter it, then go the Manure Average Input page and complete it. If you want to add the information later, Press enter twice to jump over these cells and go to the next yellow cell which is the Manure Group Site Description.



In this example, the manure group analysis results have been completed in the Manure Average Input Worksheet. The 3 years of analysis values were entered in the yellow cells listed below:



Manure Analyses Average Input

Manure Group Identification	Year	Manure Analysis Report Date (Most recent in bold)	Laboratory Name (Most recent in bold)	Manure Type	Manure Unit (lbs/ton or 1000 gal)	Total Nitrogen (N) (lbs/ton or 1000 gal)	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	Total Potash (K_2O) (lbs/ton or 1000 gal)	Percent Solids	PSC Value (Enter analytica or book value)
Cow Fall Liquid	**Average**	**11/1/2020**	**AASL**	**Dairy**	**lb/1000 gal**	**24.67**	**8.83**	**13.00**	**22.67**	**8.93**	**0.64**
Add 1 Year	1 year ago	11/1/2020	AASL	Dairy	lb/1000 gal	25.00	8.50	12.00	23.00	6.40	0.80
	2 years ago	10/25/2019	AASL			31.00	10.60	16.00	33.00	12.00	0.67
Clear all Years	3 years ago	11/15/2018	AASL			18.00	7.40	11.00	12.00	8.40	0.45
	4 years ago										
	5 years ago										

Manure Average Input

Analysis results are entered in the yellow cells.
The blue row is the average of the 3 years of analysis results

The average of the analysis results will be transferred to Appendix 3 Input worksheet

Manure Group Input

Manure Group Identification	Manure Report Date (most recent)	Laboratory Name	Manure Type	Manure Unit (lbs/ton or lbs/1000 gal)	Total Nitrogen (N) lbs / ton or lbs / 1000 gal	Ammonium N (NH4-N) lbs / ton or lbs / 1000 gal	Total Phosphate (P2O5) lbs/ton or lbs/1000 gal	Total Potash (K2O) lbs / ton or lbs / 1000 gal	Percent Solids	PSC Value (Enter analytical or book value)
Cow Fall Liquid	11/1/2020	AASL	Dairy	lb/1000 gal	24.67	8.83	13.00	22.67	8.93	0.64

1.3. Complete the Manure Group Site Description and Season Applied

Enter the Site Description and Season Applied. These are separate entries.

	B	C	L	M	N
4		Manure Average Input			
5	Manure Group Identification	Manure Report Date (most recent)	PSC Value (Enter analytical or book value)	Manure Group Site Description	Manure Group Season Applied
6	Cow Fall Liquid	11/1/2015	0.64	Slurrystore Tank	Fall

1.4. Enter the Inventory Method

If the Inventory Method selected is “Records”, the total amount of collected manure based on the farmers records will be entered in the "Records" column, (the color will change from grey to yellow). The “Total Manure Collected Units” is automatically populated from the manure group information entered in the Manure Average Input worksheet.

	A	B	M	N	O	P	Q
4	Appendix 3 Manure Group Info.						
5	Clear Manure Group Information	Manure Group Identification	Manure Group Site Description	Manure Group Season Applied	Inventory Method	RECORDS: Total Manure Collected Per Manure Group	Total Manure Collected Units
6	Clear Manure Group 1	Cow Fall Liquid	Slurrystore Tank	Fall	Records	250,000	gallons

If the Inventory Method selected is “Calculated”, the total amount of manure collected in the manure group is automatically calculated based on the values listed in the “Animal Type-Manure Production Worksheet and are the values from the Penn State Agronomy Guide Table 1.2-13. The records and total manure collected units will be greyed out.

	A	B	M	N	O	P	Q
4	Appendix 3 Manure Group Info.						
5	Clear Manure Group Information	Manure Group Identification	Manure Group Site Description	Manure Group Season Applied	Inventory Method	RECORDS: Total Manure Collected Per Manure Group	Total Manure Collected Units
6	Clear Manure Group 1	Cow Fall Liquid	Slurrystore Tank	Fall	Calculated		
7	Clear Manure Group 2				Select Method / Records / Calculated		

For this “How To” example, “Calculated” will be the selected Inventory Method for the rest of this example.

1.5. Complete the Manure Exported Amount

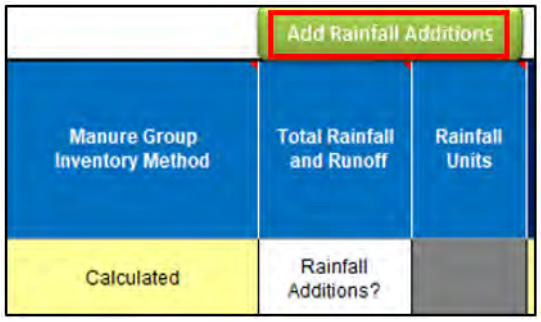
If manure from a manure group is exported off the operation, list the amount of manure in each manure group that is exported off the operation. If no manure is exported enter a zero.

	B	M	N	O	P	Q	R
5	Manure Group Identification	Manure Group Site Description	Manure Group Season Applied	Inventory Method	RECORDS: Total Manure Collected Per Manure Group	Total Manure Collected Units	Manure Exported Amount
6	Cow Fall Liquid	Slurrystore Tank	Fall	Calculated			0

1.6. Complete the Total Rainfall and Runoff

How to Complete the NMP Appendix 3 Input (Manure Group Information) Worksheet

If the "Calculated" inventory method was selected, use the Rainfall/Runoff worksheet if the manure group receives rain water either directly or from runoff. The link above will take you to the rainfall tab. The total rainfall amounts will transfer to the cell below



The rainfall worksheet is an optional worksheet. You may not need to complete it if the manure storage doesn't is a receive rain water or runoff water. If the manure group storage does receive rainfall directly on the storage or runoff from roofs an ACA then complete the rainfall worksheet.

<u>The Rainfall Worksheet doesn't need to be completed for solid manure stacking areas.</u>

Rainfall Additions Calculator

Rainfall Worksheet

Manure Group	County	Manure Storage Evaporation or No Evaporation	Surface Area Rainfall Directed to Manure Storage	Beginning Month (1-12)	Ending Month (1-12)	Storage Surface Area (Sq. ft.)	Runoff Surface Area (Sq. ft.)	Gallons of rainfall directly on storage	Gallons of rainfall directed to storage	Gallons of rain water added to this manure group
Cow Fall Liquid	Berks	Directly on Storage - With Evaporation	Directed to Storage	4	9	3,500	4,000	27,358	40,068	67,426

After the Rainfall worksheet is completed the rainfall additions are automatically transferred to Appendix 3 Input.

Clear Manure Group Information	Manure Group Identification	Manure Group Site Description	Manure Group Season Applied	Manure Group Inventory Method	Total Rainfall and Runoff	Rainfall Units
Clear Manure Group 1	Cow Fall Liquid	SlurryStore Tank	Fall	Calculated	67,426	Gallons

1.7. Complete the Animal Group Information

1.7.1. Animal Group 1 Name

All animal group names need be unique for each animal group. Even if it is the same group of animals. Make them unique by adding the season or some other unique identifier.
In the example below, a farm has a manure storage that is used to collect the manure from milk cows and is emptied and spread on the fields twice per year in the spring and fall.

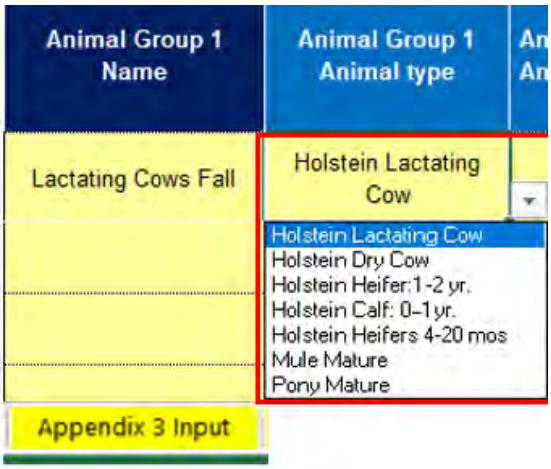
The herd of milk cows would be the animal group contributing to the manure group. Each manure group would have the same milk cow's animal group. The difference would be the season when the manure group is applied

Make the animal group name unique for animal groups that will contribute manure to more than one manure group. For example, add the spring of fall designation for a group of milk cows that will have two manure groups that will be emptied in the spring and fall.

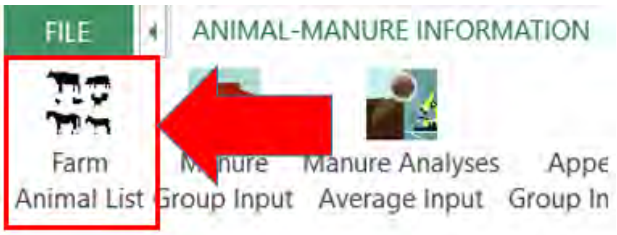
<u>This is required when the animals are on pasture and uncollected manure will need to be allocated.</u>

1.7.2. Animal Group 1 - Animal Type

Select the animal type from the drop down list. This is a list of the animal types selected in the Farm Specific Animal List tab.



If the Animal Type dropdown list is blank then go to the Farm Specific Animal List tab and select the animal that will be on the farm.



1.7.3. Animal Group 1 - Animal Number

Include the average number of animals in each animal group on a typical production day for the agricultural operation.

Manure Group Identification	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number
Cow Fall Liquid	Milk Cows Fall	Holstein Lactating Cow	110

1.7.4. Animal Group 1 - Animal Weight

The animal weight for this animal group will be automatically populated. Animal weights are populated automatically based on the animal type information completed in the Farm Specific Animal List.

Manure Group Identification	Manure Group Site Description	Manure Group Season Applied	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number	Animal Group 1 Animal Weight
Cow Fall Liquid	Slurrystore Tank	Fall	Lactating Cows Fall	Holstein Lactating Cow	110	1450

Appendix 3 Input

1.7.5. Animal Group 1 - Total Days Manure Produced

The number of days the animal group contributes manure to the manure group. For example, the lactating cows fall liquid manure group is collected for 6 months so that is 180 days.

Manure Group Identification	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number	Animal Group 1 Animal Weight	Animal Group 1 Total Days Manure Produced
Cow Fall Liquid	Lactating Cows Fall	Holstein Lactating Cow	110	1450	180

Appendix 3 Input

1.7.6. Animal Group 1 - Days on Pasture

If the animals contributing to a particular manure group are on pasture during the time frame of that manure group, the number of days on pasture during that period is entered. Enter a zero "0" if none. In the example below, the milk cows are on pasture for 180 days or the entire time the manure group is collected.

Manure Group Identification	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number	Animal Group 1 Animal Weight	Animal Group 1 Total Days Manure Produced	Animal Group 1 Days On Pasture
Cow Fall Liquid	Lactating Cows Fall	Holstein Lactating Cow	110	1450	180	180

Appendix 3 Input

1.7.7. Animal Group 1 - Hours per Day on Pasture

If the animals contributing to a particular manure group are on pasture during the time frame of that manure group, the average number of hours per day on pasture during that period is entered. Enter a zero "0" if none. In the example the milk cows have unrestricted access to the pasture and are fed and watered at the barn so they are considered to be on pasture 12 hours per day.

Manure Group Identification	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number	Animal Group 1 Animal Weight	Animal Group 1 Total Days Manure Produced	Animal Group 1 Days On Pasture	Animal Group 1 Hours Per Day On Pasture
Cow Fall Liquid	Lactating Cows Fall	Holstein Lactating Cow	110	1450	180	180	12

Appendix 3 Input

1.7.8. Animal Group 1 - Total Bedding

The amount of bedding used during the timeframe for this manure group. If none is added enter a Zero "0" If the inventory method is “Records then you don’t need to enter the Total Bedding. The cell will be conditionally formatted toc be colored grey. (Grey Cell = no data entry needed).

The amount of bedding will be in the units of the manure analysis. Liquid manure storage bedding calculations will need to be converted to gallons.

Example Calculation:

Lactating Cows Liquid Bedding Calculation

$$\frac{26 \text{ wks}}{1 \text{ manure group}} \times \frac{8 \text{ cu. yds}}{1 \text{ wk}} \times \frac{27 \text{ cu ft}}{1 \text{ cu. yds}} \times \frac{7.48 \text{ gal.}}{1 \text{ cu ft}} \times \frac{1 \text{ bedding}}{2 \text{ reduction factor}} = 21{,}004 \text{ gallons}$$

Manure Group Identification	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number	Animal Group 1 Animal Weight	Animal Group 1 Total Days Manure Produced	Animal Group 1 Days On Pasture	Animal Group 1 Hours Per Day On Pasture	Animal Group 1 Total Bedding
Cow Fall Liquid	Lactating Cows Fall	Holstein Lactating Cow	110	1450	180	180	12	21,004.00

Appendix 3 Input

1.7.9. Animal Group 1 - Total Washwater

The amount of washwater or wastewater added to each manure group is entered. If none is added then enter a Zero "0". If the inventory method is "Records then you don't need to enter the Total Washwater. The cell will be conditionally formatted to grey. (Grey Cell = no data entry needed)

Example Calculation:

Milkhouse Wastewater Calculation

$$\frac{225 \text{ gallons milkhouse wastewater}}{1 \text{ day}} \times \frac{180 \text{ days}}{1 \text{ manure group}} = \frac{40{,}500 \text{ gallons}}{\text{manure group}}$$

Manure Group Identification	Animal Group 1 Name	Animal Group 1 Animal type	Animal Group 1 Animal Number	Animal Group 1 Animal Weight	Animal Group 1 Total Days Manure Produced	Animal Group 1 Days On Pasture	Animal Group 1 Hours Per Day On Pasture	Animal Group 1 Total Bedding	Animal Group 1 Total Washwater
Cow Fall Liquid	Lactating Cows Fall	Holstein Lactating Cow	110	1450	180	180	12	21,004	40,500

Appendix 3 Input

1.8. Complete any additional manure Animal Groups

Complete any additional animal groups that contribute to the manure group. Up to six animal groups can be added to the Manure Group.

Animal Group 1 Total Washwater	Animal Group 2 Name	Animal Group 2 Animal type	Animal Group 2 Animal Number	Animal Group 2 Animal Weight	Animal Group 2 Total Days Manure Produced	Animal Group 2 Days On Pasture	Animal Group 2 Hours Per Day On Pasture	Animal Group 2 Total Bedding	Animal Group 2 Total Washwater
40,500.00	Heifers Fall	Holstein Heifers 4-20 mos	65	697	180	180	12	18,000.00	0.00

Appendix 3 Input

Additional Manure Groups can be added in the 2nd row of App 3 Input

Manure Group Identification	Manure Report Date (most recent)	Laboratory Name	Manure Type	Manure Unit (lbs/ton or 1000 gal)
Cow Fall Liquid	11/1/2016	AASL	Dairy	lb/1000 gal
	complete manure analysis			
	complete manure			

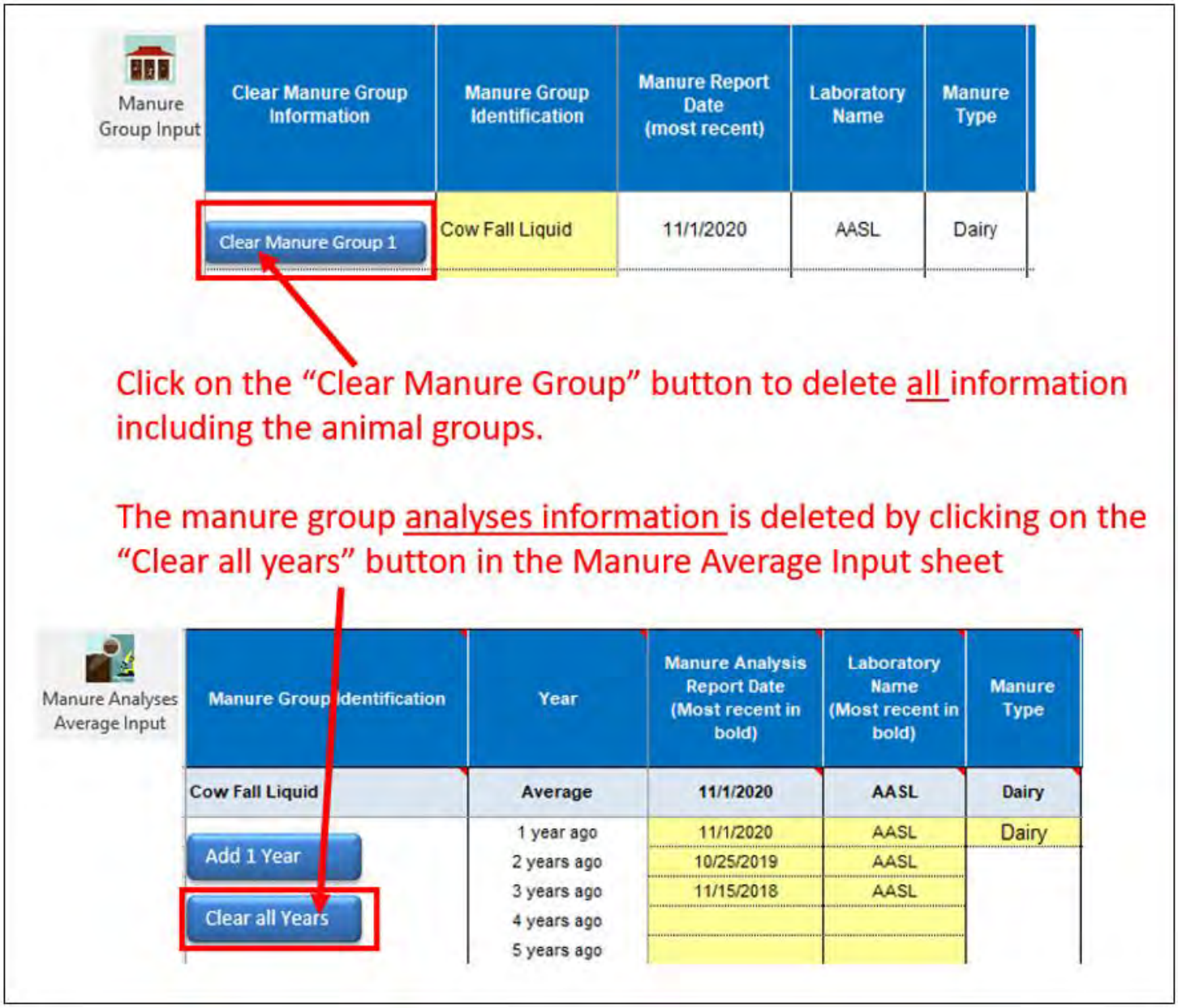
Appendix 3 Input

Add additional manure groups in the next available yellow row in App 3 Input as needed

2. Notes:

2.1. How to delete a manure group and manure analyses information

If you need to start over and completely re-enter a manure group, there is a button to clear or delete all the information of a manure group.

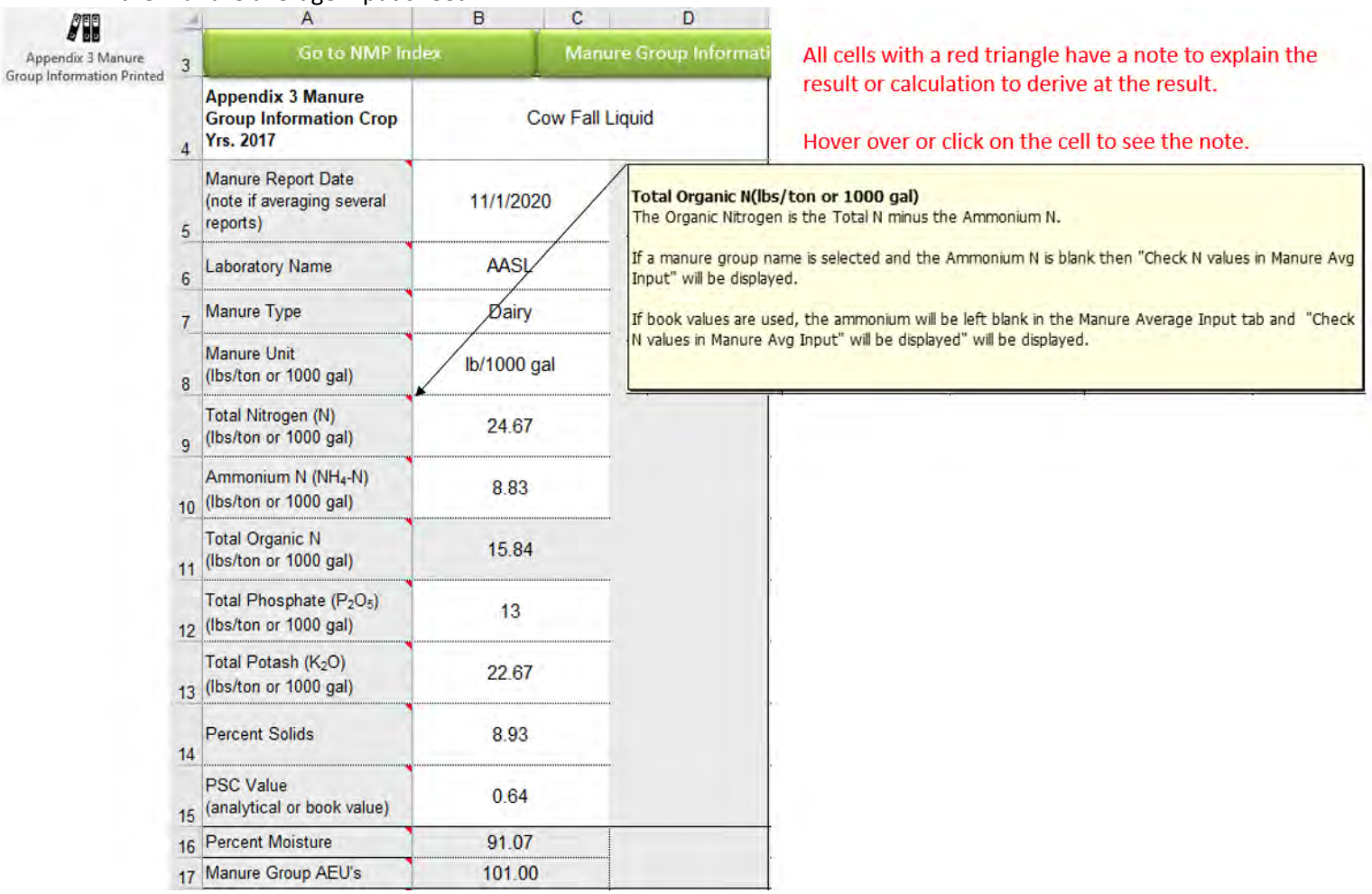


3. Overview of the Appendix 3 Manure Group Information printout

All results entered in the input sheets are transferred to the printout pages detailed below. They will be the pages submitted for review.

3.1. Manure Group Analyses information

The manure analyses information is the first section listed, (Rows 4-17), and is the average for all years entered in the manure average input sheet.



	A	B
4	**Appendix 3 Manure Group Information Crop Yrs. 2017**	Cow Fall Liquid
5	Manure Report Date (note if averaging several reports)	11/1/2020
6	Laboratory Name	AASL
7	Manure Type	Dairy
8	Manure Unit (lbs/ton or 1000 gal)	lb/1000 gal
9	Total Nitrogen (N) (lbs/ton or 1000 gal)	24.67
10	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	8.83
11	Total Organic N (lbs/ton or 1000 gal)	15.84
12	Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	13
13	Total Potash (K_2O) (lbs/ton or 1000 gal)	22.67
14	Percent Solids	8.93
15	PSC Value (analytical or book value)	0.64
16	Percent Moisture	91.07
17	Manure Group AEU's	101.00

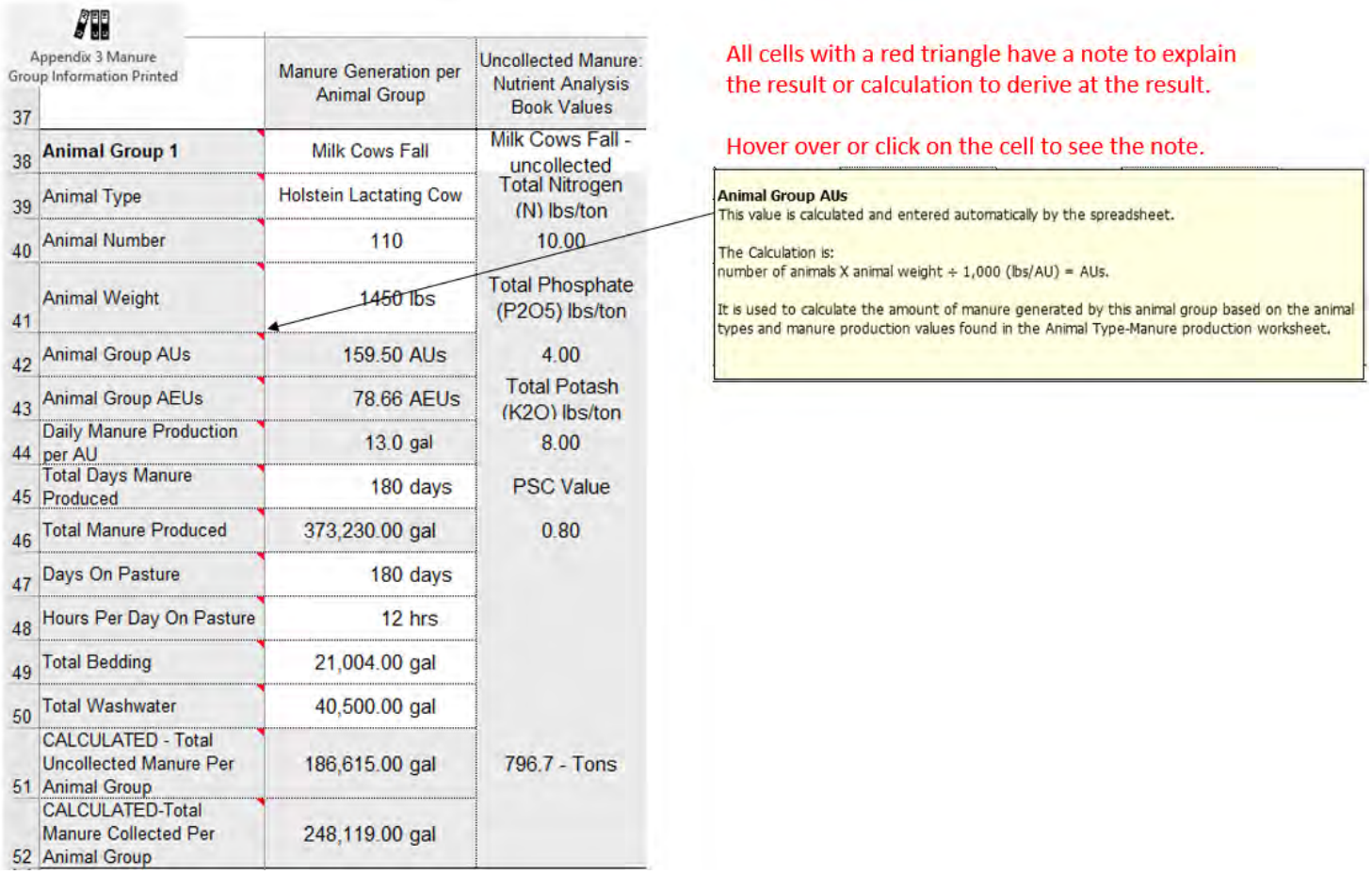
3.2. Manure Group Description, Manure amounts generated, allocated and balances.

This section shows the total amount of manure generated, allocated and balances for all six animal groups with a manure group, (Rows 18-35). The total rainfall is listed as well

18	Description: Site & Season Applied	SlurryStore Tank		Fall
19	Inventory Method	Calculated		
20		Collected Calc.		Uncollected Calc.
21	Manure Group Identification	Cow Fall Liquid		Cow Fall Liquid - uncollected
22	CALCULATED: Total Manure Collected Per Manure Group	340,675.4		919.0
23	Units	gallons		Tons
24	RECORDS: Total Manure Collected Per Manure Group			
25	Unit			
26		Collected		Uncollected
27	Manure Used On-Farm	55,000.0		0.0
28	Units	Gallons		Tons
29	Manure Exported	0.0		
30	Units	gallons		
31	Manure Allocation Balance	285,675.4		919.0
32	Units	Gallons		Tons
33	Manure Balance as a Percent of Total Manure Collected	83.9%		
34	Total Rainfall and Runoff	67,426		
35		Gallons		

3.3. Animal Group 1 Information

The remaining sections listed are the animal groups. Animal group 1 information section is shown below. (Rows 36 - 55)



	Appendix 3 Manure Group Information Printed	Manure Generation per Animal Group	Uncollected Manure: Nutrient Analysis Book Values
37			
38	**Animal Group 1**	Milk Cows Fall	Milk Cows Fall - uncollected
39	Animal Type	Holstein Lactating Cow	Total Nitrogen (N) lbs/ton
40	Animal Number	110	10.00
41	Animal Weight	1450 lbs	Total Phosphate (P2O5) lbs/ton
42	Animal Group AUs	159.50 AUs	4.00
43	Animal Group AEUs	78.66 AEUs	Total Potash (K2O) lbs/ton
44	Daily Manure Production per AU	13.0 gal	8.00
45	Total Days Manure Produced	180 days	PSC Value
46	Total Manure Produced	373,230.00 gal	0.80
47	Days On Pasture	180 days	
48	Hours Per Day On Pasture	12 hrs	
49	Total Bedding	21,004.00 gal	
50	Total Washwater	40,500.00 gal	
51	CALCULATED - Total Uncollected Manure Per Animal Group	186,615.00 gal	796.7 - Tons
52	CALCULATED-Total Manure Collected Per Animal Group	248,119.00 gal	

All cells with a red triangle have a note to explain the result or calculation to derive at the result.

Hover over or click on the cell to see the note.

Animal Group AUs
This value is calculated and entered automatically by the spreadsheet.

The Calculation is:
number of animals X animal weight ÷ 1,000 (lbs/AU) = AUs.

It is used to calculate the amount of manure generated by this animal group based on the animal types and manure production values found in the Animal Type-Manure production worksheet.

Animal Groups 2 through 6 will appear directly below Animal Group 1 in the manure group

3.4. Animal Groups 2 – 6 will appear below animal group 1, (Rows 53- 132)

Appendix 3 Manure Group Information Printed

54	**Animal Group 2**	Heifers Fall	Heifers Fall - uncollected
55	Animal Type	*User Entered* Holstein Heifers 4-20 mos	Total Nitrogen (N) lbs/ton
56	Animal Number	65	10.00
57	Animal Weight	697 lbs	Total Phosphate (P2O5) lbs/ton
58	Animal Group AUs	45.31 AUs	3.00
59	Animal Group AEUs	22.34 AEUs	Total Potash (K2O) lbs/ton
60	Daily Manure Production per AU	6.9 gal	7.00
61	Total Days Manure Produced	180 days	PSC Value
62	Total Manure Produced	56,268.81 gal	0.80
63	Days On Pasture	180 days	
64	Hours Per Day On Pasture	12 hrs	
65	Total Bedding	18,000.00 gal	
66	Total Washwater	0.00 gal	
67	CALCULATED - Total Uncollected Manure Per Animal Group	28,134.41 gal	122.32 - Tons
68	CALCULATED-Total Manure Collected Per Animal Group	46,134.41 gal	
69			
70	**Animal Group 3**		

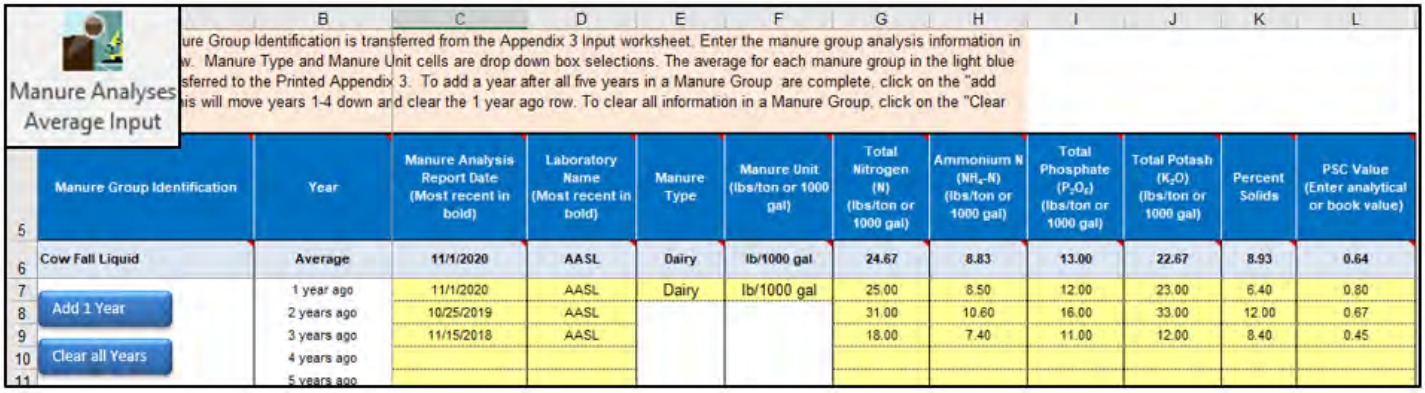
4. How the different worksheets that relate to the manure group are used in the Nutrient Management Plan.

4.1.1. Appendix 3 Input

The Appendix 3 Input sheet information is automatically transferred to the Appendix 3 Manure Group Information Printed sheet (Grey Tab). The "Appendix 3 Manure Group Information Printed" sheet is the page that's printed for submission.

4.1.2. Manure Analyses Average Input

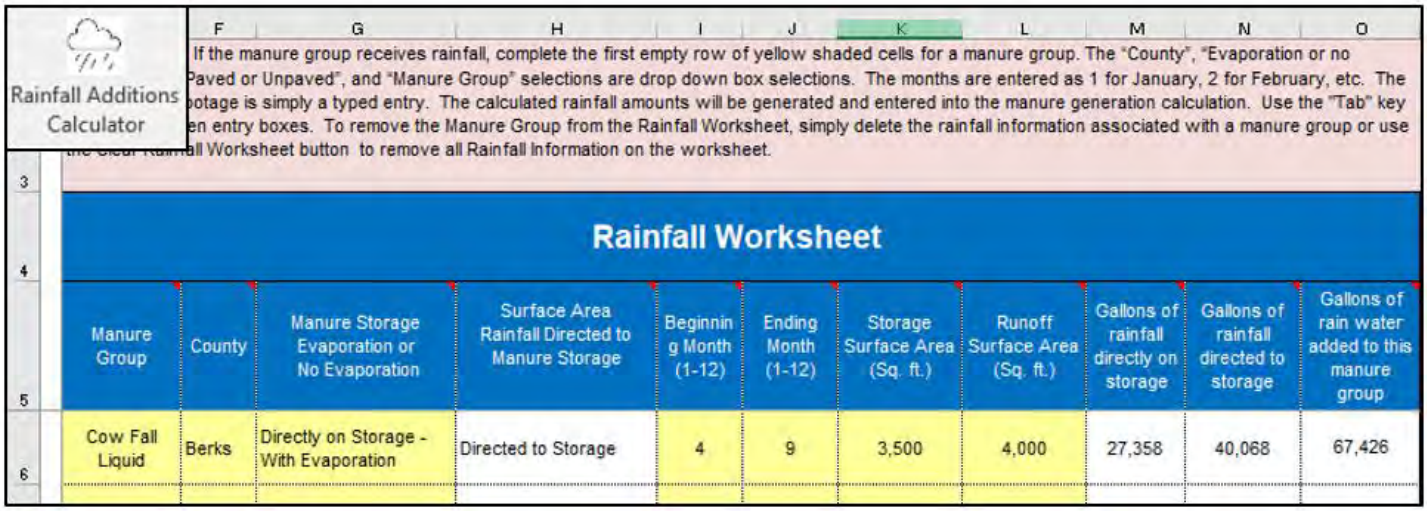
The Manure Analyses Average Input sheet information is automatically transferred to the Manure Analyses Printed sheet (Grey Tab). The "Manure Average Printed" sheet is the page that's printed for submission.



Manure Group Identification	Year	Manure Analysis Report Date (Most recent in bold)	Laboratory Name (Most recent in bold)	Manure Type	Manure Unit (lbs/ton or 1000 gal)	Total Nitrogen (N) (lbs/ton or 1000 gal)	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	Total Potash (K_2O) (lbs/ton or 1000 gal)	Percent Solids	PSC Value (Enter analytical or book value)
Cow Fall Liquid	Average	11/1/2020	AASL	Dairy	lb/1000 gal	24.67	8.83	13.00	22.67	8.93	0.64
	1 year ago	11/1/2020	AASL	Dairy	lb/1000 gal	25.00	8.50	12.00	23.00	6.40	0.80
	2 years ago	10/25/2019	AASL			31.00	10.60	16.00	33.00	12.00	0.67
	3 years ago	11/15/2018	AASL			18.00	7.40	11.00	12.00	8.40	0.45
	4 years ago										
	5 years ago										

4.1.3. Rainfall sheet

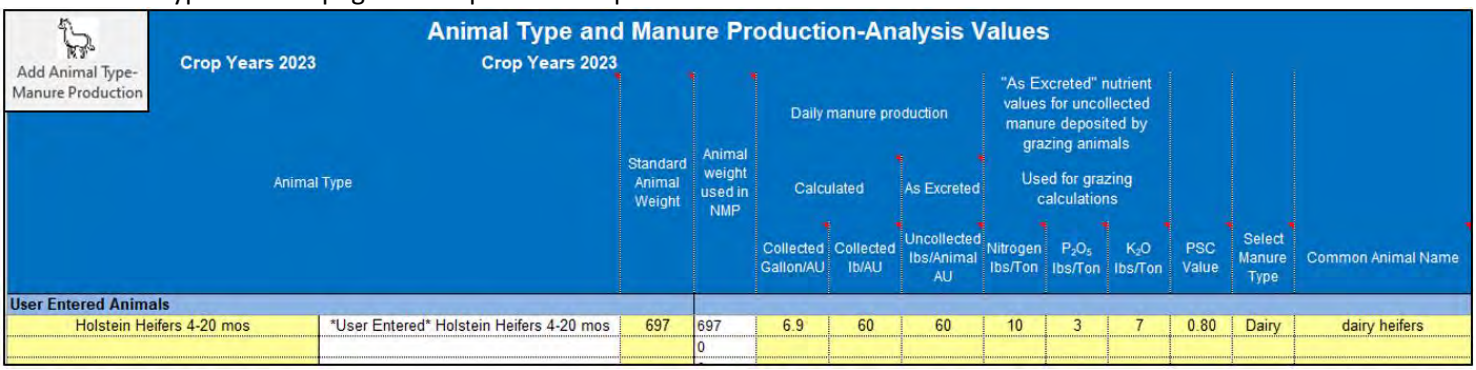
The Rainfall sheet is optional and only needed if the manure storage receives rainfall directly or runoff. It's where information is entered and is printed for submission.



Manure Group	County	Manure Storage Evaporation or No Evaporation	Surface Area Rainfall Directed to Manure Storage	Beginning Month (1-12)	Ending Month (1-12)	Storage Surface Area (Sq. ft.)	Runoff Surface Area (Sq. ft.)	Gallons of rainfall directly on storage	Gallons of rainfall directed to storage	Gallons of rain water added to this manure group
Cow Fall Liquid	Berks	Directly on Storage - With Evaporation	Directed to Storage	4	9	3,500	4,000	27,358	40,068	67,426

4.1.4. Animal Type-Manure Production

The Animal Type Manure Production sheet is optional and only needed if an animal isn't currently listed in the Animal type list. The page is an input and is a printout for submission.



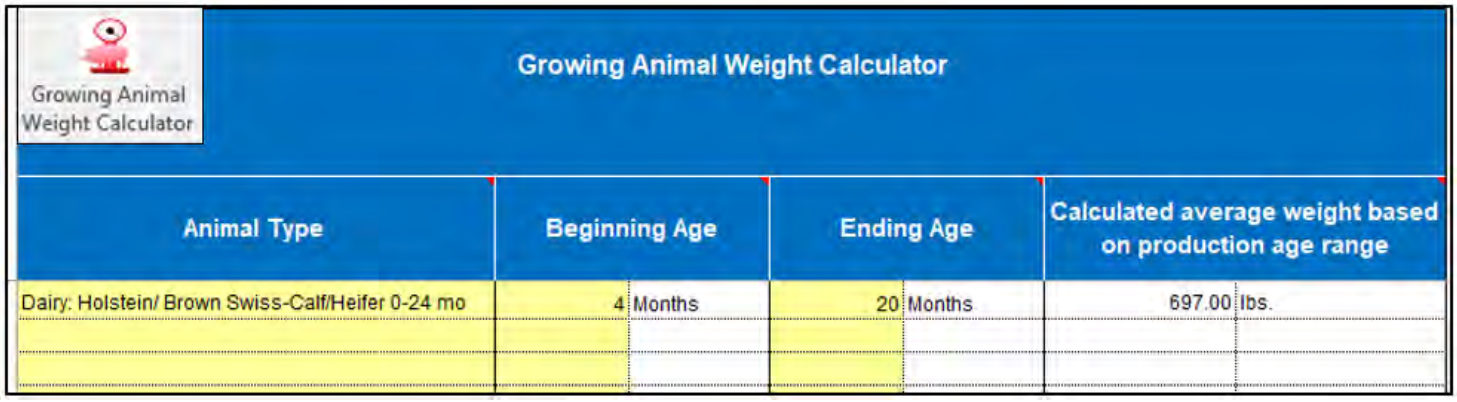
Add Animal Type-Manure Production

Animal Type and Manure Production-Analysis Values

Animal Type	Crop Years 2023	Standard Animal Weight	Crop Years 2023 Animal weight used in NMP	Daily manure production: Calculated: Collected Gallon/AU	Daily manure production: Calculated: Collected lb/AU	Daily manure production: As Excreted: Uncollected lbs/Animal AU	"As Excreted" nutrient values for uncollected manure deposited by grazing animals: Used for grazing calculations: Nitrogen lbs/Ton	P_2O_5 lbs/Ton	K_2O lbs/Ton	PSC Value	Select Manure Type	Common Animal Name
User Entered Animals												
Holstein Heifers 4-20 mos	"User Entered" Holstein Heifers 4-20 mos	697	697	6.9	60	60	10	3	7	0.80	Dairy	dairy heifers
			0									

4.1.5. Growing Animal Weight Calculator

The Animal Weight Calculator sheet is optional and only needed if you want to determine the weight of a growing animals. For example, it can be used to determine the weight of heifers growing from 4 months to 20 months. It's where information is entered and is printed for submission.



Growing Animal Weight Calculator

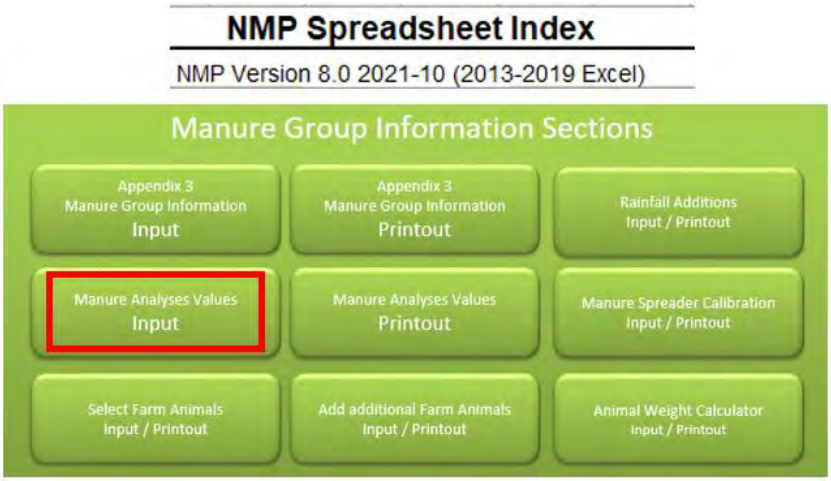
Growing Animal Weight Calculator

Animal Type	Beginning Age		Ending Age		Calculated average weight based on production age range	
Dairy: Holstein/ Brown Swiss-Calf/Heifer 0-24 mo	4	Months	20	Months	697.00	lbs.

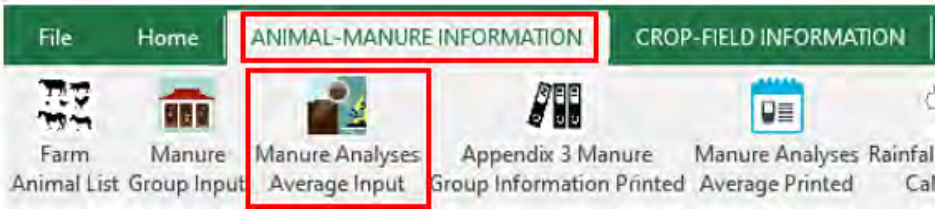
How to Complete the Manure Analysis Average Input Worksheet

Purpose:
This tutorial describes how to complete the Manure Analysis Average Input sheet. The sheet is labeled “Manure Average Input" in the Excel NMP workbook. All of the Manure Group analysis information is entered here.

You can find it by looking for the hyper link in the NMP Spreadsheet Index



Or just scroll through the toolbar ribbon at the top of your screen until you find it. The ribbon icon looks like this:

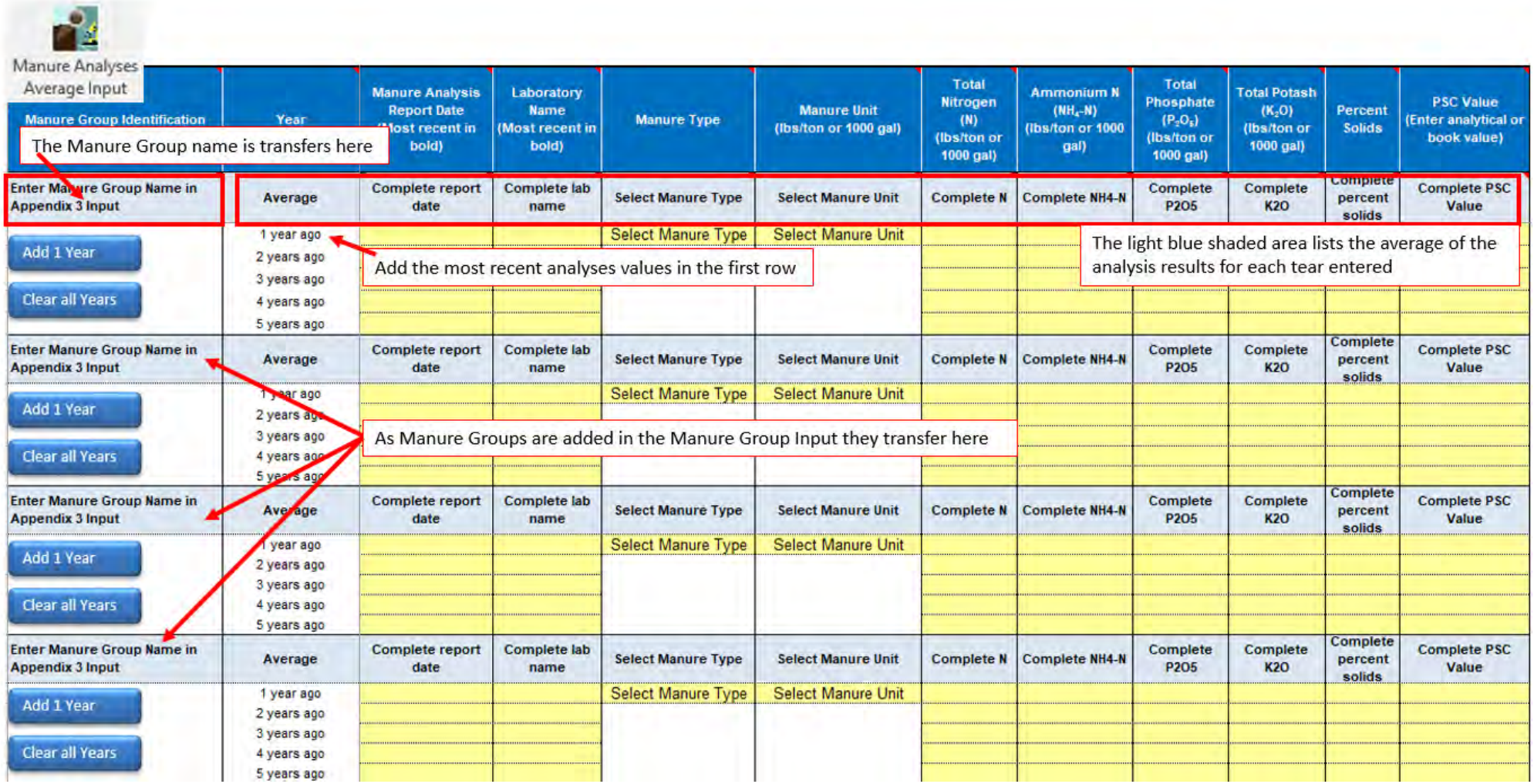


Once a Manure Groups name is entered in Appendix 3 Input that name will transfer here.

The analysis results for a manure group are entered in a set of 5 yellow shaded rows. The following manure analysis information is entered in the first row for the most recent analysis results.

- Name of Laboratory completing the analysis
- Manure Type (Select from a drop down list)
- Manure Units (lbs./ton or 1000 gal) (Select from a drop down list)
- Total Nitrogen (N) (lbs./ton or 1000 gal)
- Ammonium N (NH_4-N) (lbs./ton or 1000 gal)
- Total Phosphate (P_2O_5) (lbs./ton or 1000 gal)
- Total Potash (K2O) (lbs./ton or 1000 gal)
- Percent Solids
- PSC Value (Enter analytical or book value)

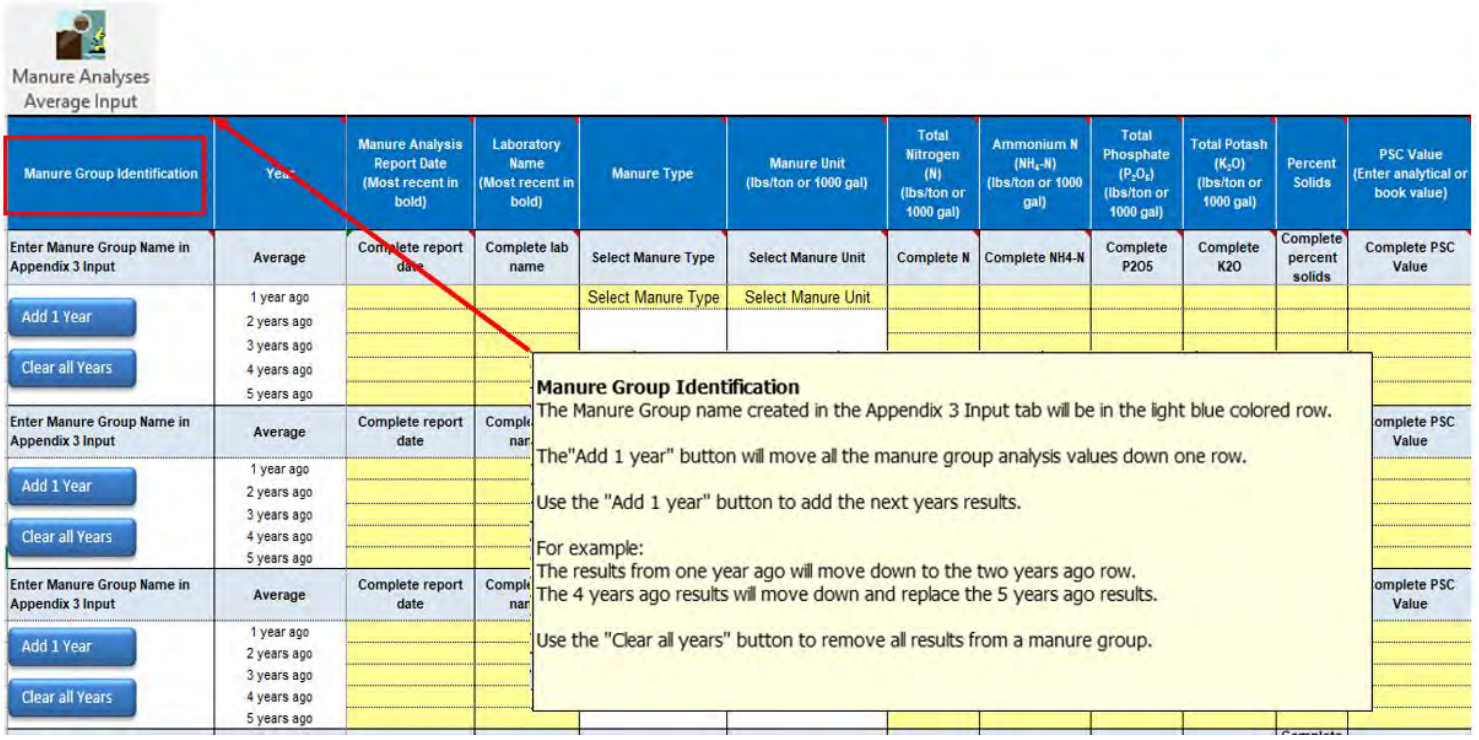
Layout of the Manure Analysis Average sheet



How to Complete the Manure Analysis Average Input Worksheet

The blue column headers with red triangles have notes to help you understand what needs to be entered or what the cell data is used for.

For example, when you click in the blue column header “Manure Group Identification”, the following note will appear:



In each row of the worksheet there are yellow, white, and grey cells.

- The light blue rows are the transferred manure group names and average values.
- Yellow cells: are for data entry.
- White cells are locked (the cursor will jump over them when entering data)

<u>The Manure Average Input is only used for data entry and is not printed for submission</u>. Once you complete the analysis information, the information is transferred to the printed Manure Analyses Average printout that will be submitted for review and approval. It is also transferred to the Appendix 3 Input sheet.

How to Complete the Manure Analysis Average Input Worksheet

1. Procedure

1.1. Enter the Manure Group Analysis Date

Enter the Manure Group Analysis Report Date for the most recent analysis in the first yellow row.
available manure group cell.

1.2. Enter the Laboratory Name

Enter the laboratory name that completed the manure analysis. If book values are used for N, P_2O_5, and K_2O, enter the book value information source in the Laboratory Name entry. For example, enter "PSU Agronomy Guide" for the Penn State Agronomy Guide.

1.3. Select the Manure Type from the drop down list.

Select the Manure Type from the drop down list. . It's better to select the name "Dairy" from the list versus typing it. If it's not spelled correctly or an extra space is entered then calculations won't work.

1.4. Select the Manure Type from the drop down list.

Select the Manure Unit from the drop down list. . It's better to select the name "lb/1000 gal" from the list versus typing it. If it's not spelled correctly or an extra space is entered then calculations won't work.

1.5. Enter the Total Nitrogen results from the manure analysis report.

Enter the Total Nitrogen results from the manure analysis report.

1.6. Enter the Ammonium Nitrogen results from the manure analysis report.

1.7. Enter the total Phosphate results from the manure analysis report.

1.8. Enter the total Potash results from the manure analysis report.

1.9. Enter the percent solids results from the manure analysis report.

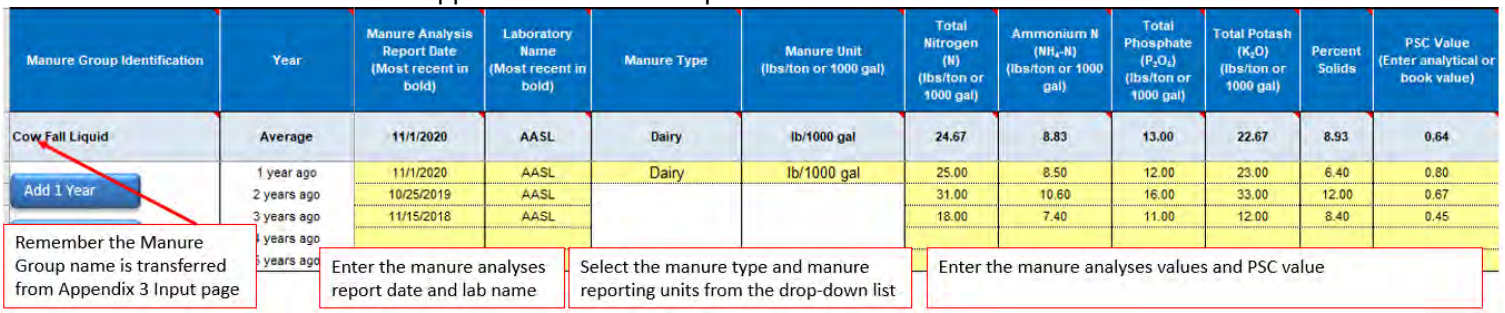
Remember that for very liquid manures, less than 5 percent solids, the Nitrogen availability will be increased by 20% after one day for very liquid manures to account for soaking in on application when using Table 1.2-15(required for atypical manures).

1.10. Enter the Phosphorous Source Coefficient (PSC) values from the manure analysis report or enter book values.

PSC Value (Enter analytical or book value)
Enter analysis results from manure report(s) or a select a book value from the dropdown list.
PSC book values:
Swine manure 1.0
Veal 1.0
Broiler, Layer, Turkey, Duck 0.8
Dairy – Liquid or Bedded Pack 0.8
Other (Beef, Horse, Sheep, Goat) 0.8
Biosolids
BPR Biosolids 0.8
All biosolids (except BPR) 0.4

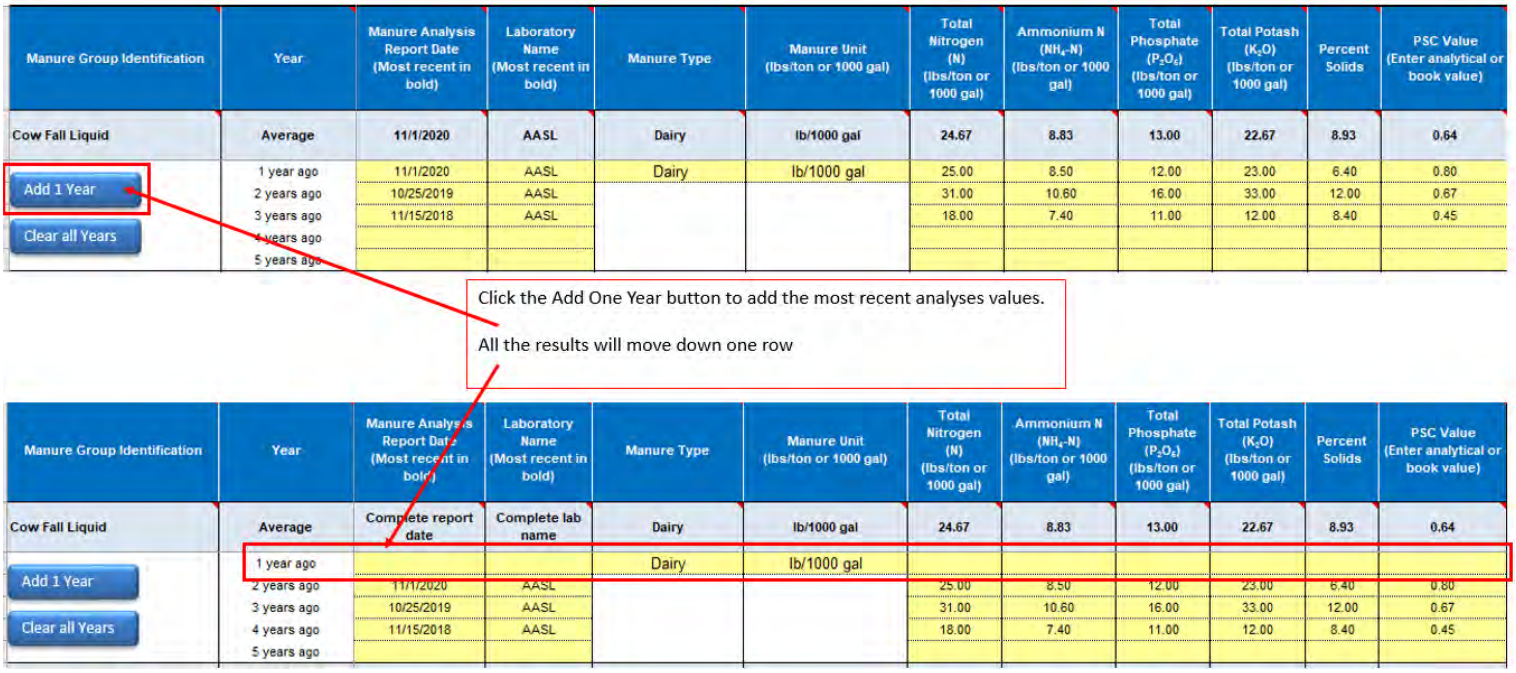
1.11. Enter any additional years of analysis results, (up to five years)

In this example, Three years of analysis values were entered in the yellow cells listed below. Remember the light blue row with the manure group name is the average of the values entered. They are the Nitrogen and Phosphorous value used to determine the manure application rates on crops.



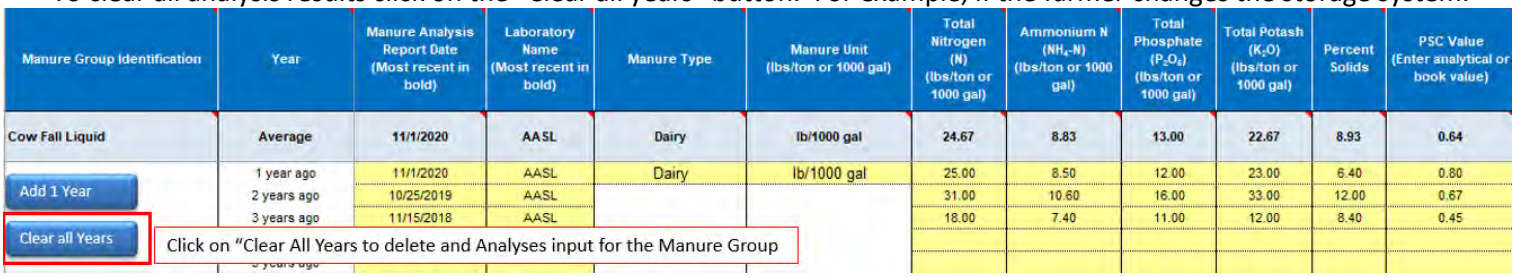
1.12. To add additional analysis results click on the "Add 1 year" button

To add additional analysis results click on the "Add 1 year" button. Finally, in year 6, the year 5 analysis results will be discarded and replaced with the year 4 results.



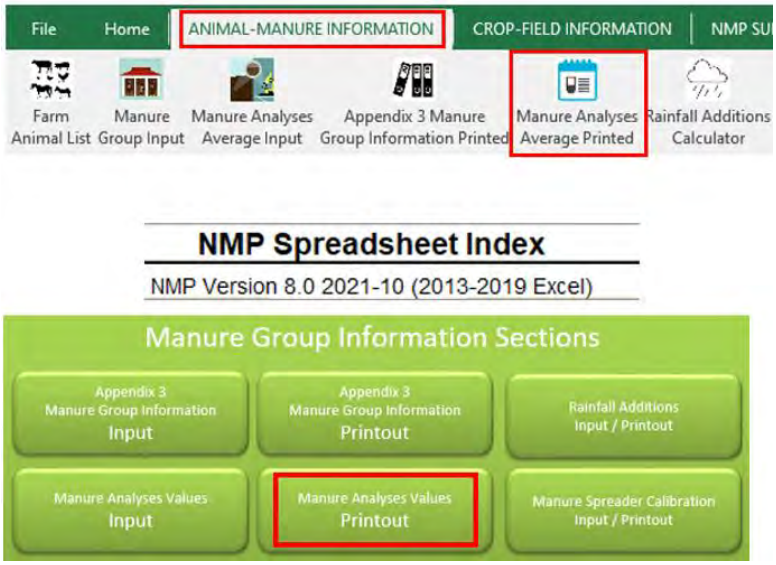
1.13. To clear all analysis results click on the "Clear all years" button

To clear all analysis results click on the "Clear all years" button. For example, if the farmer changes the storage system.



2. Notes

2.1. The manure analyses average rsults can be found using the NMP Index or the toolbar ribbon.

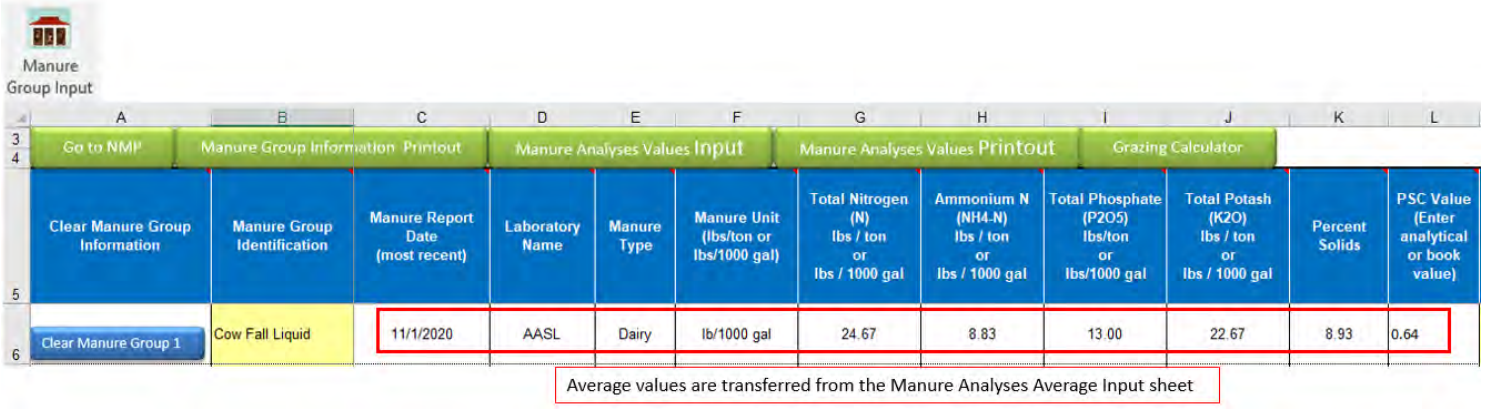


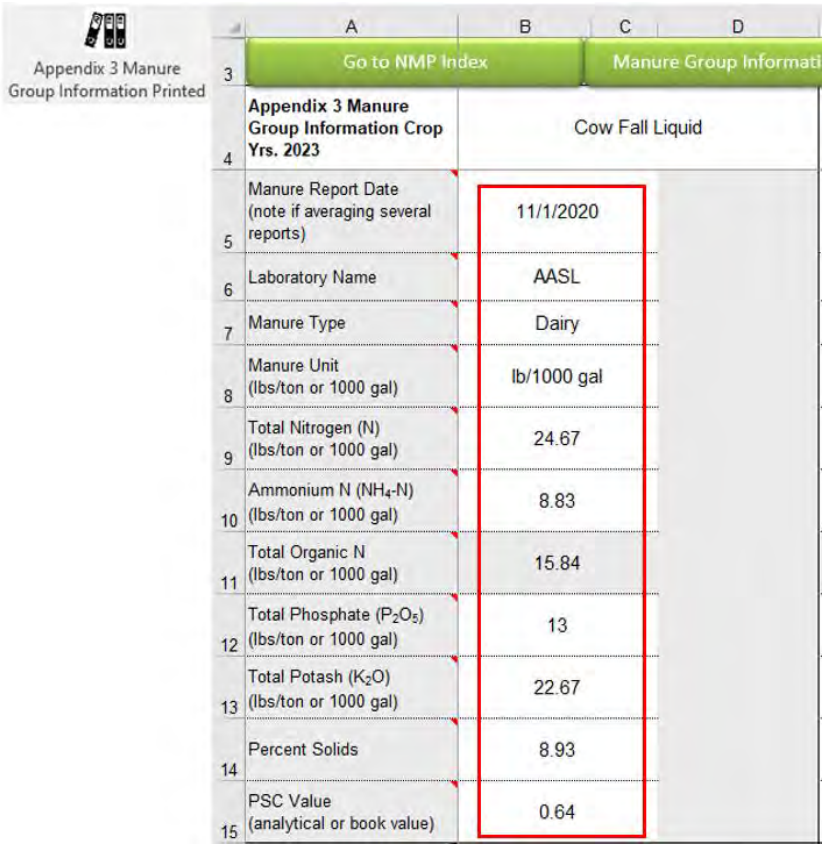
2.2. The Manure 5-year Running Average printout will look like this. This is the printout for submission.

Manure Analyses Average Printed

Manure Analysis 5 Year Running Average						
Manure Average for Crop Years. 2023	Cow Fall Liquid					
	Average	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
Manure Report Date	**Nov 01 2020**	Nov 01 2020	Oct 25 2019	Nov 15 2018		
Laboratory Name	**AASL**	AASL	AASL	AASL		
Manure Type	**Dairy**	Dairy	Dairy	Dairy		
Manure Unit (lbs/ton or 1000 gal)	**lb/1000 gal**	lb/1000 gal	lb/1000 gal	lb/1000 gal		
Total Nitrogen (N) (lbs/ton or 1000 gal)	**24.67**	25.00	31.00	18.00		
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	**8.83**	8.50	10.60	7.40		
Total Organic N (lbs/ton or 1000 gal)	**15.84**	16.50	20.40	10.60		
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**13.00**	12.00	16.00	11.00		
Total Potash (K_2O) (lbs/ton or 1000 gal)	**22.67**	23.00	33.00	12.00		
Percent Solids	**8.93**	6.40	12.00	8.40		
PSC Value (Enter analytical or book value)	**0.64**	0.80	0.67	0.45		

2.3. The Manure Group Average analysis will appear in Appendix 3 Input





2.4. The Manure Group Average analysis will appear in the Printed Appendix 3 Manure Group Information

How to Complete the Farm Crop List Worksheet and associated worksheets

Purpose and Overview:

This procedure describes how to complete the Farm Crop List Input sheet for a Nutrient Management Plan (NMP). All crops grown on the farm for are selected here. The crops listed in this table are from the Penn State Agricultural Analytical Services Laboratory (AASL) soil test recommendations for agronomic crops database.

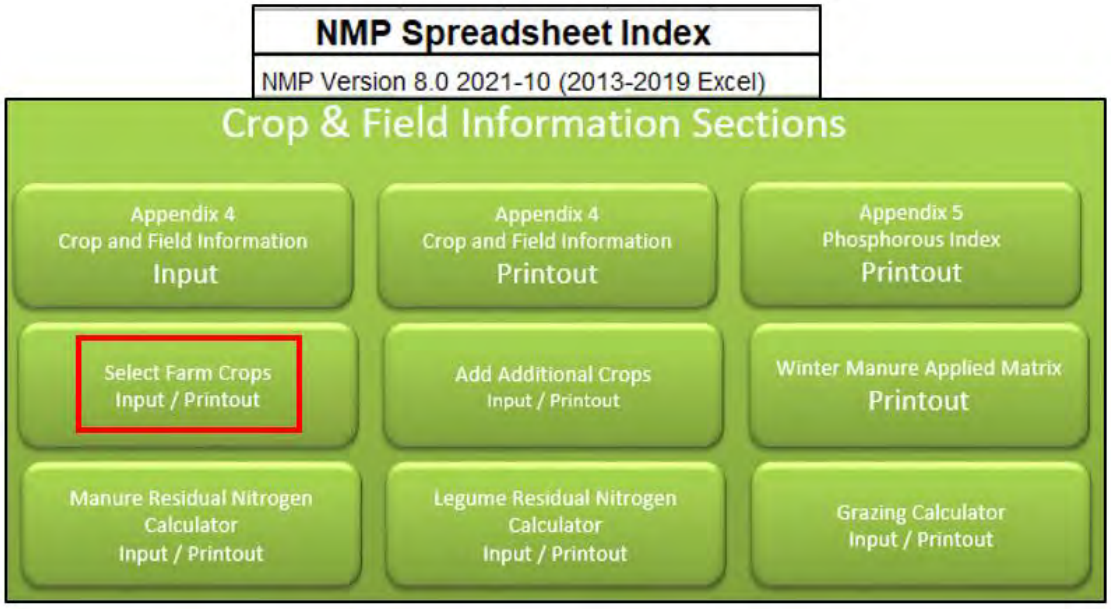
Begin in the first row of yellow shaded cells by selecting the Crop Group from the drop-down list in the Crop Group column. Next select the crop from the Crop Name column. Repeat the process in the next blank yellow row until all crops grown on the farm are selected. The selected crops will be listed in the Crop drop-down box in Appendix 4 Input.

To add crops not listed go to the Crop List Options tab and enter the required crop information. Return to the Create Farm Crop List tab and select "User Entered Crops" for the Crop Group. The added crop will be available for selection in the Crop Name column.

To clear a row – Select the Crop Group cell next to the crop to be removed and press the delete key or use the clear contents command. This will clear all information selected in that row. To clear the entire table, select all the Crop Group input cells that are populated and press the delete key.

This particular worksheet requires <u>data entry so it has a yellow colored sheet tab</u> in the NMP workbook.

You can find the Create Farm Crop List tab by looking for the hyper link in the NMP Spreadsheet Index

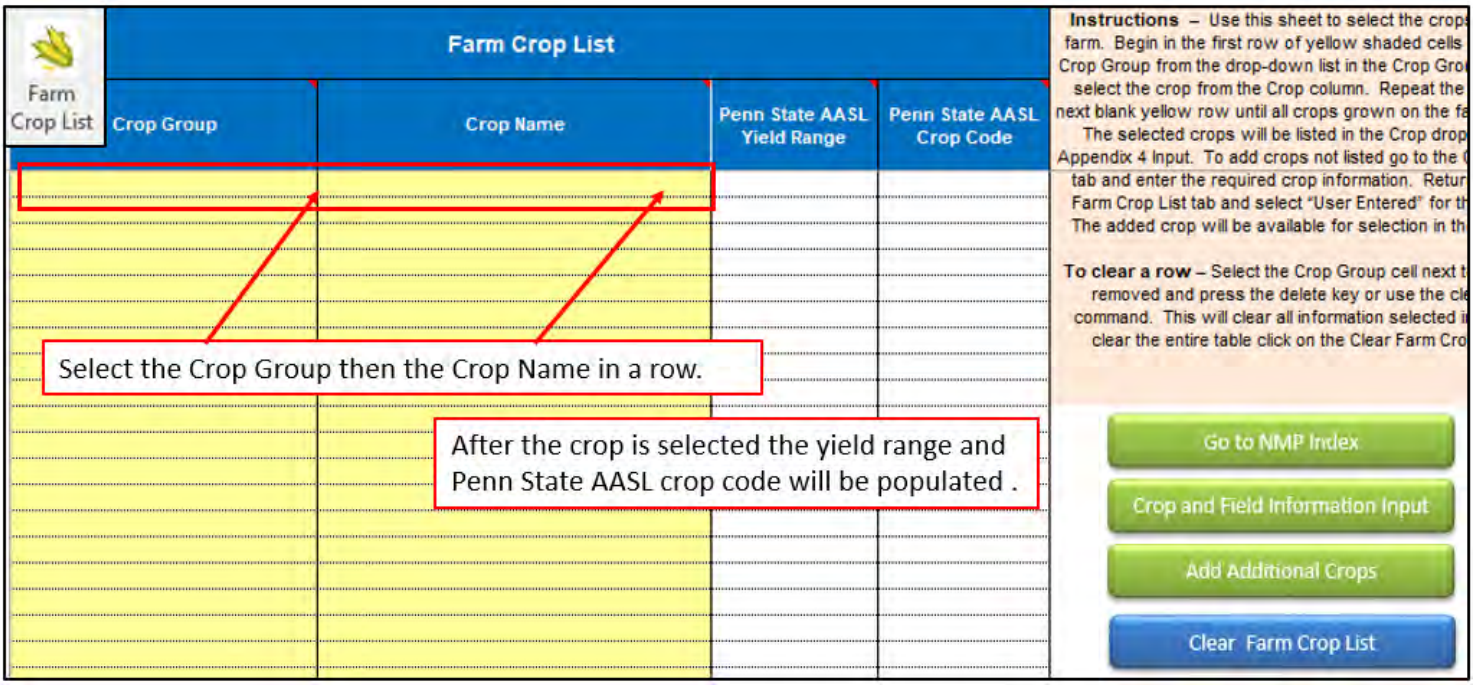


Or just scroll through the toolbar ribbon at the top of your screen until you find it. The ribbon icon looks like this:

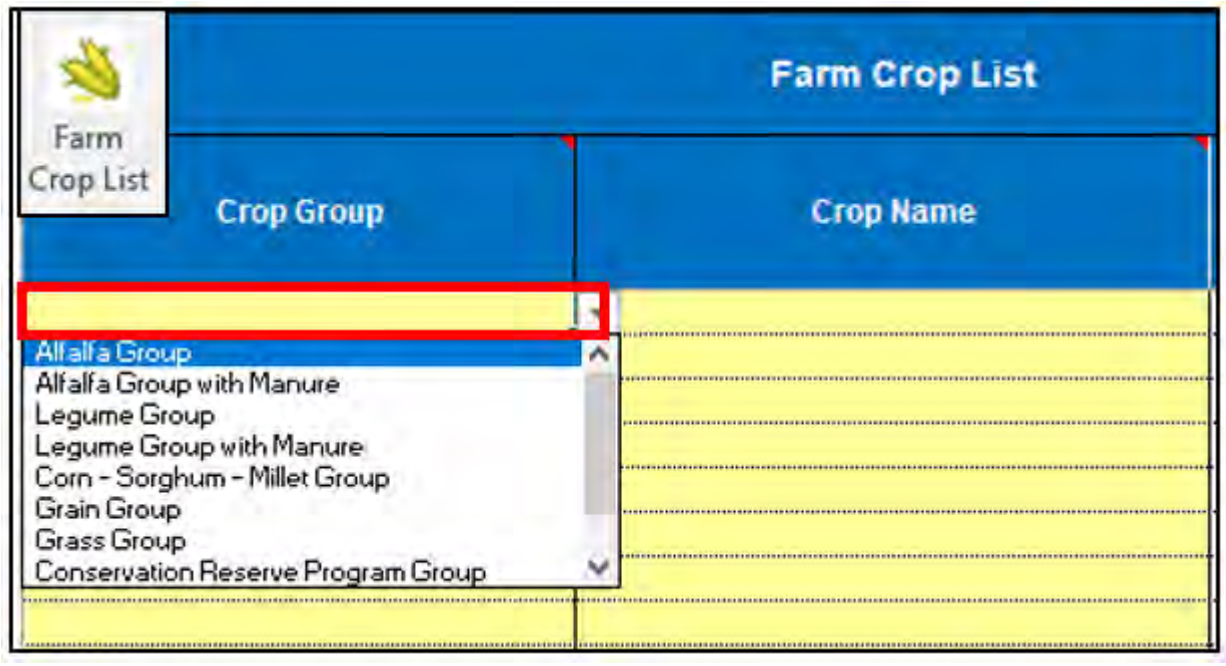
How to Complete the Farm Crop List Worksheet and associated worksheets

1. Layout and Use of the Create Farm Crop List Tab

1.1. Layout of the worksheet and overview



1.2. Selecting the Crop Group



Select the crop group from the drop-down list. Most crop groups are the same as those listed on a Penn State AASL form. There are two additional groups, "Alfalfa Group with Manure" and "Legume Group with Manure" are used when manure will be applied to a legume crop.

How to Complete the Farm Crop List Worksheet and associated worksheets

Any crop not listed can be added in the Crop List Options tab then select "User Entered" as the Crop Group. The newly added crop will be available for selection. Additional directions for this option are found below in section 1.7. Legumes with manure would need to be selected when applying manure to a legume. This will assign a nitrogen removal rate for the legume with manure.

Below is the list of Crop Groups from the AASL Sample Submission Form for Agronomic Crops.

Rev. 11/17

CODE GUIDE FOR AGRONOMIC CROPS

Page 2

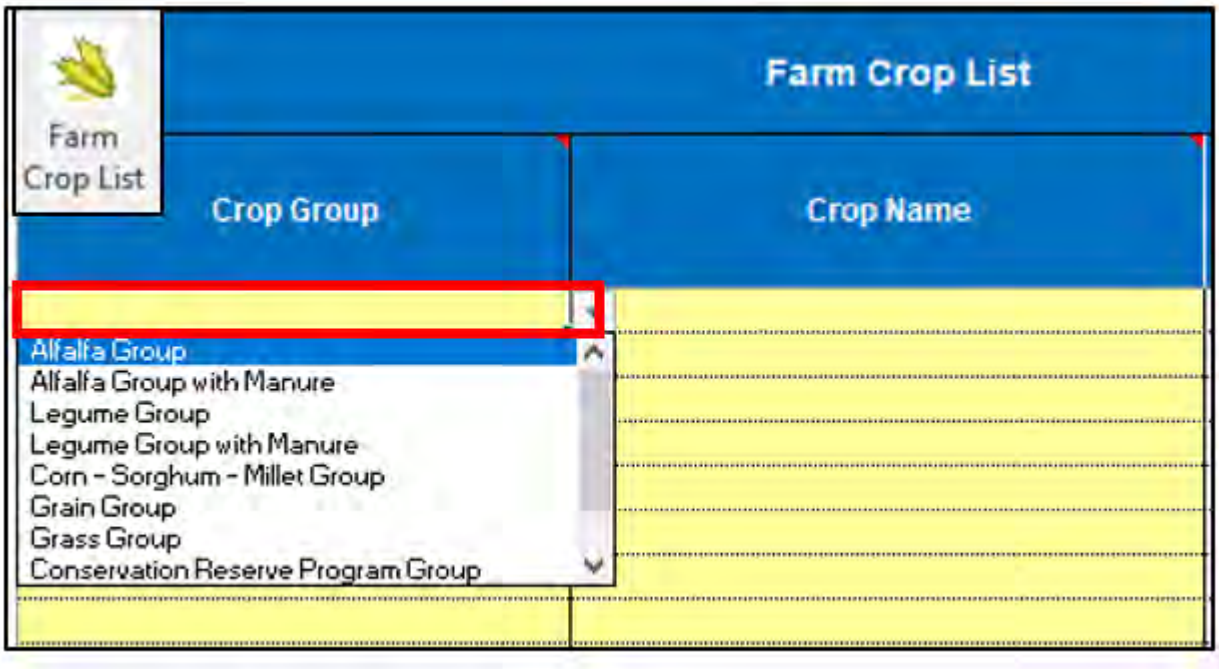
LOCATE CROP NAME BELOW

Write code number (4 digits) into "Crop Code" Blocks on Opposite side of the page. Note the Acceptable Yield Range for each Crop

CROP CODE	CROP NAME	YIELD RANGE
ALFALFA GROUP		
1020	Planting Alfalfa	2-6 Ton/A
1023	Planting Alfalfa (no-till)	2-6 Ton/A
1035	Planting Alfalfa in Oats	2-6 Ton/A
1032	Planting Alfalfa in Wheat	2-6 Ton/A
1022	Planting Alfalfa-Trefoil	2-6 Ton/A
1021	Planting Alfalfa-Grass	2-6 Ton/A
1001	Established Alfalfa	4-8 Ton/A
1072	Established Alfalfa-Grass	4-8 Ton/A
LEGUME GROUP		
1030	Planting Crownvetch	2.5-4 Ton/A
1031	Planting Crownvetch (no till)	2.5-4 Ton/A
1029	Planting Ladino Clover	2-4 Ton/A
1027	Planting Red Clover	2-4 Ton/A
1028	Planting Red Clover (no-till)	2-4 Ton/A
1037	Planting Red Clover in Oats	2-4 Ton/A
1034	Planting Red Clover in Wheat	2-4 Ton/A
1073	Planting Red Clover-Grass	2-4 Ton/A
1024	Planting Trefoil	1-3 Ton/A
1026	Planting Trefoil (no-till)	1-3 Ton/A
1036	Planting Trefoil in Oats	1-3 Ton/A
1033	Planting Trefoil in Wheat	1-3 Ton/A
1025	Planting Trefoil-Grass	2-4 Ton/A
1011	Established Crownvetch	2.5-4 Ton/A
1014	Established Ladino Clover	2-6 Ton/A
1015	Established Red Clover	2-6 Ton/A
1074	Established Red Clover-Grass	2-6 Ton/A
1005	Established Trefoil	2-6 Ton/A
1006	Established Trefoil-Grass	2-6 Ton/A
GRAIN GROUP		
1068	Spring Barley	60-100 Bu/A
1060	Winter Barley	50-130 Bu/A
1069	Buckwheat	30-70 Bu/A
1059	Oats	60-120 Bu/A
1061	Rye	50-90 Bu/A
1064	Soybeans	40-80 Bu/A
1071	Sunflowers	10-30 CWT/A
1058	Wheat	40-120 Bu/A
1012	Canola	30-80 Bu/A
1013	Spelt	70-150 Bu/A
1050	Barley/Soybean Double Crop	50-130 Bu/A
1051	Small Grain Silage	4-12 T/A

CROP CODE	CROP NAME	YIELD RANGE
CORN, SORGHUM & MILLET GROUP		
1042	Corn for Grain	110-270 Bu/A
1044	Corn for Grain (no-till)	110-270 Bu/A
1043	Corn for Silage	17-38 Ton/A
1045	Corn for Silage (no-till)	17-38 Ton/A
1057	Sorghum for Grain	90-170 Bu/A
1063	Sorghum for Forage	15-31 Ton/A
1048	Millet for Grain	30-70 Bu/A
1049	Millet for Forage	2-6 Ton/A
GRASS GROUP		
1038	Planting Bluegrass	1-2 Ton/A
1039	Planting Bromegrass	1-5 Ton/A
1062	Planting Mixed Grasses	1-5 Ton/A
1040	Planting Orchardgrass	1-5 Ton/A
1085	Planting Reed Canarygrass	1-5 Ton/A
1041	Planting Timothy	1-5 Ton/A
1075	Planting Tall Fescue	1-5 Ton/A
1077	Planting Warm Season Grasses	1-4 Ton/A
1010	Established Bluegrass	1-4 Ton/A
1016	Established Bromegrass	3-7 Ton/A
1019	Established Mixed Grasses	3-7 Ton/A
1017	Established Orchardgrass	3-7 Ton/A
1086	Established Reed Canarygrass	3-7 Ton/A
1018	Established Timothy	3-7 Ton/A
1076	Established Tall Fescue	3-7 Ton/A
1078	Established Warm Season Grasses	3-7 Ton/A
1066	Sudangrass	1-5 Ton/A
1067	Sorghum-Sudangrass	15-27 Ton/A
1080	Renovating Pasture (with legume)	2-4 Ton/A
1081	Established Pasture (without legume)	2-4 Ton/A
1082	Established Pasture (with legume)	2-4 Ton/A
1083	Planting Pasture (without legume)	2-4 Ton A
1084	Planting Pasture (with legume)	2-4 Ton A
CONSERVATION RESERVE PROGRAM		
1054	CRP Cool Season Grasses	------
1053	CRP Warm Season Grasses	------
MISCELLANEOUS		
1079	Brassicas	2-6 Ton/A
1800	Disturbed Lands	------
1055	Horticultural Cover Crop	------
1065	Tobacco	1-1.5 Ton/A
1056	Wildlife Food Plot	------
1052	Hops	------

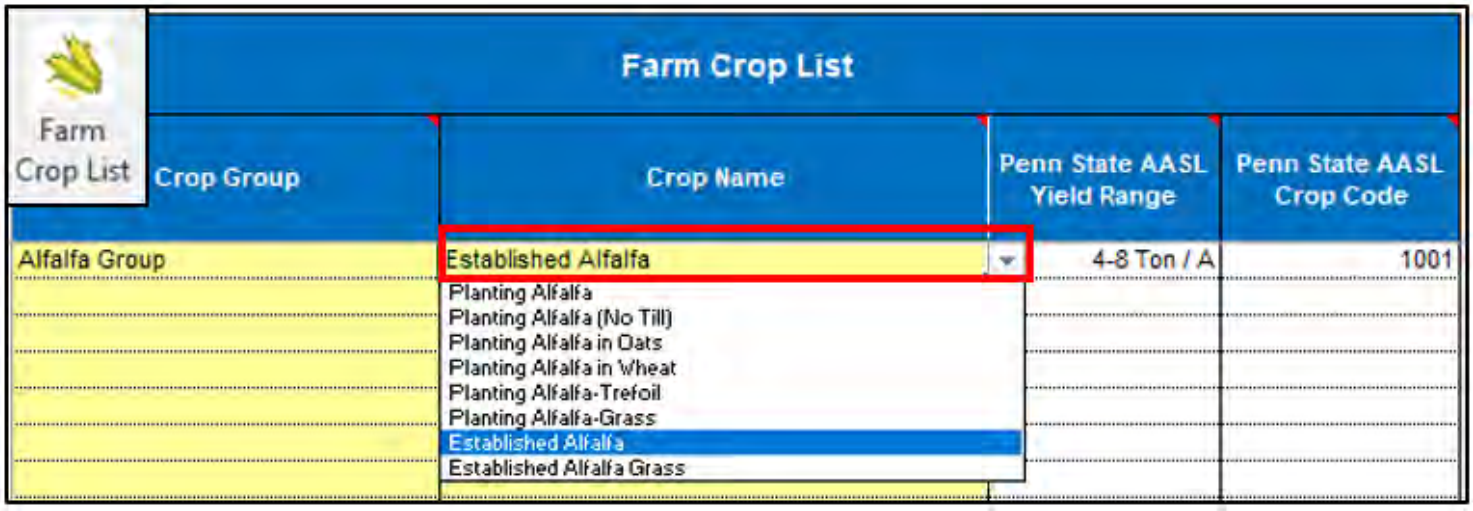
1.3. Selecting the Crop Name



The crops available for selection are based on the Crop Group. Select the crop from the drop-down list. The crop groups and crops can be found on the back of a Penn State AASL Agronomic Crop submission form.

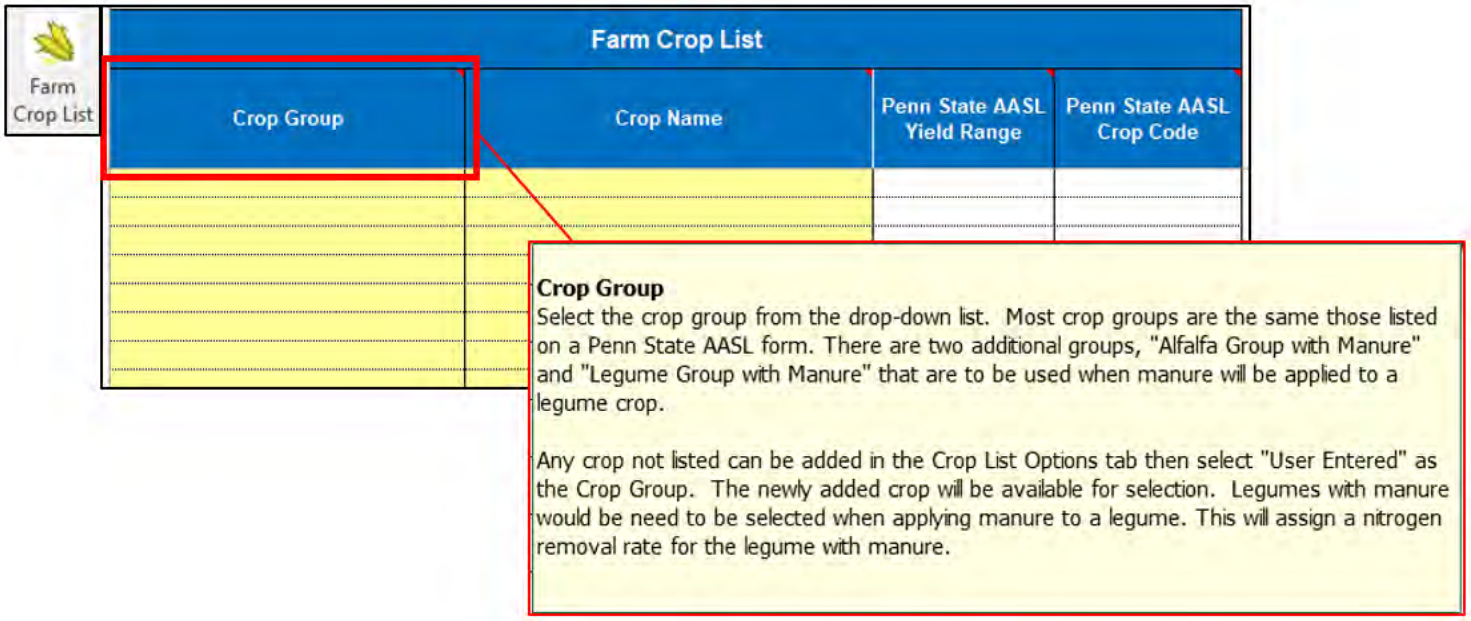
Any crop not listed can be added in the Crop List Options tab then select "User Entered Crops" as the Crop Group. Additional directions for this option are found below in section 1.7. The newly added crop will be available for selection.

1.4. Penn State AASL Yield Range and Crop Code



The crop yield range is the range where you will get a nutrient recommendation based on a soil test result. Values outside the range will need to have User Recommendations assigned. The Penn State AASL Crops Code is displayed for convenience but not used in the calculations.

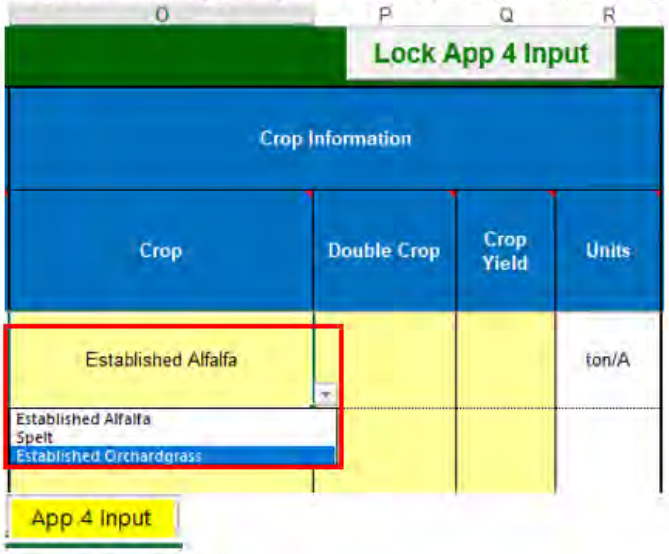
1.5. Column Header Note



The blue column headers cells with red triangles have notes included to help you understand what needs to be entered or what the cell data is used for. Where you see a red triangle in the cell, there is a note to help explain what should be entered in that column. For example when you click in the Crop Group column header the following message above will appear:

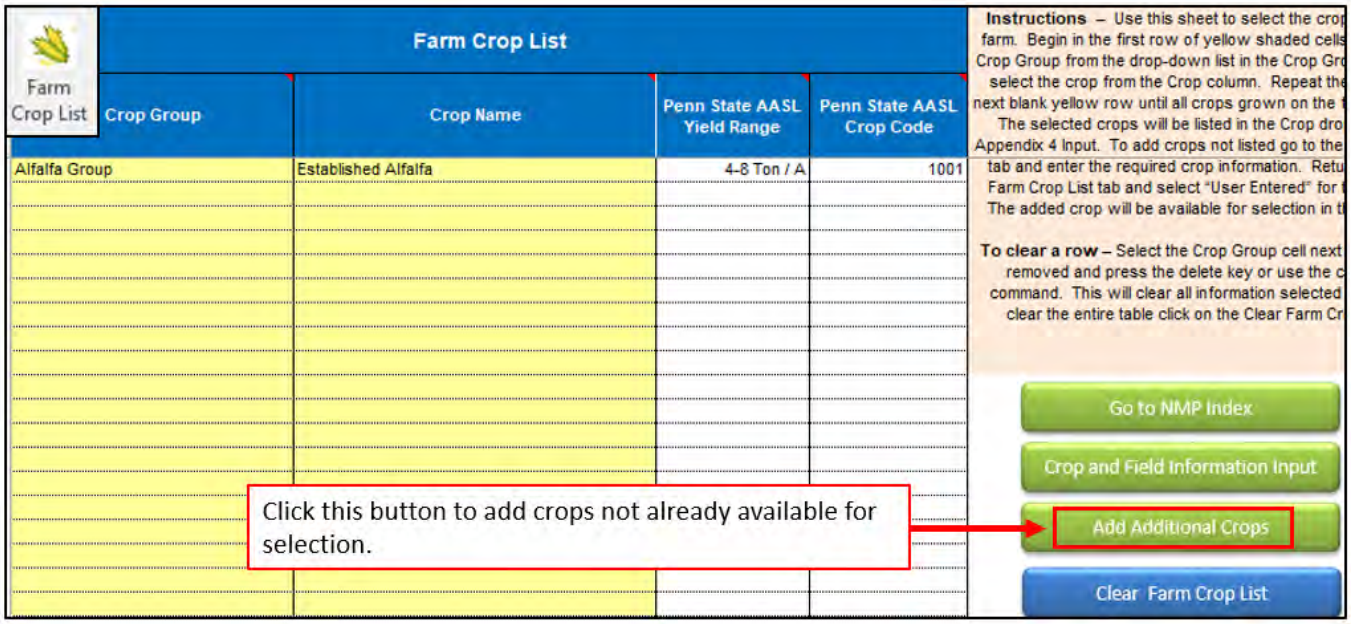
1.6. Selected crops will be available for selection in Appendix 4 Input tab

Crops Selected in the Create Farm Crops List can be selected from the dropdown list in App 4 Input when completing field planning scenarios



1.7. Adding Crops not available in the list

Crops not already available for selection in the Farm Crop List can be entered in the Crops List Options Tab. Click on the Add Additional Crops button to go to that page.



In the Crops List Options Tab, begin in the first available yellow row. Crops entered here will be available in the User Entered Crop Group in the Farm Crop List Tab. Print this optional worksheet if you use it.

User Entered Crop – Enter the crop name. Triticale was entered as an example below

Yield Units – Enter the yield units. For a crop with a recommendation for the entire crop with no yield enter "Per Crop".

Crop P Removal Rate – Enter a value. This will be used to determine a crop phosphorous removal rate used in the P Index calculations.

Winter Crop – A winter crop is a crop planted in the fall and harvested in the spring. The "Winter Crop" designation will appropriately assign the Nitrogen availability when using the N fractions method, Table 1.2-15 in the Agronomy Guide.

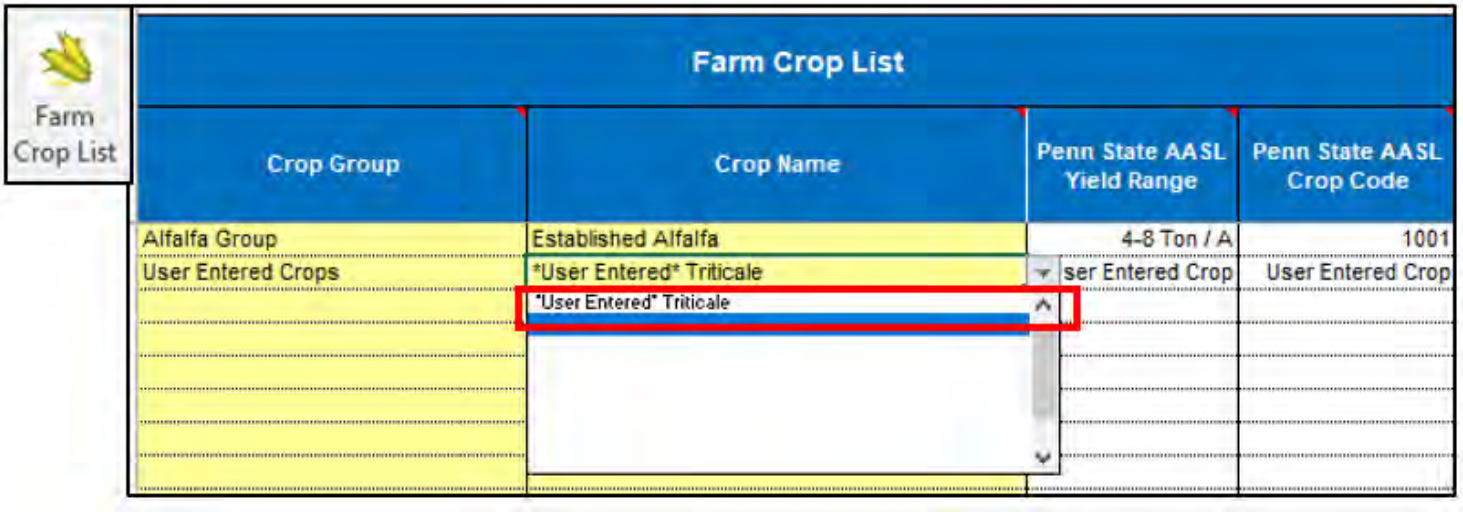
Legume – Select if a user entered crop is a legume. This will affect the Legume Nitrogen carryover history. Legumes don't receive a legume credit. This will affect the supplemental nitrogen fertilizer. Legumes don't need additional nitrogen fertilizer.

Perennial – The perennial designation will appropriately assign the Nitrogen availability when using the N fractions method, Table 1.2-15 in the Agronomy Guide.

Summer Annual – A summer annual crop user utilizes the full growing season. Summer annual crops utilize nitrogen during the warmer months and receive a carryover legume nitrogen credit.

1.7.1. Selecting a User Entered Crop.

A crop entered in the Crop List Options tab can be selected using the "User Entered Crops" Crop Group. A yield range and crop code won't be listed for user entered crops.



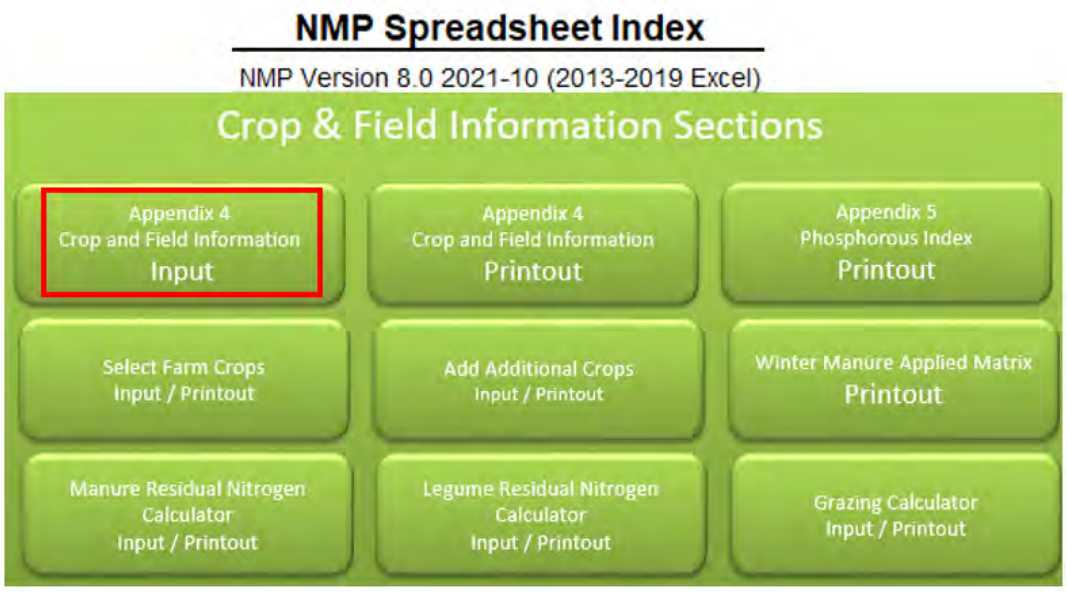
1.8. Revising the Create Farm Specific Crop list

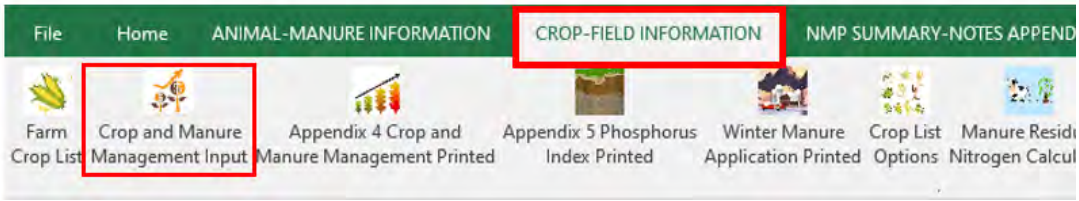
Additional crops can be added at any time. The order of crops in App 4 Input will be the same order as they are selected in the Farm Crop List.

How to Complete the NMP Appendix 4 Input Worksheet
(Appendix 4 Crop & Manure Management, Appendix 5 P Index, Winter Manure Application Matrix)

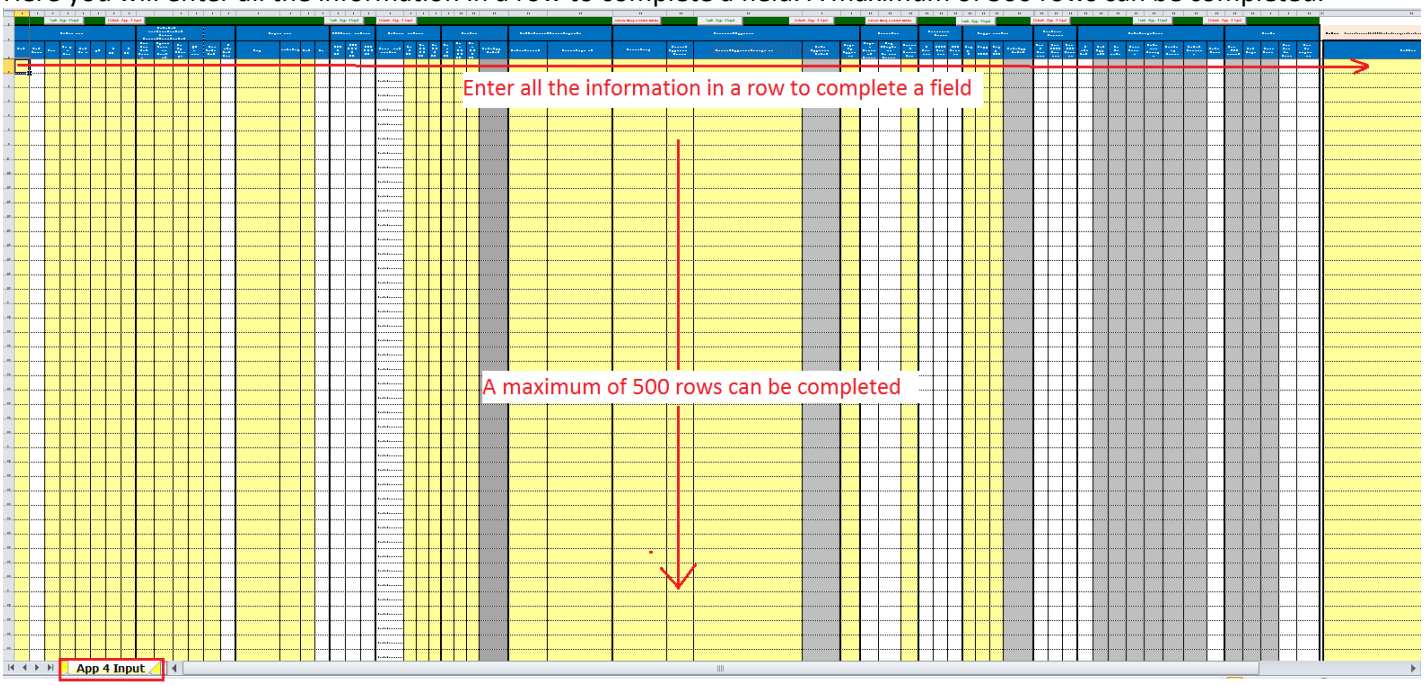
Purpose:
This procedure describes the process to complete the App Input, (Appendix 4 Crop & Manure Management), Worksheet. All of the field or Crop Management Unit, (CMU), information is entered in one row including the Phosphorous Index, and Winter Manure Application Matrix information.

Look for a navigation button in the NMP Spreadsheet or a toolbar ribbon icon that looks like the screenshot below:





Here you will enter all the information in a row to complete a field. A maximum of 500 rows can be completed.

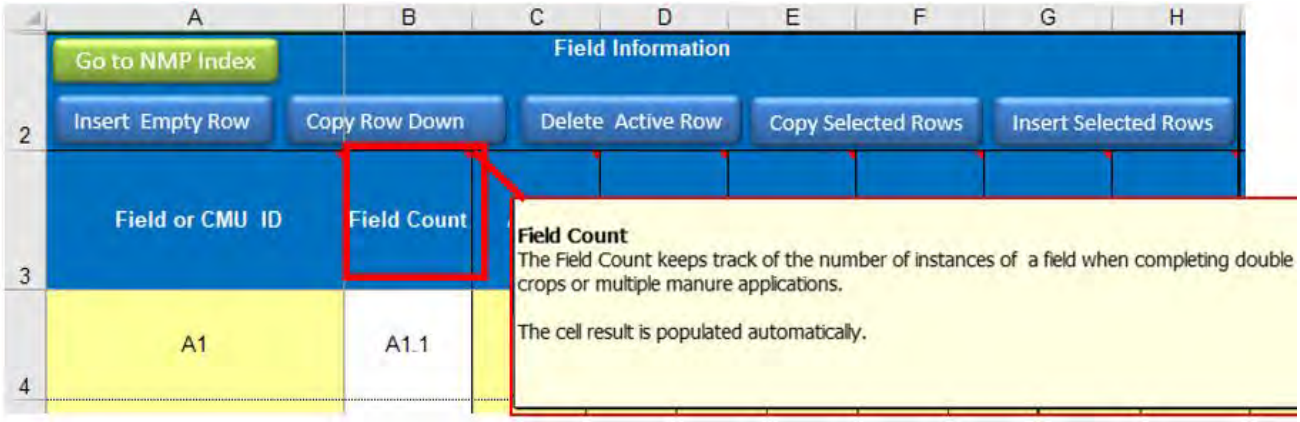


Each field contains the following sections within a row of the App 4 Input worksheet.

- Field Information
- P Index Part A Questions
- Crop Information
- Soil Test Recommendations
- Starter Fertilizer
- Residual and Carryover Nitrogen
- Manure Application Information
- Manure Rate
- Balance after Manure
- Supplemental Fertilizer
- Final Nutrient Balance
- P Index Information
- Winter Matrix Information
- Field Notes

Within Each section are individual columns where information is entered or transferred. The blue column headers with red triangles cells have helpful pop up notes included to help you understand what needs to be entered or what the cell data is used for.

When you click in the blue column header "Field Count", the following pop-up box will appear:



In each row of the worksheet there are yellow, white, and grey cells.

- Yellow cells: are for data entry.
- White cells: contain information that's returned from a database look up. Don't enter data into the white cells.
- Grey cells: are conditionally formatted to turn yellow if you need to enter data. For example if you entered a starter P fertilizer and it's a P index field you will need to make a selection for the P Index Application Method. You can make a selection in a grey cell but if it's grey, you don't need to enter the information and it should be blank.

The App 4 Input is only used for data entry and is not printed for submission. Once you complete the appropriate sections in a field row the information is transferred to the printed worksheets that will be submitted for review and approval. The printed worksheets automatically populated from the App 4 Input sheet are:

- Appendix 4 Crop and Manure Mgmt.
- Appendix 5 P Index
- Winter Application Matrix

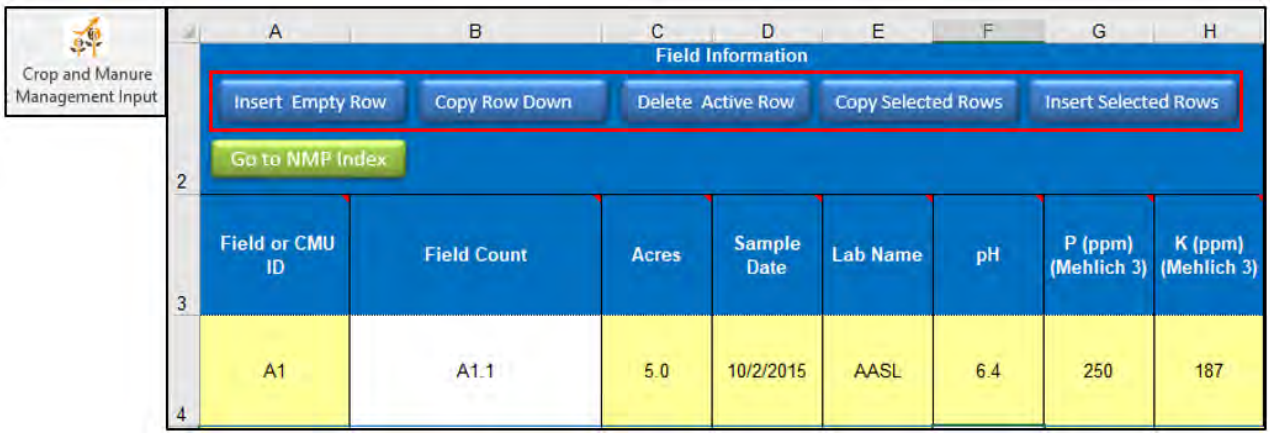
They can be elected in the toolbar ribbon using the following icons.

There is no data entry required in these worksheets since all information is transferred from the App 4 Input sheet.

How to Complete the NMP Appendix 4 Input Worksheet
(Appendix 4 Crop & Manure Management, Appendix 5 P Index, Winter Manure Application Matrix)

This guide only describes how to complete a single field within the App 4 Input sheet. For guidance on how to complete multiple applications of manure on a field or a double crop scenario, there are two separate guidance documents.

There are buttons in the Field Information section of App 4 Input to modify the rows.



Clicking on the buttons will perform the following functions:

Insert Empty Row - Add an empty row <u>below</u> the active or selected row.

Copy Row Down - Copy the selected row down below the active row.

Delete Active Row - Delete the selected row.

Copy Selected Rows - Copy a group of contiguous rows. (used to copy an existing multiple or double crop scenario). A dialog box will alert you that the rows were successfully copied.

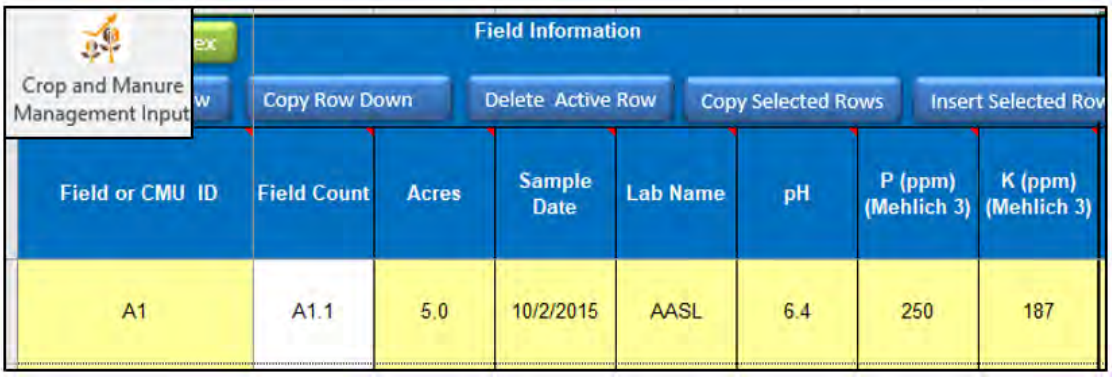
Insert Selected Rows - Paste a group of contiguous rows above the active row <u>after</u> the paste the Copied Selected Rows button was used. The currently copied selected rows can be pasted many times without re-selecting the rows again. For example, a double crop with multiple manure applications can be selected then pasted many times without reselecting the rows.

1. Procedure

1.1. Enter the CMU of Field ID.

Avoid special characters like: . @ & # as they may interfere with the calculations.
The field count cell is used to keep track of multiple applications and double crops. You don't need to enter anything here. (Remember a white cell is a formula cell and no data entry is needed.)

- Enter the Field or CMU acres
- Enter the Soil Sample Date
- Enter the Soil Testing Lab Name
- Enter the soil test pH result
- Enter the soil test P result in ppm. (Make sure the soil test P lab result was reported in Mehlich 3 soil test values ppm P)
- Enter the soil test K result in ppm.



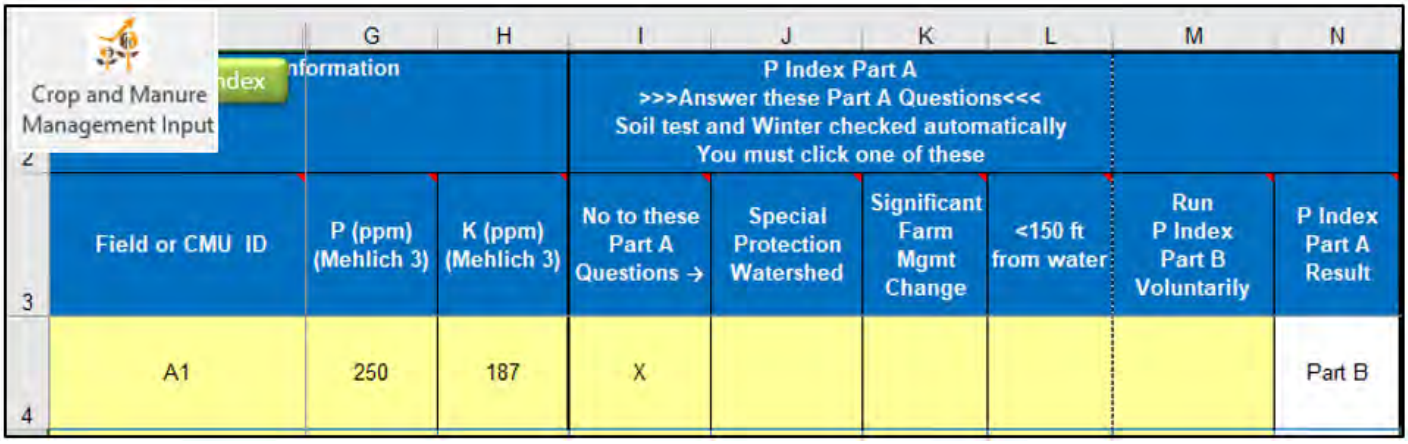
Field or CMU ID	Field Count	Acres	Sample Date	Lab Name	pH	P (ppm) (Mehlich 3)	K (ppm) (Mehlich 3)
A1	A1.1	5.0	10/2/2015	AASL	6.4	250	187

1.2. Complete the P Index Part A Questions Section

1.2..1. Review the P Index questions: Special Protection Watershed, Significant Farm Management Change, and <150 feet from water. Place an "X" if they apply to the field. You can select an "X" using the drop down box or enter an "X". If none of the Part B questions apply you must place an X in the "No to All Part A Questions" cell. This acknowledges you reviewed this section and none of the Part A questions apply.

The soil test P and Winter Application Part B test is checked automatically. Completing the winter matrix is discussed in Section 1.13.

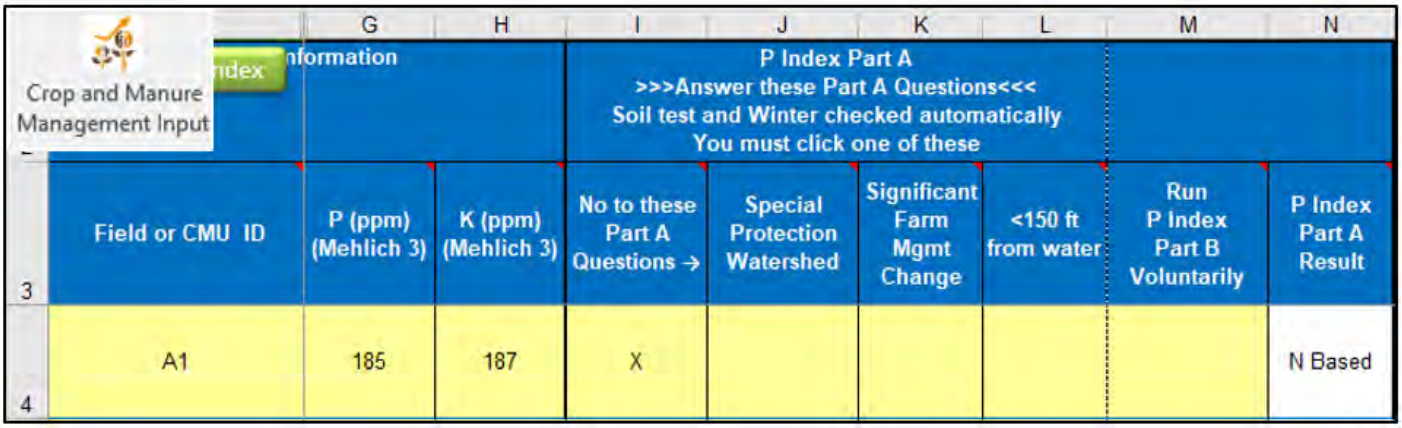
The P Index Part A result cell will return an answer based on your selections to the questions. In the example below No to all part A questions is checked but the P Index Part A result is "Part B" because the soil test is greater than 200ppm.



	G	H	I	J	K	L	M	N
2	Crop and Manure Management Input		nformation		P Index Part A >>>Answer these Part A Questions<<< Soil test and Winter checked automatically You must click one of these			
3	Field or CMU ID	P (ppm) (Mehlich 3)	K (ppm) (Mehlich 3)	No to these Part A Questions →	Special Protection Watershed	Significant Farm Mgmt Change	<150 ft from water	Run P Index Part B Voluntarily	P Index Part A Result
4	A1	250	187	X					Part B

There is an option to run the P Index voluntarily if none of the Part A questions apply. Place an X in the "Run P Index Part B" column and the field will be included in the P Index.

In the example below, the soil test was less than 200ppm P and none of the Part A questions apply. The "Run P Index Part B" column was selected and the P Index Part A result will state "Part B".



	G	H	I	J	K	L	M	N
2	Crop and Manure Management Input		nformation		P Index Part A >>>Answer these Part A Questions<<< Soil test and Winter checked automatically You must click one of these			
3	Field or CMU ID	P (ppm) (Mehlich 3)	K (ppm) (Mehlich 3)	No to these Part A Questions →	Special Protection Watershed	Significant Farm Mgmt Change	<150 ft from water	Run P Index Part B Voluntarily	P Index Part A Result
4	A1	185	187	X					N Based

Remember you can click in the blue column headers to get a pop-up note to help you complete the selections.

1.3. Complete the Crop Information Section

1.3..1. Crop: Select the crop from the drop down list. This cell is a drop down list of farm specific crops. To make a farm specific crop list go to the "Create Farm Crops List worksheet" and select the crops that are planned to be planted. All of the crops in the AASL Soil Test Recommendations for Agronomic Crops are listed here. If the crop isn't in the list you can add a crop in the Crop Lists Option worksheet. After you select the crop the worksheet will assign the appropriate crop units. For example if you select corn silage then the crop unit of ton/A will be assigned.

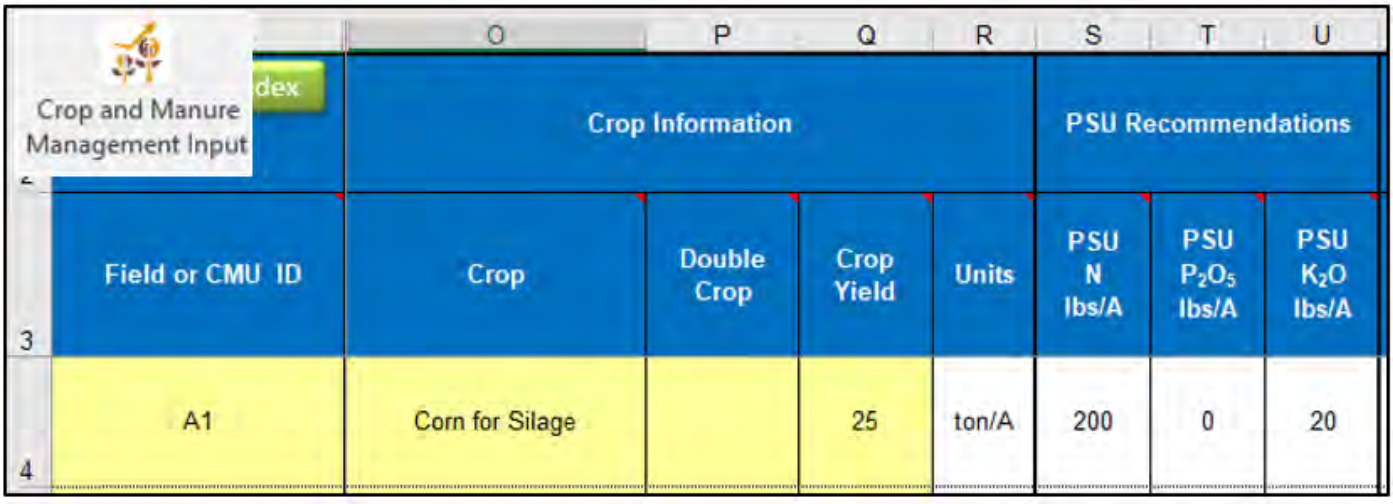
1.3..2. Double Crop: This example is only a single crop in a crop year so it will be left blank. If a double crop was planned for this field then either "Winter crop in a double crop" or "Summer crop in a double crop" would be selected. Remember a winter crop always needs to be completed first before a summer crop in a double crop scenario.

1.3..3. Yield: Enter the expected crop yield. After you select the crop and yield the worksheet will assign the appropriate crop units. For example if you select corn silage then the crop unit of ton/A will be assigned.

1.4. Review the Crop PSU and User Recommendations Section.

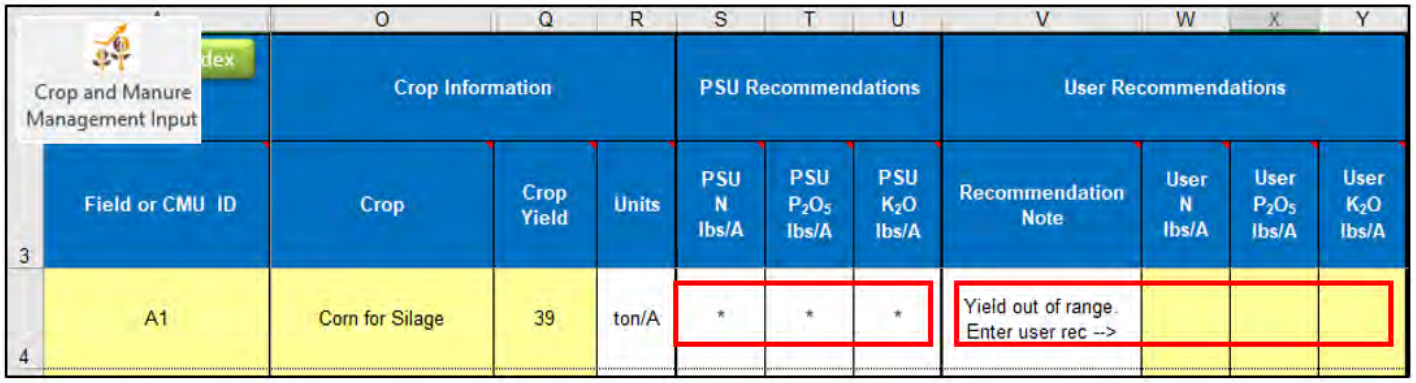
1.4..1. The crop and yield information is used to look up the recommendations based on the soil test results in the AASL Soil Test Recommendations for Agronomic Crops.

For example, if a field had a soil test result of 250ppm P and 187 ppm K and you entered corn silage @ 25 ton/A you would get the example below:



	O	P	Q	R	S	T	U
2	Crop and Manure Management Input		Crop Information			PSU Recommendations		
3	Field or CMU ID	Crop	Double Crop	Crop Yield	Units	PSU N lbs/A	PSU P_2O_5 lbs/A	PSU K_2O lbs/A
4	A1	Corn for Silage		25	ton/A	200	0	20

Regulations require that recommendations that are "similar" to AASL recommendations. However, the regulations do allow other recommendations. These alternative recommendations can be entered in the User N, User P, and User K columns as lbs. N, P_2O_5, and K_2O/A. If User Recommendations are entered, these will be used for the calculations in the plan. **Leave the User Recommendations blank to use the AASL recommendations**. **If you enter zeros for the User Recommendations then any N, P205, K20 applied will be calculated as excess and give a negative nutrient balance after manure**. Even if User Recommendations are entered and used in the calculations, the AASL recommendations will be displayed in the plan printout for comparison in the review process. If you enter a yield that's outside the range listed in the AASL Soil Test Recommendations for Agronomic Crops an asterisk * will be in the PSU recommendation cells. You will need to enter user recommendations in the cells provided. You may also need to enter user recommendations for crops that are not in the AASL Recommendations for Agronomic Crops list.

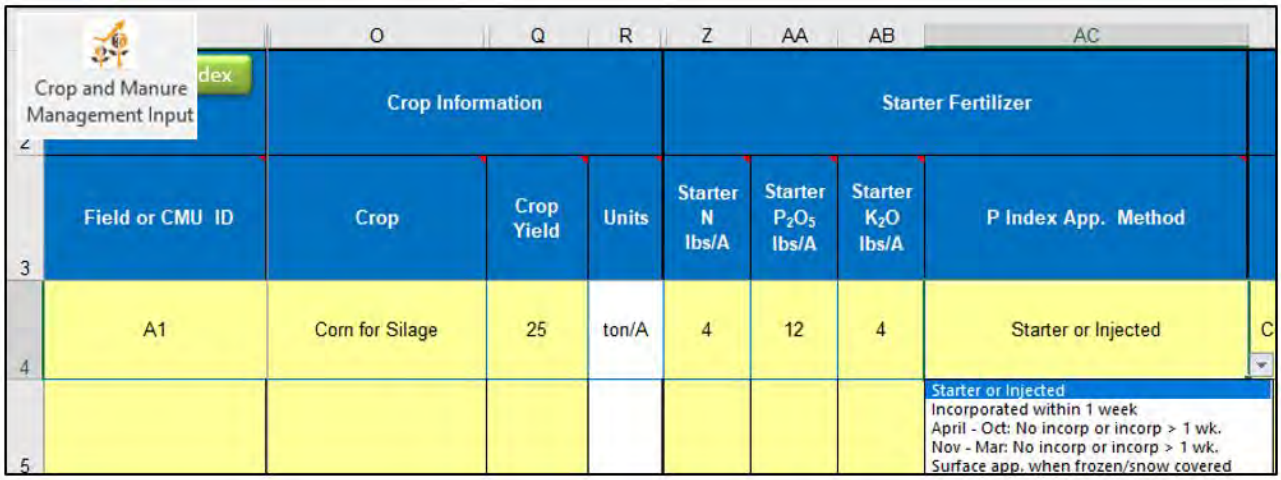


1.5. Enter the Starter or Other Fertilizer

1.5..1. Enter a value for the starter (or other fertilizer. Planned for application regardless of manure or supplemental fertilizer to be applied.

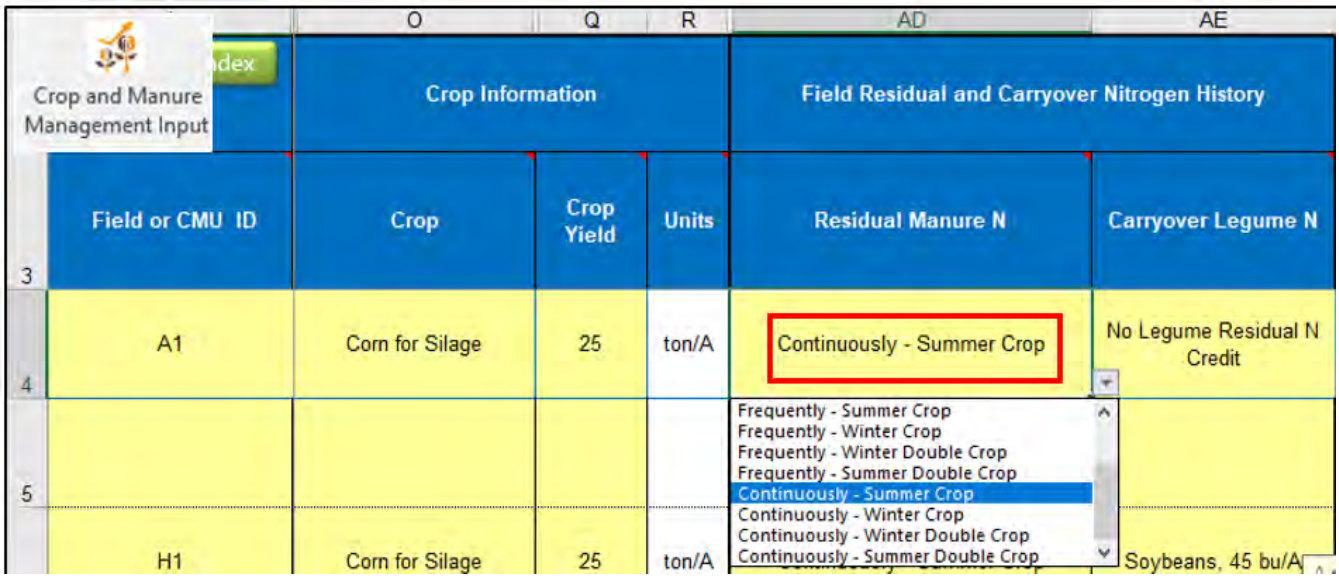
The starter fertilizer must be listed in the first instance of a field when completing multiple manure applications or double crops.

If there is no starter applied enter a zero "0" in each of the cells or the spreadsheet won't calculate properly when working on a plan that's been transferred from a Version 4.x plan. If the field is a P Index "Part B" field and a value is entered for the P fertilizer then the P Index application method cell will change from grey to yellow requiring you to select an application method. If you don't enter a starter P fertilizer and you select an application method the factor will appear in the P index but there will be no lbs. of P fertilizer associated with it. This can be confusing to reviewers when you have a lot of applications. If the P index application method cell is grey do not enter a P Index Application Method, or if one has been entered, delete the text.



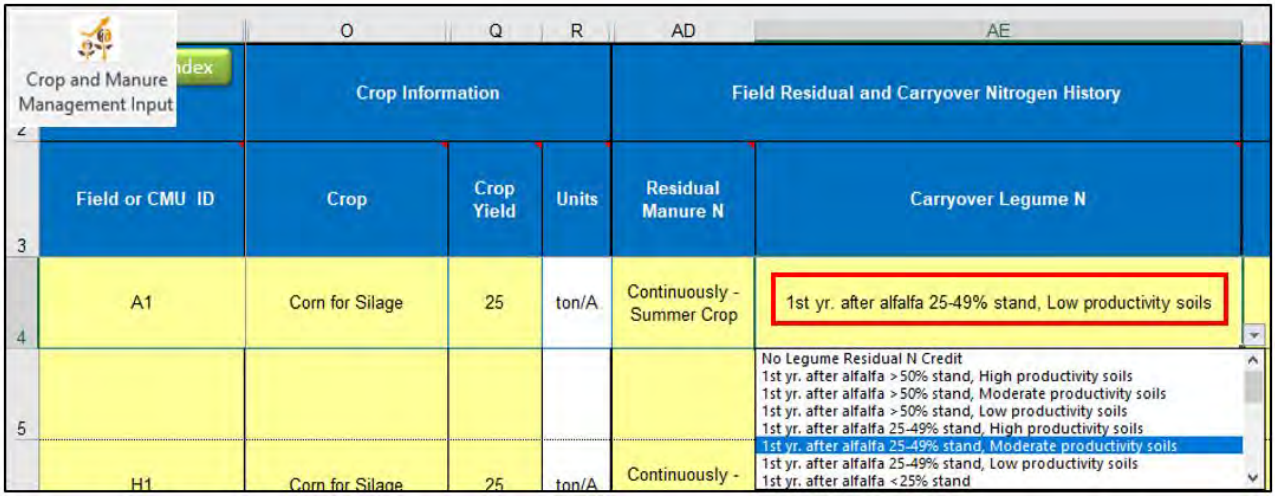
1.6. Complete the Residual and Carryover Nitrogen

1.6..1. Residual Manure N - Select the residual manure description that best fits the field history. These are the residual manure histories found in Agronomy Guide Table 1.2-14 B



1.6..2. Carryover Legume N - Select the previous legume history description that best fits the field history. These are the previous legume categories found in Agronomy Guide Table 1.2-6. If the previous year's crop wasn't a legume it's recommended that you select "No previous Legume". If this was a winter double crop and the previous crop was a legume it's suggested to select "Legume Residual N Credited to Summer Crop". (Remember the legume residual gets credited to the summer crop in a double crop).

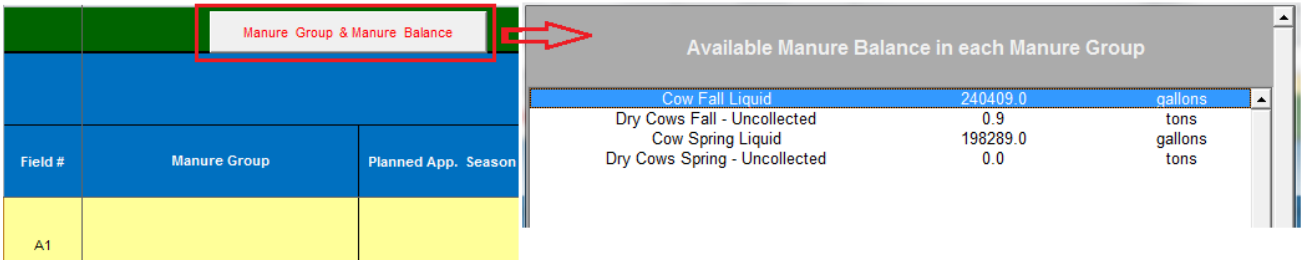
Legume residual nitrogen is only credited to summer annual crops. Crops considered a "Summer Annual" that will receive the legume residual credit are listed in the Crop List Option Tab in the spreadsheet. The cell will be yellow if the crop is a summer annual. The cell will be shaded green if the crop IS NOT a summer annual. Legume crops do not receive a carryover legume N credit.



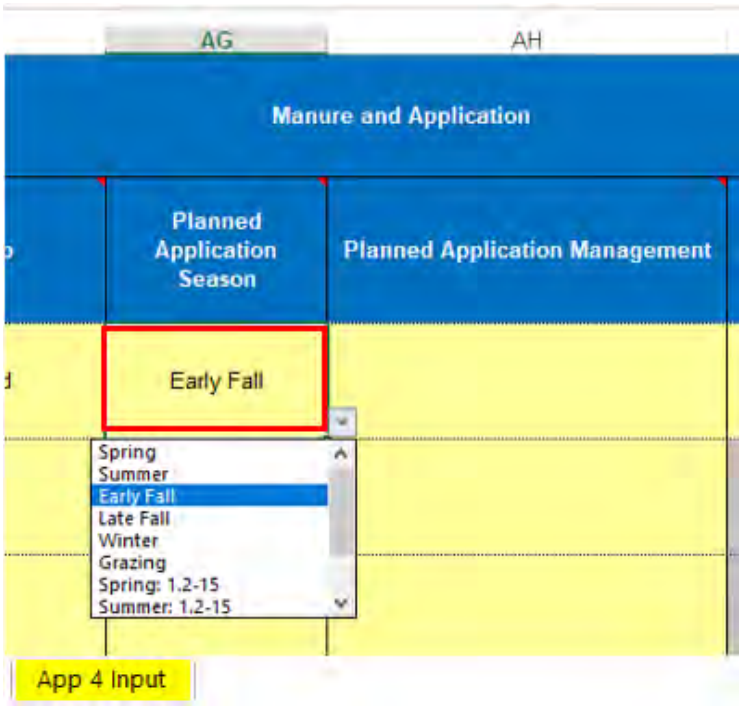
Remember you can click in the blue column headers to get a pop-up note to help you complete the selections.

1.7. Complete the Manure Application Information

1.7..1. Manure Group - Select the Manure Group to be applied to the field. There is a pop up box button called "Manure Group & Manure Balance" above the Manure group header. After it opens it will display the manure groups and amounts available for allocation. If you have not created any manure groups yet, go to the Appendix 3 Input worksheet and enter the manure group Information. Select the manure group from the drop down box in the yellow cell and not in the pop up box associated with the "Manure Group & Manure Balance" Button. **If no manure is to be applied then leave this cell blank and "No Manure Applied" will display in the printed Appendix 4 Crop & Manure Management Section.**



1.7..2. Planned Application Season -.Select the Planned Application Season from the drop down list. If no manure is applied leave it blank



The Planned Application Season values are from Tables 5, (Agronomy Guide Table 1.2-11), and Table 6, (Agronomy Guide Table 1.2-12) in the spreadsheet. If you need further clarification of the selections, Tables 5 and 6 have pop up messages in the Planned Application Season boxes

Table 5

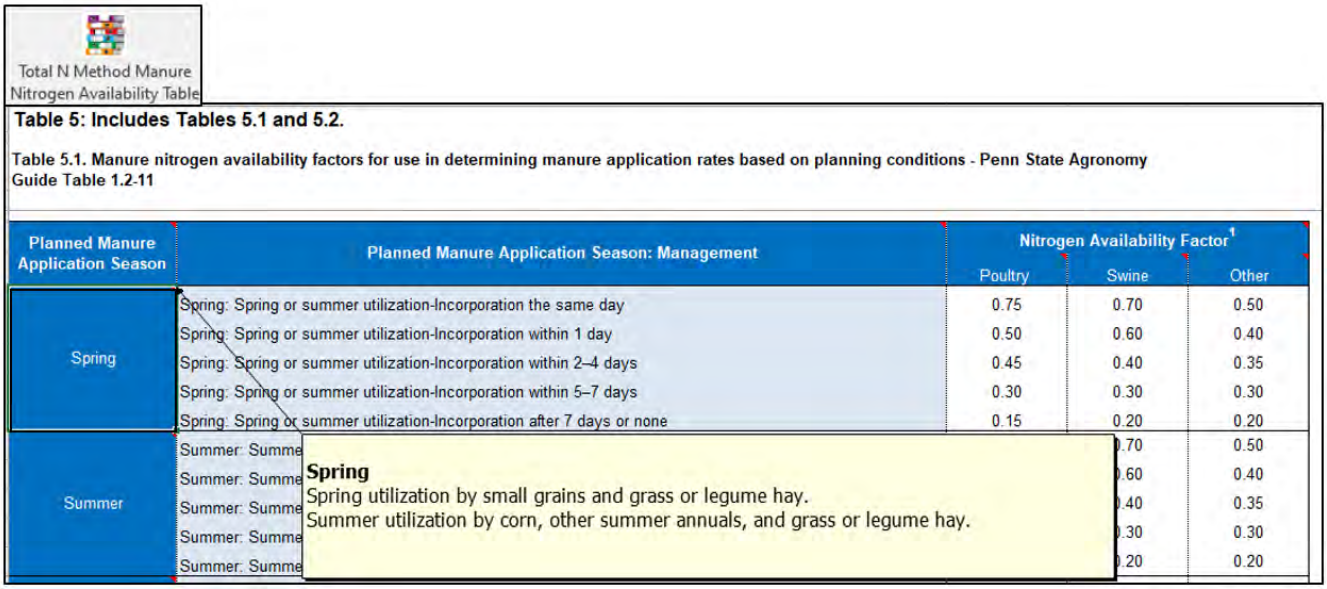
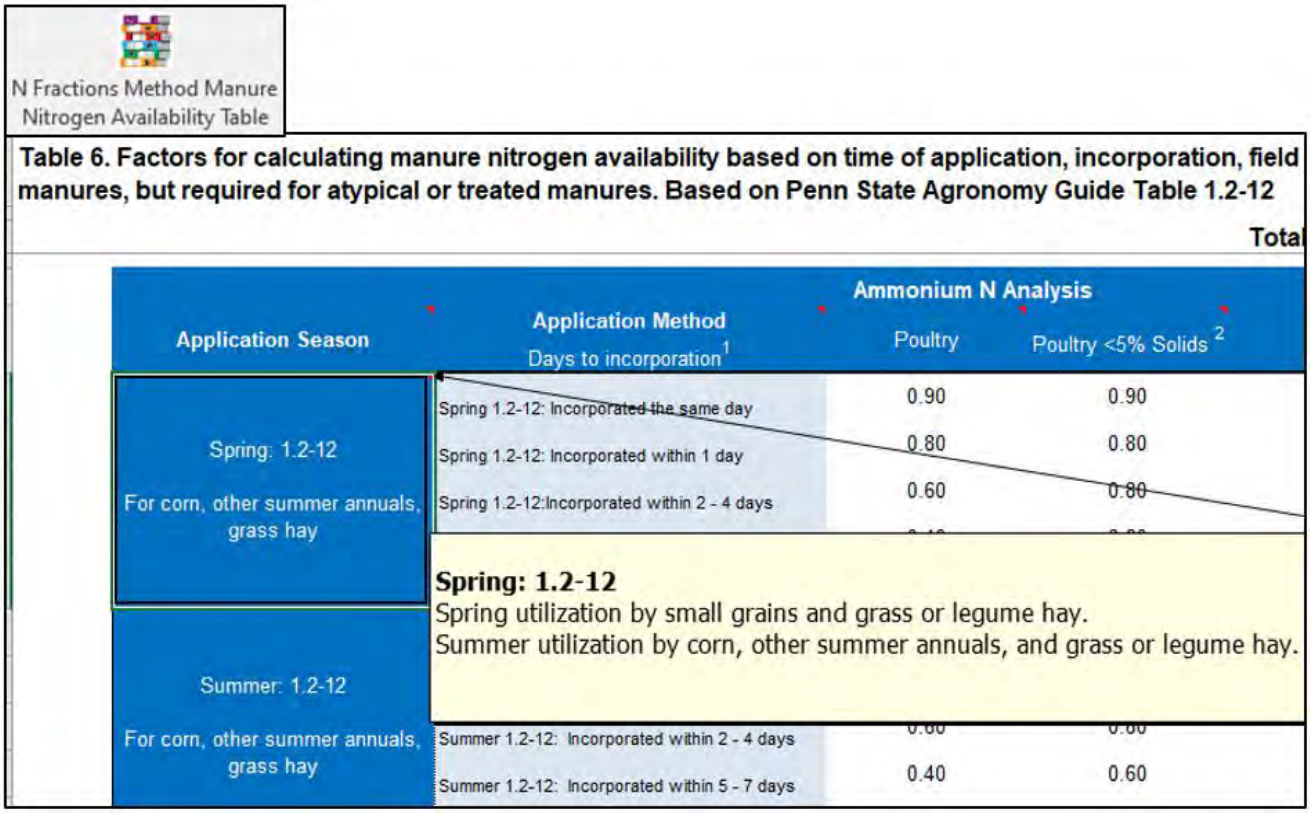
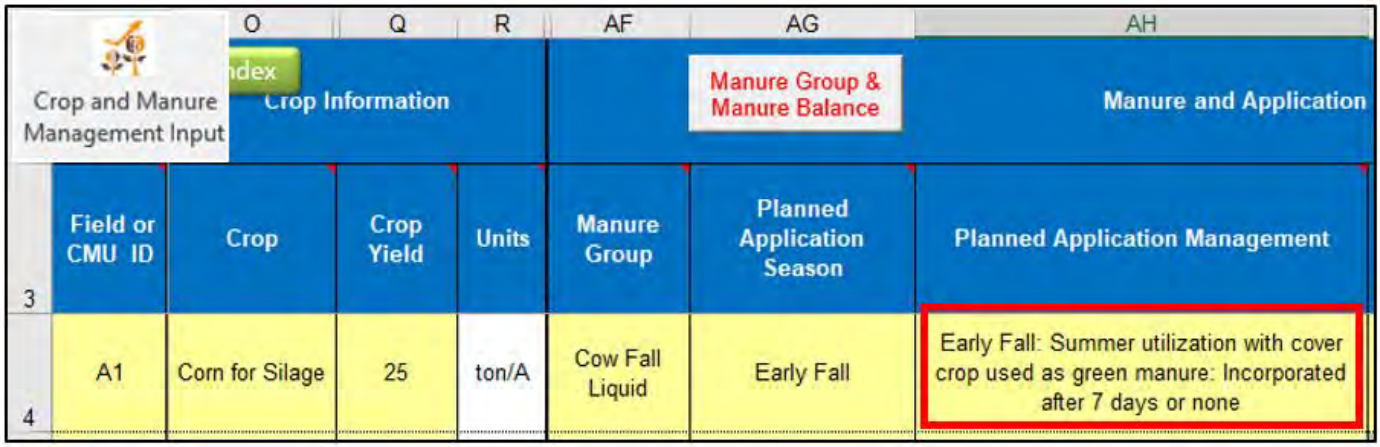


Table 6

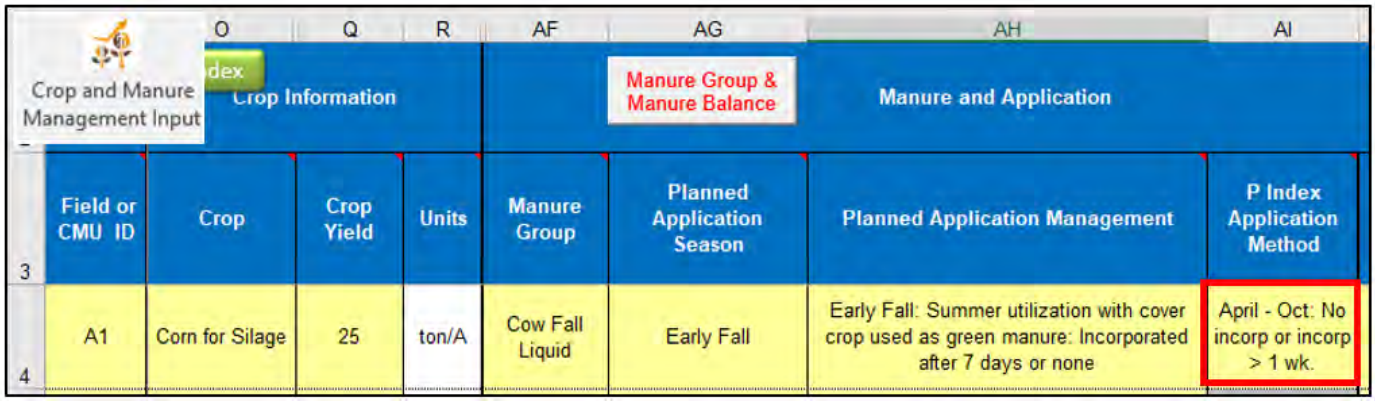


1.7..3. Planned Application Management - The Planned Application Management categories are dependent on the Season selected, if the season is changed, the method must be re-selected. If no manure is applied leave it blank. The Planned Application Management values are from Tables 5,(Agronomy Guide Table 1.2-11), and Table 6, (Agronomy Guide Table 1.2-12) in the spreadsheet.



	O	Q	R	AF	AG	AH
	Crop and Manure Management Input	Crop Information			Manure Group & Manure Balance	Manure and Application
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Season	Planned Application Management
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none

1.7..4. P Index Application Method - Select the P Index Application Method if applicable. If the field is a P Index "Part B" field and a manure group is selected then the P Index Application Method cell will change from grey to yellow indicating requiring you to select a manure application method.

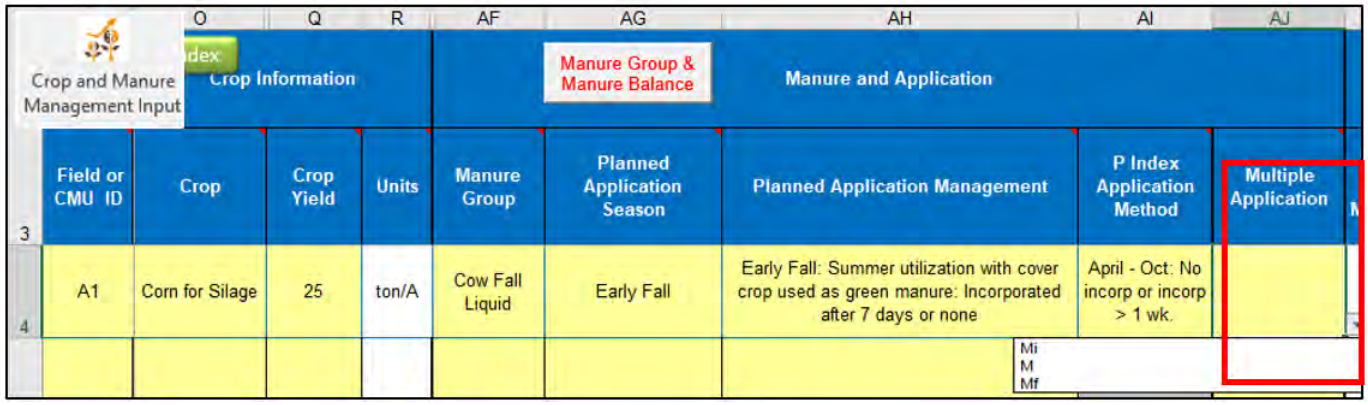


	O	Q	R	AF	AG	AH	AI
	Crop and Manure Management Input	Crop Information			Manure Group & Manure Balance	Manure and Application	
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Season	Planned Application Management	P Index Application Method
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	April - Oct: No incorp or incorp > 1 wk.

1.7..5. Multiple Designations: <u>When you are only applying one application of manure leave this cell blank.</u>

Complete the Multiple Application. This cell has a drop down list consisting of the following selections and their meanings.
Mi = Multiple Initial. This would be the first application in a multiple manure application on a crop
M = Multiple. This is any intermediate multiple application. Not the final application of manure. There may be more than 1 intermediate multiple applications.
Mf = Multiple Final. This is the final application of manure on a crop.

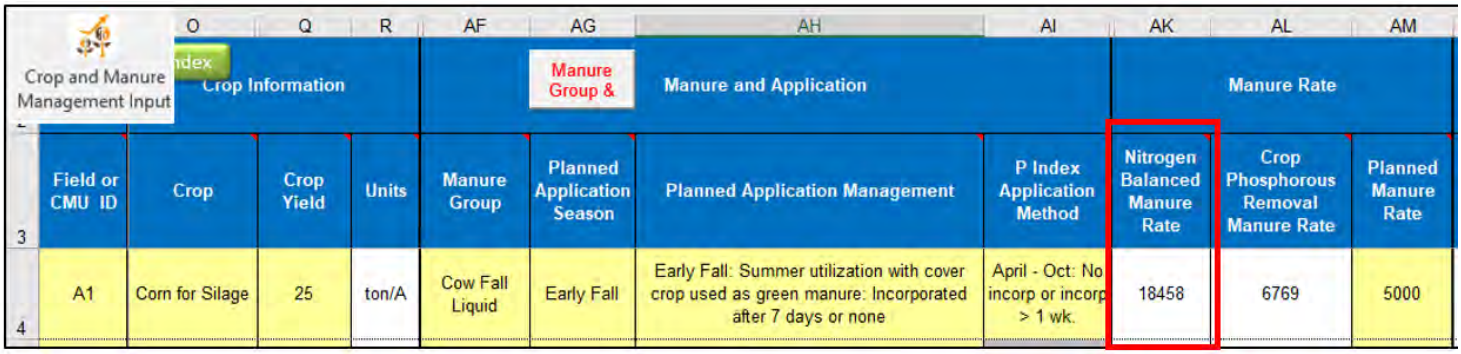
<u>For the multiple applications to properly accounted for, the multiple applications must be planned in order i.e. Mi planned first and Mf planned last, and any intermediate multiples in between and in order of the initial and final applications.</u>



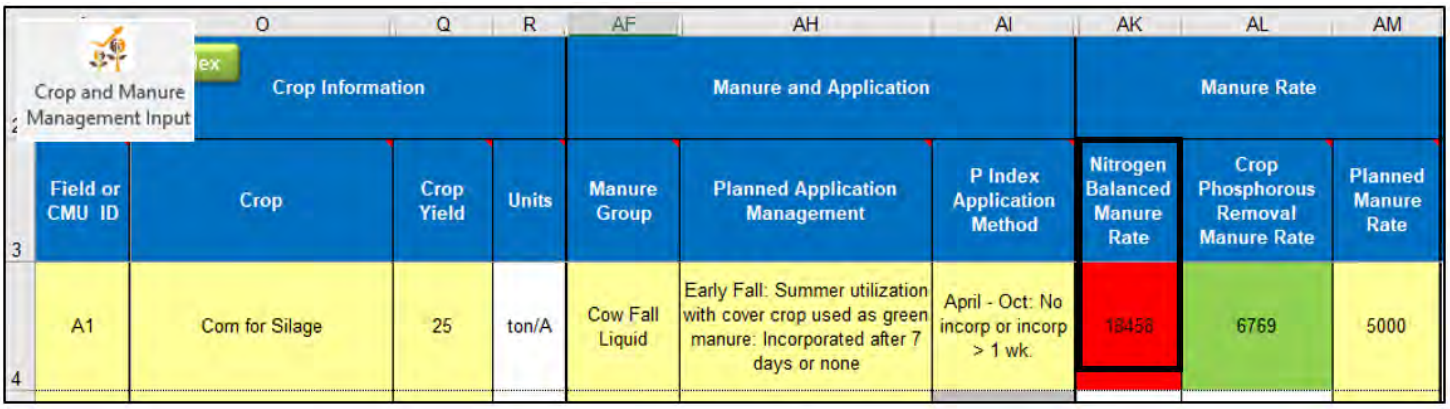
1.8. Manure Rate Section

There are three cells in this section. Nitrogen, (N), balanced manure rate outlined in red, Crop P removal manure rate, and Planned Manure Rate. (yellow data entry cell)

1.8..1. Nitrogen Balanced Manure Rate: This is the amount manure that would be needed to meet the crop nitrogen needs based on the selected manure group, planned application season, and planned application management. (White cells =no data entry)

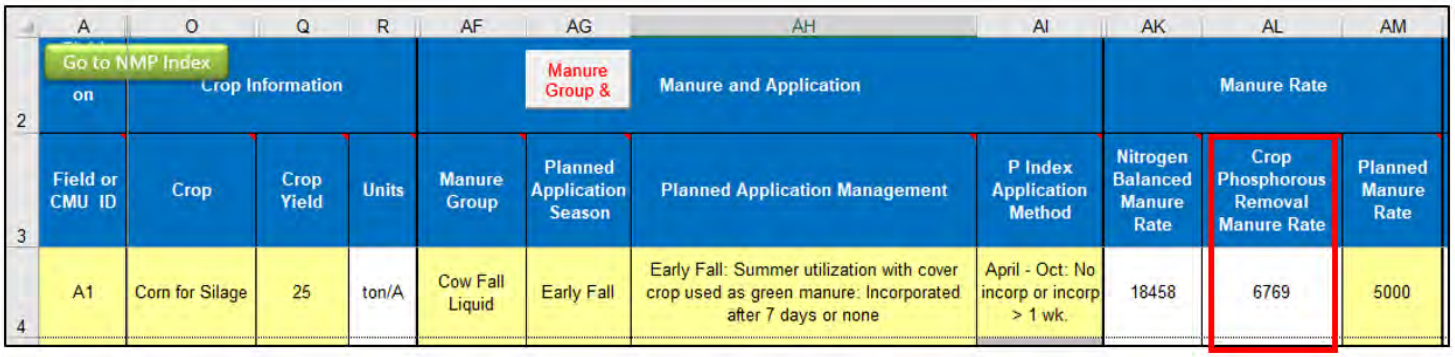


The Nitrogen Balanced Manure Rate: cell color will change to red If the field is a P Index Part B field And has a P index score greater than 80. (The P Index transport factors and a manure application rate need to be completed to get P Index Score. If no manure is applied than enter a zero in the "Planned Manure Rate" column.)



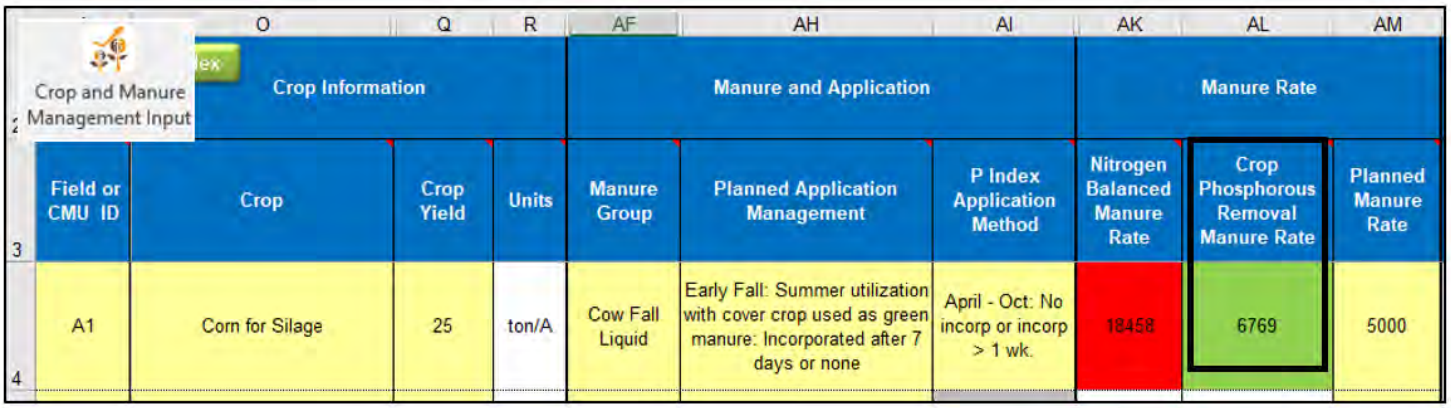
	O	Q	R	AF	AH	AI	AK	AL	AM
2	Crop and Manure Management Input	Crop Information			Manure and Application		Manure Rate		
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Management	P Index Application Method	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	April - Oct: No incorp or incorp > 1 wk.	18458	6769	5000

1.8..2. Crop Phosphorous Removal Manure Rate: This is the amount of manure that will replace the P removed from the field by the crops accounting for all other P applied (White cells =no data entry)



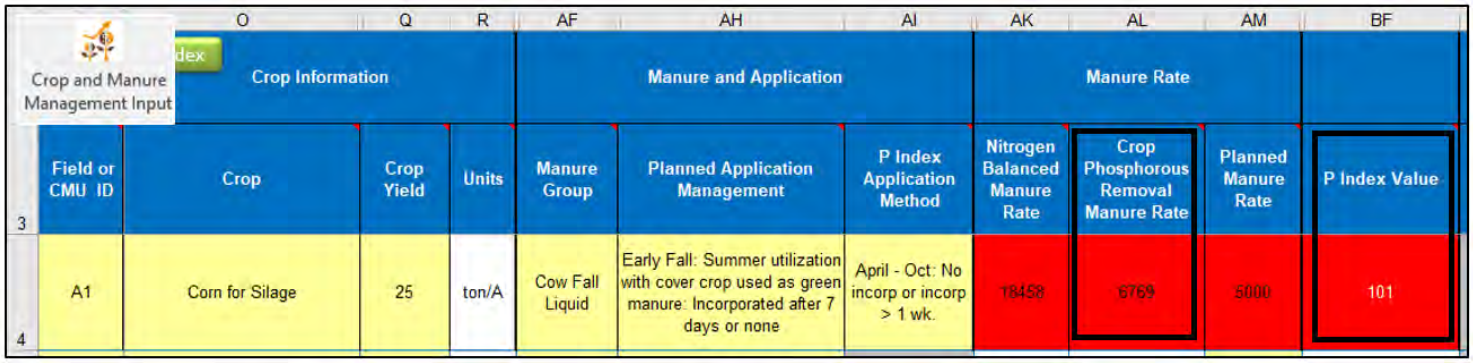
	A	O	Q	R	AF	AG	AH	AI	AK	AL	AM
2	Go to NMP Index on	Crop Information				Manure Group &	Manure and Application		Manure Rate		
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Season	Planned Application Management	P Index Application Method	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	April - Oct: No incorp or incorp > 1 wk.	18458	6769	5000

The cell color will change to green if it's a P Index Part B field And has a P index score greater than 80 but less than 100 which limits all P to no more than crop removal.



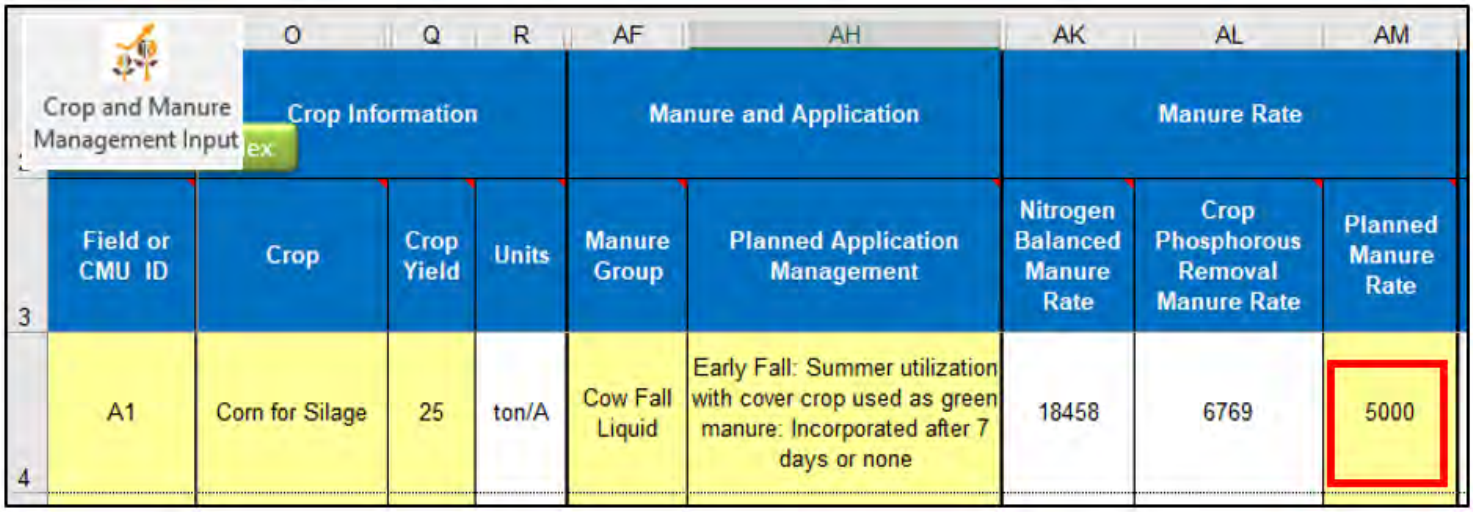
	O	Q	R	AF	AH	AI	AK	AL	AM
2	Crop and Manure Management Input	Crop Information			Manure and Application		Manure Rate		
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Management	P Index Application Method	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	April - Oct: No incorp or incorp > 1 wk.	18458	6769	5000

The Phosphorous Removal Manure Rate cell color will change to red if it's a P Index Part B field And has a P index score greater than 100 which means no P may be applied.



	O	Q	R	AF	AH	AI	AK	AL	AM	BF
Crop and Manure Management Input	Crop Information			Manure and Application			Manure Rate			
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Management	P Index Application Method	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate	P Index Value
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	April - Oct: No incorp or incorp > 1 wk.	18458	6769	5000	101

1.8..3. Planned Manure Rate - Enter the planned manure rate. If no manure is to be applied than enter a Zero. This will display as "No Manure Applied" in the NMP Summary for the field Planned Manure Rate.



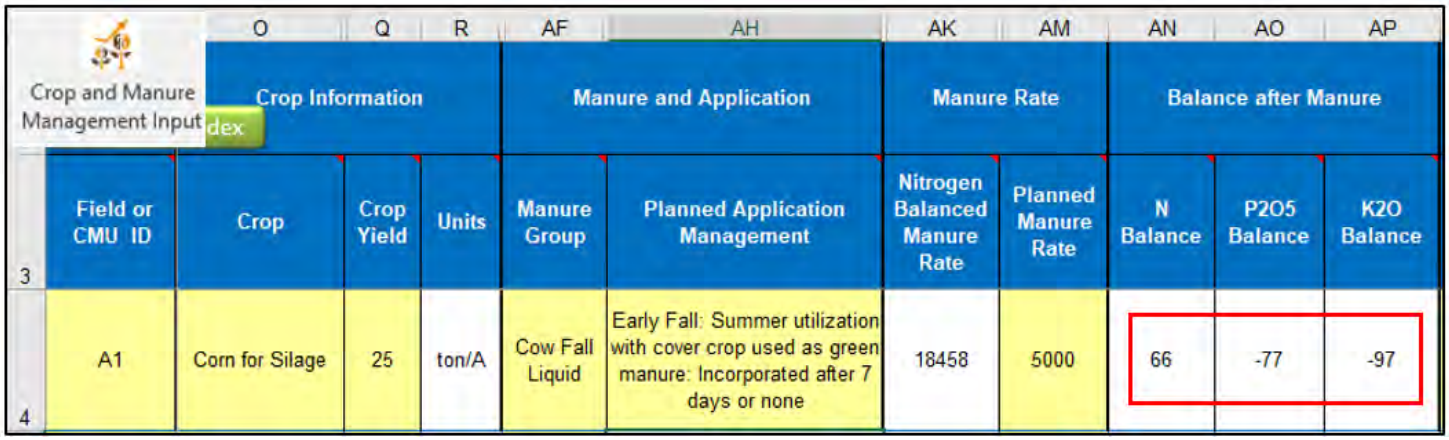
	O	Q	R	AF	AH	AK	AL	AM
Crop and Manure Management Input	Crop Information			Manure and Application		Manure Rate		
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Management	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	18458	6769	5000

Color Coding for the planned manure rate:
The Planned Manure Rate cell color will change to red for one of the following reasons:

- The nitrogen balance after manure is negative which means excess N would be applied at the planned rate.
- It's P Index Part B field and the P Index is incomplete.
- The P index score is greater than 80 and planned rate is greater than P removal rate.
- The P index score is greater than 100.

1.9. Balance after Manure Section

This is the nutrient balance after manure. A positive number indicates additional nutrients are required. A negative number indicates an excess nutrient balance. (White cells =no data entry).

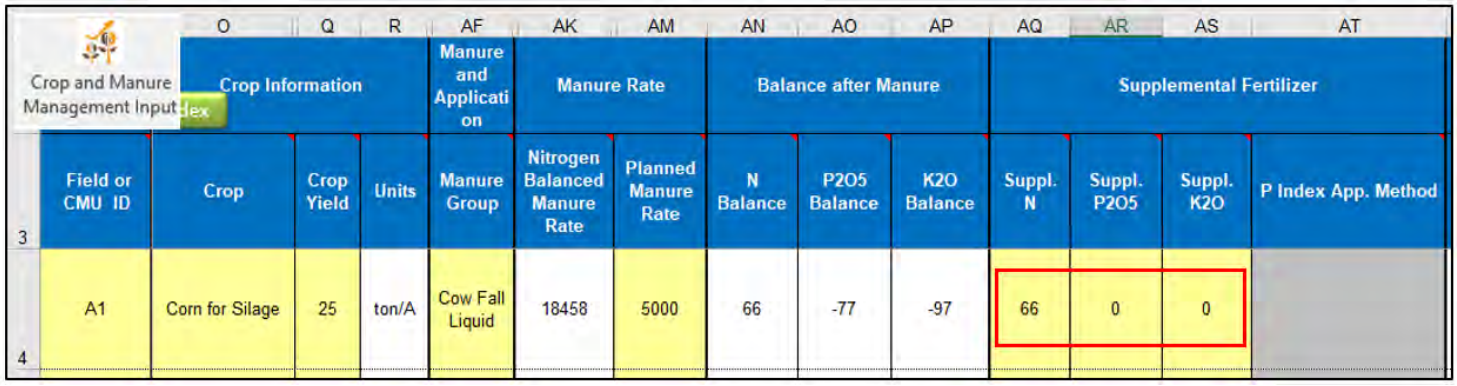


Crop and Manure Management Input dex	O	Q	R	AF	AH	AK	AM	AN	AO	AP
	Crop Information			Manure and Application		Manure Rate		Balance after Manure		
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Management	Nitrogen Balanced Manure Rate	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	18458	5000	66	-77	-97

1.10. Supplemental Fertilizer

Enter any supplemental fertilizer values here. <u>If there is no supplemental fertilizer applied enter a zero "0" in each of the cells or the spreadsheet won't calculate properly when working on a plan that's been transferred from a Version 4.x plan.</u>

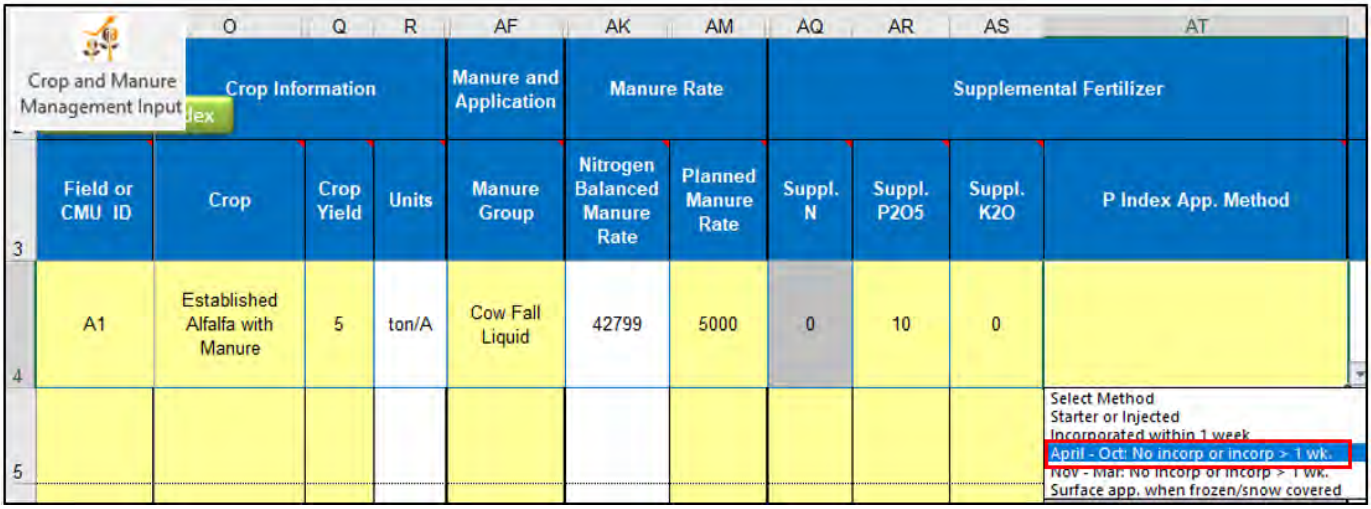
The P Index Application Method cell is greyed out if supplemental P blank or zero. If Supplemental P is e



Crop and Manure Management Input dex	O	Q	R	AF	AK	AM	AN	AO	AP	AQ	AR	AS	AT
	Crop Information			Manure and Applicati on	Manure Rate		Balance after Manure			Supplemental Fertilizer			
3	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Nitrogen Balanced Manure Rate	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance	Suppl. N	Suppl. P2O5	Suppl. K2O	P Index App. Method
4	A1	Corn for Silage	25	ton/A	Cow Fall Liquid	18458	5000	66	-77	-97	66	0	0	

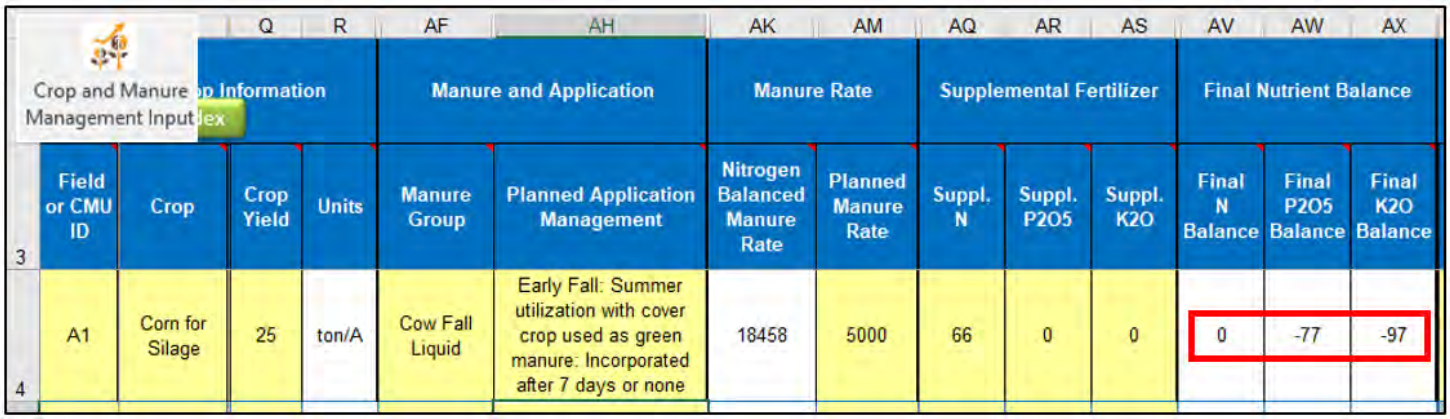
If it's a legume with manure applied the Supplemental N cell will be greyed out. This is an instance where a value would be entered in a grey cell. If no supplemental fertilizer applied, this entry should be zero for a legume because it won't calculate properly when working on a plan that's been transferred from a Version 4.x plan.

If it's a part B field and supplemental Phosphorous is applied, the P Index Application method cell will be yellow and an application method will need to be selected. If the cell is grey, there should not be a selection in the cell. In the screenshot below no supplemental Phosphorous was applied so the P Index Application Method is greyed out indicating no data entry is needed.



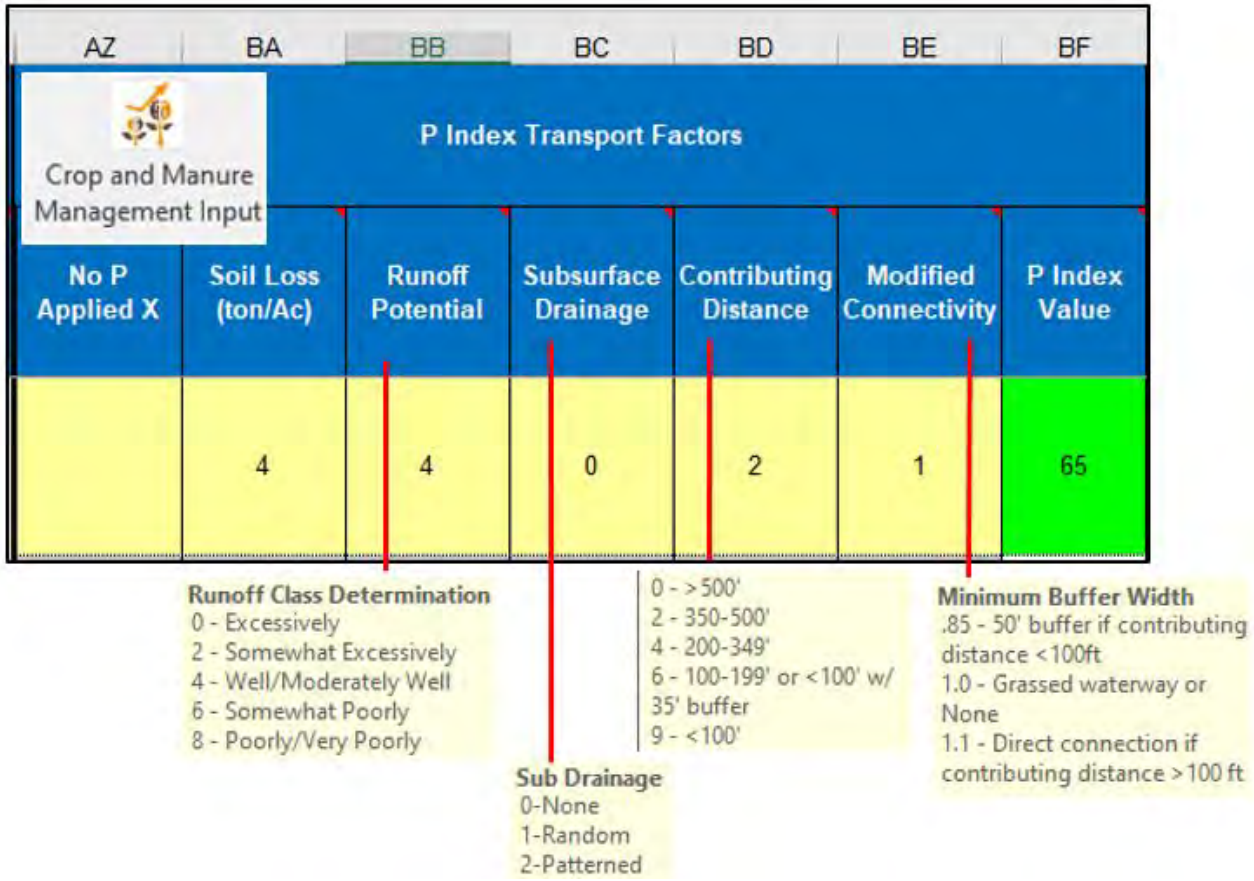
1.11. Final Nutrient Balance

The final nutrient balances for N, P_2O_5, and K_20 are calculated values. (White cells =no data entry). The "Final N Balance" can never be negative.



1.12. P Index Transport Factors

The P Index value will state PI Incomplete until you enter the transport factors. Complete the P index transport factors. The soil loss is a typed entry. The others transport factors have a note to remind you of the selections and are drop down box selections or you can enter them by typing the number. Transport factors can be copied and pasted from other fields as well

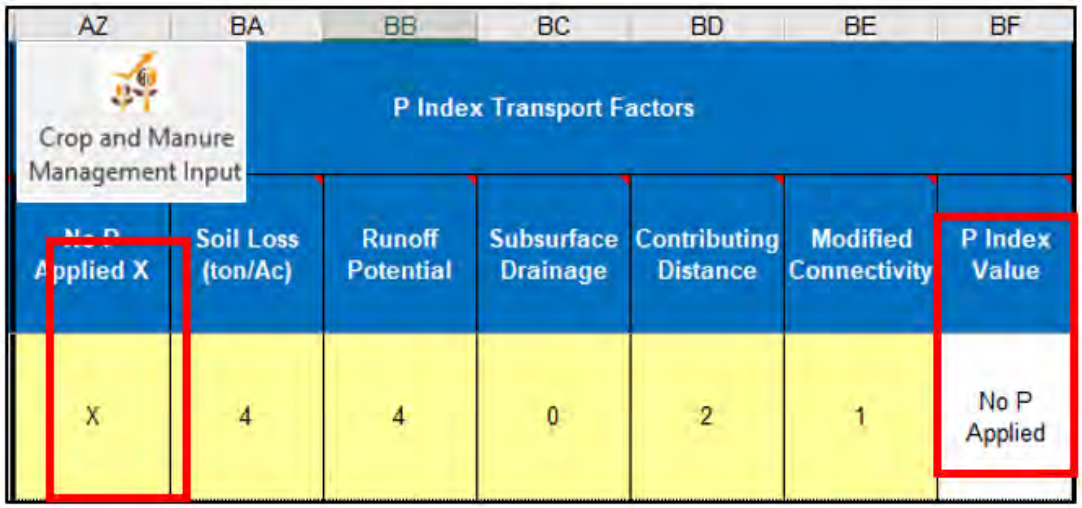


The P Index value is conditionally formatted to change color.

Low: 59 or less	Nitrogen based management
Medium: 60 to 79	Nitrogen based management
High: 80 to 99	Phosphorus limited to crop removal
Very High: 100 or greater	No Phosphorus applied

If a field is a Part B field but a management decision has been made that that no Phosphorous will be applied then place an X in the "No P Applied" cell. The P Index Value will state "No P Applied"

If you previously entered a starter or supplemental phosphorous rate you need to go back and manually delete the entries. Any manure application rate will need to be deleted as well.



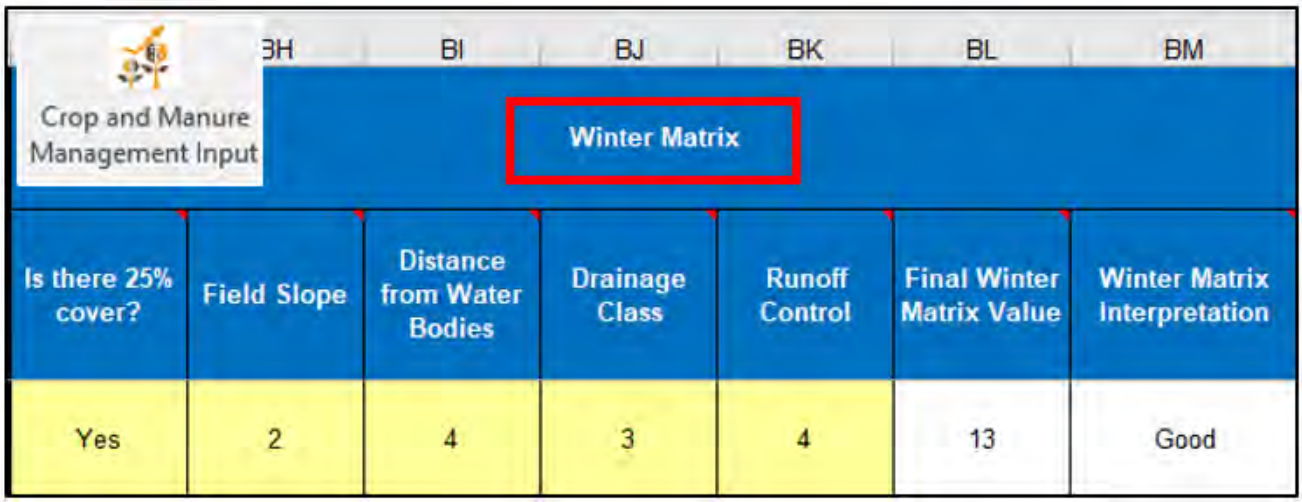
AZ	BA	BB	BC	BD	BE	BF
Crop and Manure Management Input	P Index Transport Factors					
No P Applied X	Soil Loss (ton/Ac)	Runoff Potential	Subsurface Drainage	Contributing Distance	Modified Connectivity	P Index Value
X	4	4	0	2	1	No P Applied

1.13. Winter Matrix

The winter matrix cells will be greyed out unless the manure application season selected was "Winter" or "Winter:1.2-12". Once "Winter" or "Winter: 1.2-12" is selected as the application season, the field will appear in the Printed Winter Manure Application Matrix and the winter matrix cells will turn yellow indicating they need to be completed.

Complete the Winter Matrix if the cells are yellow. Enter the appropriate cell information. The question "Is there 25% cover?" is a drop down selection. If you select No the winter matrix evaluation will state "Not Allowed". The Field slope and Runoff Control cells have a note to remind you of the selections and are drop down box selections or you can enter them by typing the number.

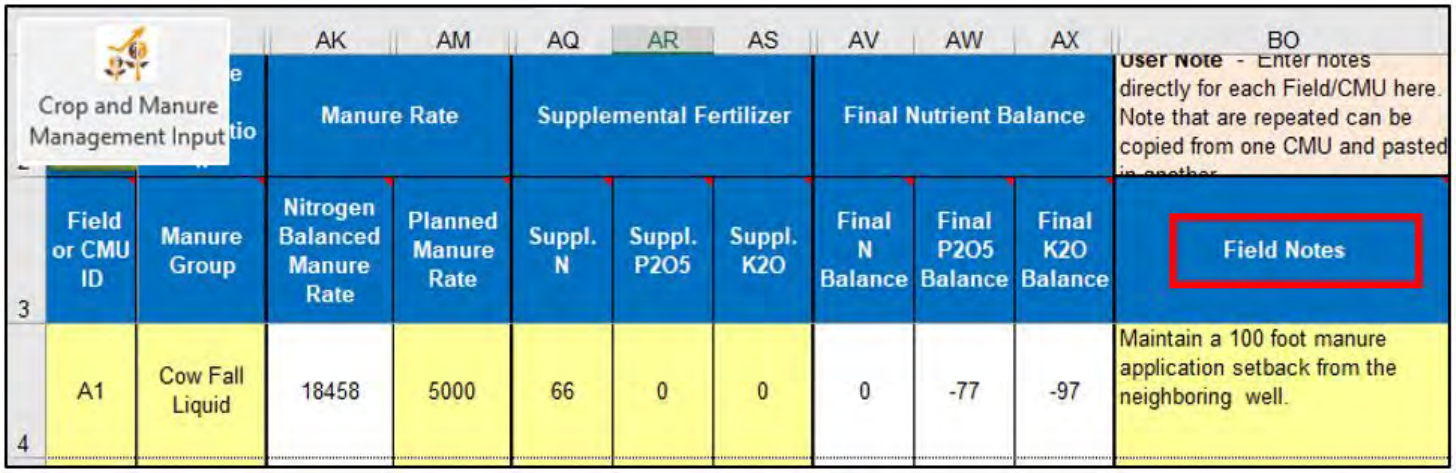
The winter matrix selections can be copied and pasted from other fields as well.



BH	BI	BJ	BK	BL	BM
Crop and Manure Management Input	Winter Matrix				
Is there 25% cover?	Field Slope	Distance from Water Bodies	Drainage Class	Runoff Control	Final Winter Matrix Value	Winter Matrix Interpretation
Yes	2	4	3	4	13	Good

1.14. Field Notes

Enter field notes directly in the yellow cell. They can be copied and pasted to other fields or CMU's if needed.



	AK	AM	AQ	AR	AS	AV	AW	AX	BO
		Manure Rate		Supplemental Fertilizer			Final Nutrient Balance		User Note - Enter notes directly for each Field/CMU here. Note that are repeated can be copied from one CMU and pasted
3	Field or CMU ID	Manure Group	Nitrogen Balanced Manure Rate	Planned Manure Rate	Suppl. N	Suppl. P2O5	Suppl. K2O	Final N Balance	Final P2O5 Balance	Final K2O Balance	Field Notes
4	A1	Cow Fall Liquid	18458	5000	66	0	0	0	-77	-97	Maintain a 100 foot manure application setback from the neighboring well.

2. Notes:

2.1. The App 4 Input sheet information is transferred automatically to the following printed pages:

- Appendix 4 Crop & Manure Management Printout.
- Appendix 5 P Index Printout.
- Winter Application Matrix Printout.

2.2. The information is not automatically transferred to:

- Nutrient Management Plan Summary (Yellow Tab)
- NMP Summary Notes (Grey Tab)

There is a button on the NMP Summary page to transfer the information from the App 4 Input to the NMP Summary and NMP Summary Notes.

2.3. A maximum of 500 rows or field replicates can be completed in Appendix 4 Input. The following message will appear in the field count column if you exceed the 500 row limit.

Field or CMU ID	Field Count	Acres	Sample Date	Lab Name
Field 500	Field 500.1	9.6	9/5/2021	AASL
Field 501	Exceeds 500 field limit. Do not enter data in this row	11.5	9/5/2021	AASL

2.4. How the field will appear in the Printed Appendix 4 Crop & Manure Management Section after completing it in App 4 Input

All information is automatically transferred from Appendix 4 Input.

	A	B	C	D
1	**App. 4: Crop Yrs. 2023**	A1		
2	CMU/Field ID			
3	Acres	5.0		
4	Soil Test Report Date	October 2, 2015		
5	Laboratory Name	AASL		
6	Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH
7	(Show conversions to ppm in Appendix 10)	250	187	6.4
8	P Index Part A Evaluation	Soil Test P		
9	Part A Result	Part B		
10	Crop	Corn for Silage		
11	Planned Yield	25 ton/A		
12	PSU Soil Test Recommendation (lb/A)	**N**	**P2O5**	**K2O**
13		200	0	20
14	User Soil Test Recommendation (lb/A)			
15	Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	4	12	4
16	P Index Application Method	Starter or Injected		
17	Double Crop CarryOver N (lb/A)	0		
18	Manure History Description Residual Manure N (lb/A)	35	Continuously - Summer Crop	
20	Legume History Description Residual Legume N (lb/A)	70	1st yr. after alfalfa 25-49% stand, Moderate productivity soils	
21	Net Nutrients Required (lb/A)	91	-12	16
22	Manure Group	Cow Fall Liquid		
23	Application Season: Management (Incorporation, cover crops, etc.)	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none		
24	Availability Factors (Total N or NH4-N & Organic N)	**Total N**	**NH4-N**	**Org. N**
25		0.20		
26	P Index Application Method	April - Oct: No incorp or incorp > 1 wk.		
27	N Balanced Manure Rate (ton, gal/A)	18458 gal/A		
28	P Removal Balance Manure Rate	6763 gal/A		
29	(ton or gal/A, if required by P Index)	Crop P Removal (lb/A)	68.0	
30	P Index Value	No P Applied		
31	Planned Manure Rate (ton or gal/A)	**5000 gal/A**		
32	Nutrients Applied at Planned Manure Rate (lb/A)	25	65	113
33	Nutrient Balance after Manure	66	-77	-97
34	Supplemental Fertilizer (lb/A)	66	0	0
35	P Index Application Method			
36	Final Nutrient Balance (lb/A)	**0**	**-77**	**-97**
37	Multiple Application			
38	Manure Utilized on CMU	25,000 gallons		

2.5. How the field will appear in the Printed Appendix 5 P Index after completing App 4 Input

All information automatically transferred from Appendix 4 Input.

Appendix 5 Phosphorus Index Printed

	A	B	C	D	E	F	G
1	**Appendix 5 - P Index**						Go to NM
2	Crop Yrs. 2023	Pennsylvania P Index Version 2					
3	**PART A: SCREENING TOOL CMU/Field ID**			**PART A: SCREENING TOOL**		**CMU/Field ID**	**A1**
4	Is the CMU in a Special Protection watershed?			Is the CMU in a Special Protection watershed?		If the answer is Yes to any of these questions, Part B must be used.	No
5	A significant farm management change as defined by Act 38?			Is there a significant farm management change as defined by Act 38?			No
6	Soil Test Mehlich 3 P greater than 200 ppm P?			Is the Soil Test Mehlich 3 P greater than 200 ppm P? (enter soil test value in pp			250
7	Contributing Distance from CMU to receiving water <150 ft.?			Is the Contributing Distance from this CMU to receiving water less than 150 ft.?			No
8	Is winter manure application planned for this field ?			Is winter manure application planned for this field ?			No
9	Run P Index Part B voluntarily? (No to all Part A questions.)			Run P Index Part B voluntarily? (Answers are No to all Part A questions.)			No
10	**PART B: SOURCE FACTORS:** Mehlich 3 Soil Test P (ppm P)			Mehlich 3 Soil Test P (ppm P)			250
12	**Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)**						50
13	FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)					Fertilizer P (lb P2O5/acre)	12
14	P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARDLESS OF MANURE[1]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated > 1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	0.2
15	SUPPLEMENTAL P FERTILIZER					Fertilizer P (lb P2O5/acre)	0
16	P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[2]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated > 1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	-
17	**Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method**						2
18	MANURE P RATE					Manure P (lb P2O5/acre)	65
19	MANURE APPLICATION METHOD[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated > 1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil	0.6
20	P SOURCE COEFFICIENT[3]	Refer to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Table 1					0.64
21	**Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient**						25
22	**Source Factor Sum**						77
23	**PART B: TRANSPORT FACTORS**						
24	EROSION	Soil Loss (ton/acre/yr)					4
25	RUNOFF POTENTIAL	0 *Drainage Class is* Excessively	2 *Drainage Class is* Somewhat Excessively	4 *Drainage Class is* Well/Moderately Well	6 *Drainage Class is* Somewhat Poorly	8 *Drainage Class is* Poorly/Very Poorly	4
26	SUBSURFACE DRAINAGE	0 None		1 Random		2[1] Patterned	0
27	CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with 35 ft. buffer	8[2] < 100 ft.	2
28	**Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance**						10
29	MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST < 100 FT		1.0 Grassed Waterway or None	1.1 Direct Connection APPLIES TO DIST > 100 FT		1
30	**Transport Sum x Modified Connectivity / 24**						0.42
31	**P Index Value = 2 x Source x Transport**						**65**
	Low: 59 or less Nitrogen based management	Medium: 60 to 79 Nitrogen based	High: 80 to 99 Phosphorus limited to crop removal		Very High: 100 or greater		

Appendix 5 Phosphorous Index Printout

2.6. How a field will appear in the Printed Winter Matrix

A field would need to have "Winter" or "Winter 1.2-12" as the application season to be automatically transferred into the Winter Application Matrix. All information is automatically transferred from Appendix 4 Input.

PA Technical Manual Supplement 10:
Winter Manure Application Matrix

PA Technical Manual Supplement 10: Winter Manure Application Matrix

Winter Manure Application Printed

Winter Manure Applied Matrix Printout

Crop Years 2023

User Notes for the Winter Manure Application Matrix

1. Under Act 38, any one of the following conditions meets the "winter" definition - see §83.201.
   - December 15 to February 28
   - Frozen ground (4 inch depth)
   - Snow-covered ground
2. All setbacks including those specific to winter manure application must be followed - see §83.294 (f) and (g).
   - No winter manure application within 100 ft. of an above ground agricultural drainage inlet where surface flow is toward the inlet.
   - No winter manure application within 100 ft. of a wetland (identified on National Wetland Inventory Maps) within the 100 year floodplain of an Exceptional Value stream segment if surface flow is toward the wetland.
3. Fields receiving winter manure applications must have 25% cover or an established cover crop - see §83.294 (g).

Verify the CMU meets the required cover conditions described in User Note 3.

CMU/Field ID	CMU/Field ID	A1
Does the CMU have 25% cover or an established cover crop?	Does the CMU have 25% cover or an established cover crop?	Yes

Evaluation Criteria	**Evaluation Criteria Descriptions and Ranking Values**				
	4	3	2[b]	1[c]	
Field Slope	< 4 %	4 - 8%	9 - 15%	> 15%	2
Distance from Water Bodies[a]	> 350 ft.	350 - 200 ft	199 - 100 ft	<100 ft	4
Drainage Class	Somewhat Excessively OR Excessively	Well OR Moderately Well	Somewhat Poorly	Poorly OR Very Poorly	3
Runoff Control	Recommended conservation practices are in place. **Very low potential for concentrated flow.**	Some conservation practices are in place. **Low potential for concentrated flow.**	Some conservation practices are in place. **Moderate potential for concentrated flow.**	No conservation practices are in place. **High potential for concentrated flow.**	4
					13
					Good

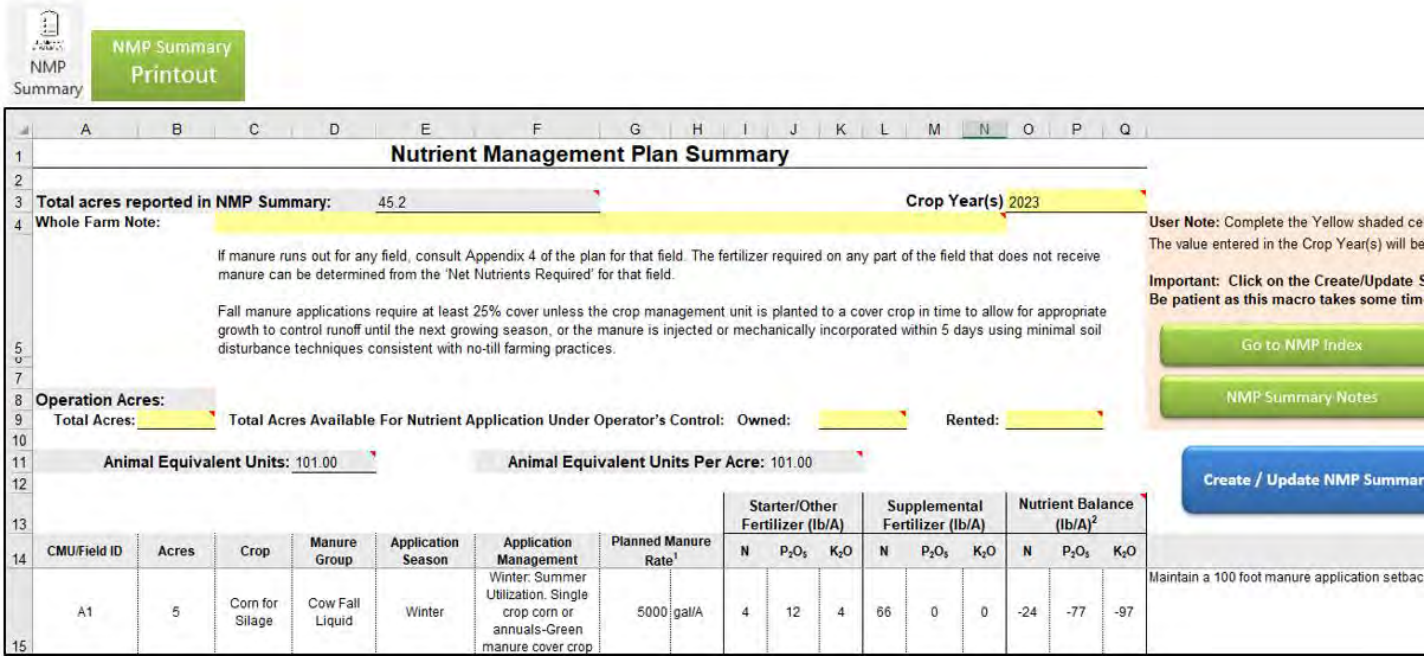
[a] Includes Perennial and Intermittent streams with defined bed and bank, Lakes, Ponds, Open sinkholes, and Active private and public water sources.

[b] If a field receives a rating of "2" in any two categories the field is not recommended for winter application regardless of the final field Ranking Value.

[c] If a field receives a rating of "1" in any one category the field is not recommended for winter application regardless of the final field Ranking Value.

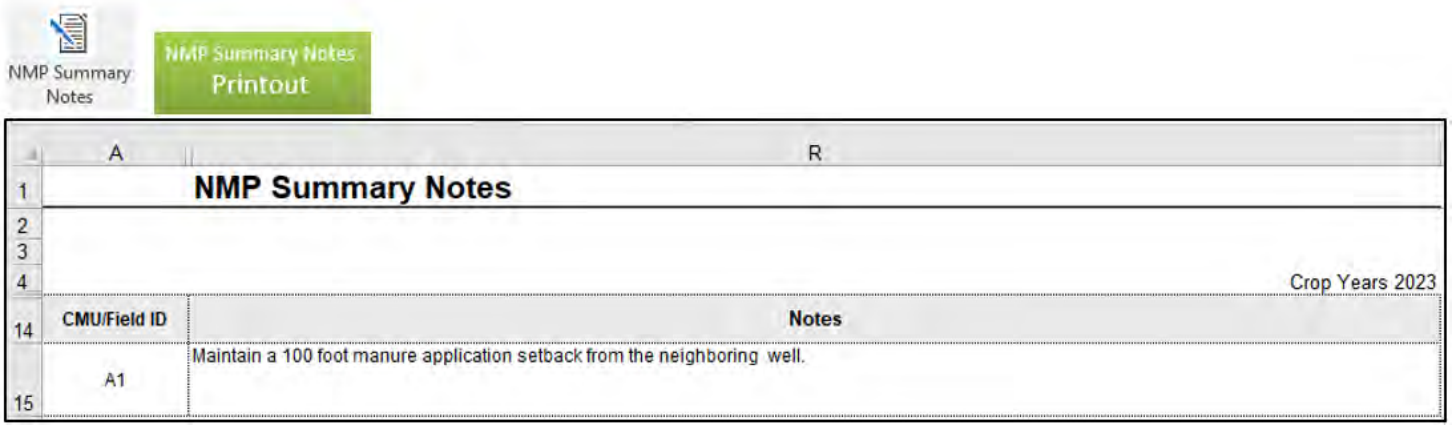
2.7. How the field appears in the NMP Summary

Important Note: All information is transferred from Appendix 4 Input after clicking on the Create/Update Summary Button on the NMP Summary Page.



2.8. How the field appears in the NMP Summary Notes

Important Note: All information is transferred from Appendix 4 Input after clicking on the Create/Update Summary Button on the NMP Summary Page.

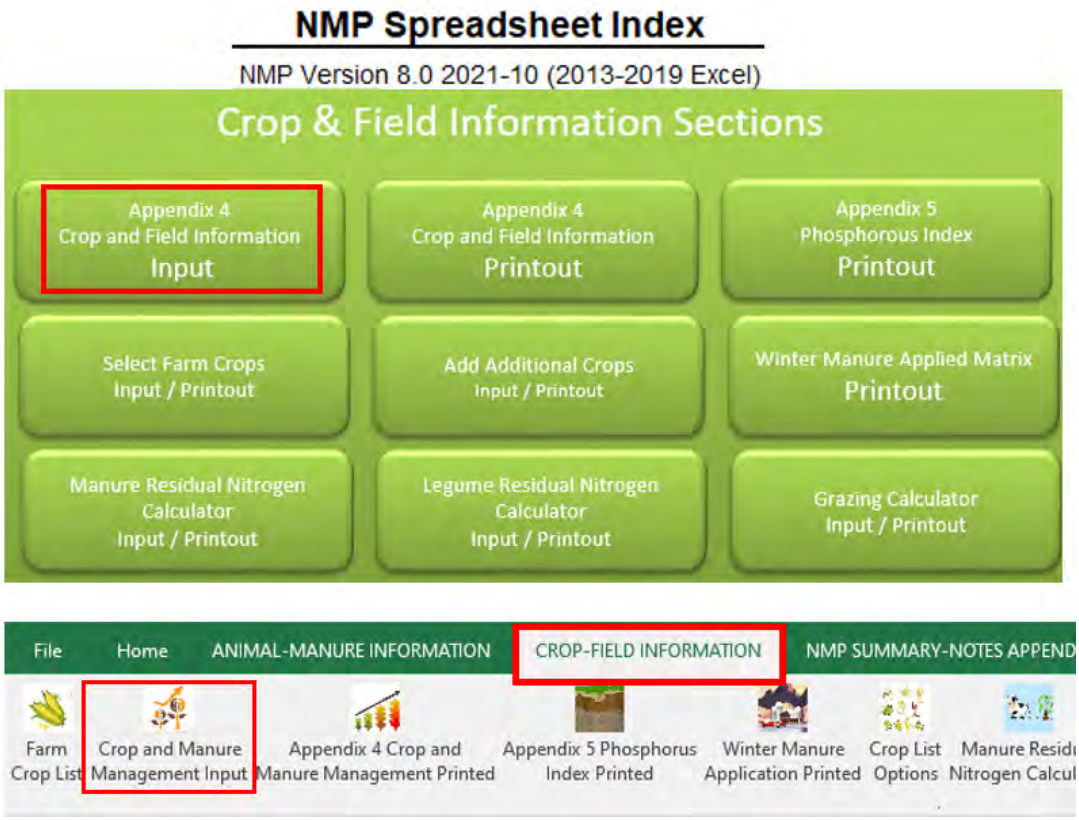


How to complete a Multiple Manure Application in Appendix 4 Input

This procedure describes how to complete multiple manure applications on a crop during a crop year in Appendix 4 Crop and Field Input worksheet. If you have not yet completed a field in Appendix 4 Input and need help, then please refer to the guidance document: How to Complete App 4 Input.

This is a worksheet that requires data entry worksheet tab in the NMP workbook. worksheet in the NMP Index.

Look for a navigation button in the NMP Spreadsheet or a toolbar ribbon icon that looks like the screenshot below:



Multiple Manure Application Limitations

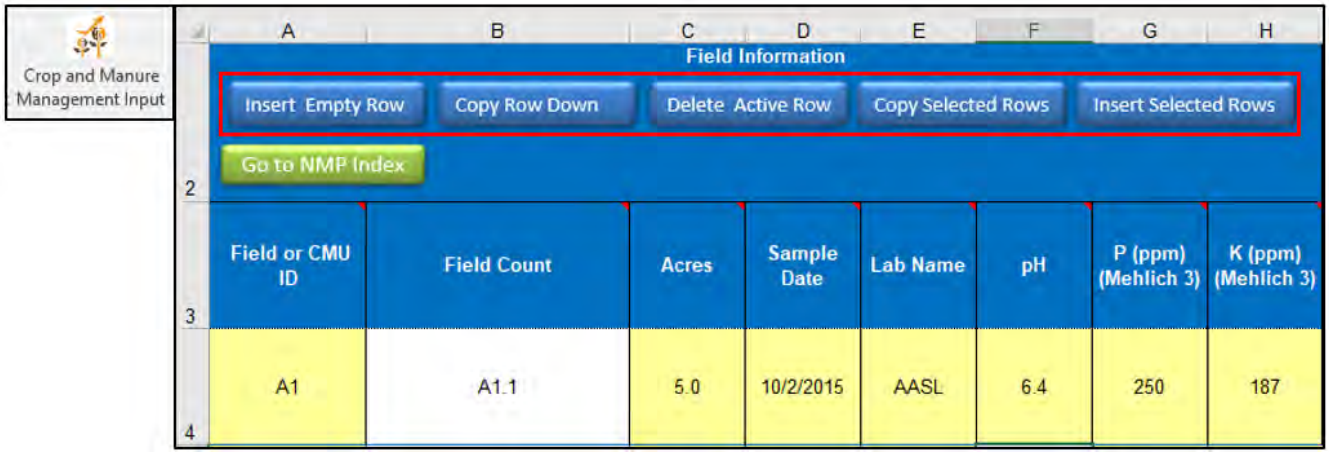
Nitrogen based planning
The maximum number of multiples or replicates is limited to ten replicates for nitrogen based planning. This could be ten manure applications on a single crop or 5 manure applications on each crop in a double cropped field.

P Index Part B planning
The maximum number of multiples or replicates is limited to six replicates for P Index Part B based planning. This could be six manure applications on a single crop or 3 manure applications on each crop in a double crop.

How to complete a Multiple Manure Application in Appendix 4 Input

1. Modify Rows Button

There are buttons in the Field Information section of App 4 Input to modify the rows.



Clicking on the buttons will perform the following functions:

Insert Empty Row - Add an empty row <u>below</u> the active or selected row.

Copy Row Down - Copy the selected row down below the active row.

Delete Active Row - Delete the selected row.

Copy Selected Rows - Copy a group of contiguous rows. (used to copy an existing multiple or double crop field). A dialog box will alert you that the rows were successfully copied.

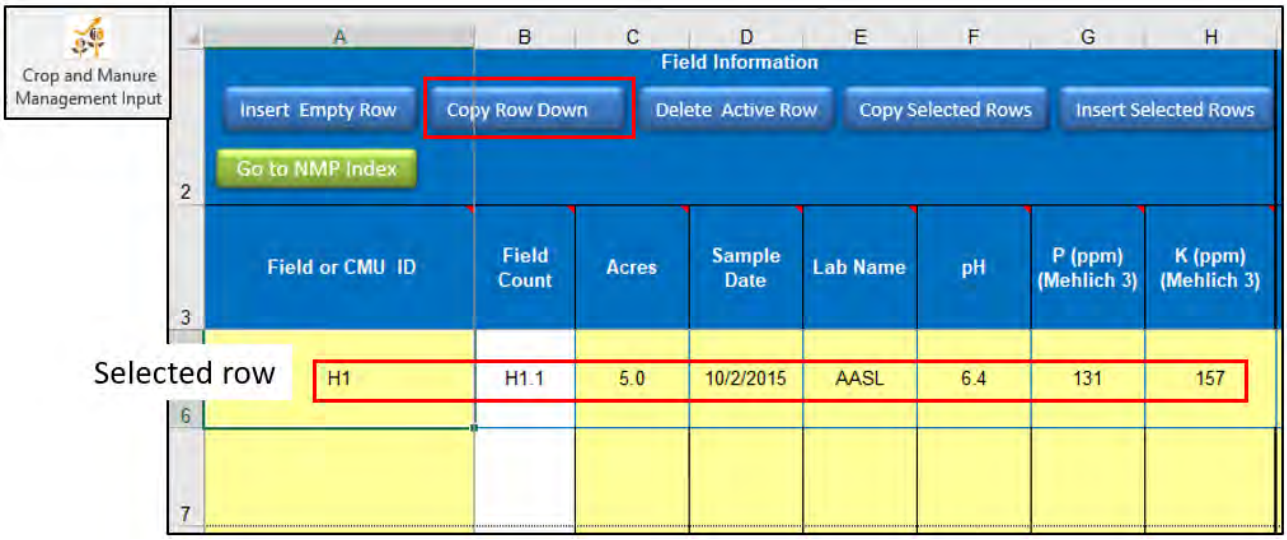
Insert Selected Rows - Paste a group of contiguous rows above the active row <u>after</u> the paste the Copied Selected. Rows button was used. The currently copied selected rows can be pasted many times without re-selecting the rows again. For example, a double crop with multiple manure applications can be selected then pasted many times without reselecting the rows.

In the 1st example, a field that will be planted in corn silage has liquid manure applied in the fall and solid manure applied in the spring before planting. Multiple Manure applications in the Nutrient Management Plan should follow the crop year. The crop year begins in the fall so the fall applied manure would be entered before the spring or summer applied manure.

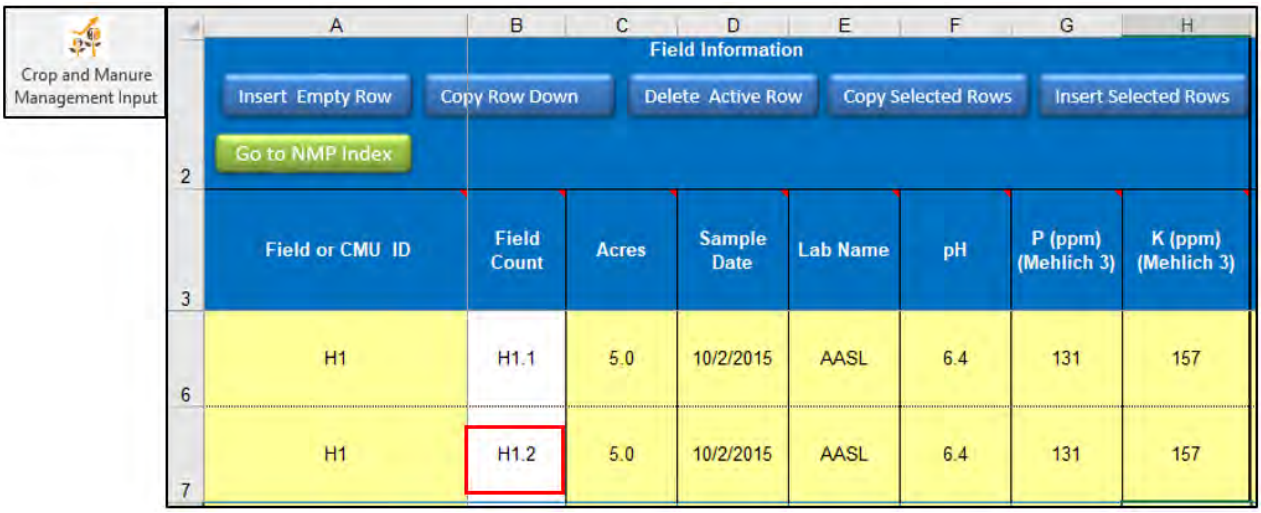
The procedure will step through adding each field section and changing the appropriate selections for each multiple manure application.

2. Procedure

2.1. Click in any cell within the row to select the field row to be completed for a multiple manure application and click on the copy row down button.



The selected row will be copied down the next row.



The copied field will have the field counter increased to the next replicate number.
In this example, the "Field Count" column indicate the field name with a ".2". This means they are recognized as the same field. It indicates it is the 2nd instance of the field, and will appropriately carryover nutrient balance after manure.

Multiple manure applications must have the Field ID name.

2.2. Update the starter or other fertilizer information.

When completing multiple manure applications, **any starter or other fertilizer needs to be entered ONLY into the first instance of a field**.

If the field is copied to create an additional multiple then enter zeros for the starter or other fertilizer for any multiple other than the initial application (There should be no starter or other fertilizer listed for any field with the M of Mf designation described below). Having the values from the initial field in the following applications won't affect the calculations but it will appear as if starter is being applied twice in the printed Appendix 4 Crop & Manure Management and the NMP Summary.

Crop and Manure Management Input

	A	B	O	Q	R	S	T	U	Z	AA	AB	AC
2	Field Information Go to NMP Index		Crop Information			PSU Recommendations			Starter Fertilizer			
3	Field or CMU ID	Field Count	Crop	Crop Yield	Units	PSU N lbs/A	PSU P_2O_5 lbs/A	PSU K_2O lbs/A	Starter N lbs/A	Starter P_2O_5 lbs/A	Starter K_2O lbs/A	P Index App. Method
6	H1	H1.1	Corn for Silage	25	ton/A	200	0	90	4	12	4	
7	H1	H1.2	Corn for Silage	25	ton/A	200	0	90	0	0	0	

2.3. Change the Manure and Application Information for the fields

Since all the field information was copied from the initial field, only the Manure Application Information and Manure Rate needs to be changed for both instances of the field.

Change the Manure group, Application Season, and Application Management for the multiple application. Note that this could be the same or it can be a different manure group, season, and application method. Make sure that each multiple has the intended management information correctly entered in these three cells.

Crop and Manure Management Input

	A	B	O	Q	R	S	T	U	AF	AG	AH
2	Field Information Go to NMP Index		Crop Information			PSU Recommendations			Manure and Application		
3	Field or CMU ID	Field Count	Crop	Crop Yield	Units	PSU N lbs/A	PSU P_2O_5 lbs/A	PSU K_2O lbs/A	Manure Group	Planned Application Season	Planned Application Management
6	H1	H1.1	Corn for Silage	25	ton/A	200	0	90	Cow Fall Liquid	Early Fall	Early Fall: Early spring utilization incl. winter crop in double crop system: Incorporated after 7 days or
7	H1	H1.2	Corn for Silage	25	ton/A	200	0	90	Heifer Bedded Pack	Spring	Spring: Spring or summer utilization-Incorporation within 5–7 days

2.4. Select the appropriate multiple designation from the drop down list.

There are three choices:

Mi = Initial Manure Application in a Multiple
M = Middle Manure Applications in a Multiple
Mf = Final Manure Application in a Multiple

There are pop-up notes in the blue column headers to help you make the appropriate selection.

The first manure application gets the “Mi” designation
The last or final manure application gets the “Mf” designation.

When you entered the first application, if you know that there will be multiple applications on the field, you can enter the initial application designation (Mi) at that time or if you made a decision later to make a multiple application, you will need to go back to the row for the initial application and designate it as the initial application by selecting “Mi” in this cell. If there are only 2 applications planned, they must be designated “Mi” and “Mf” respectively.

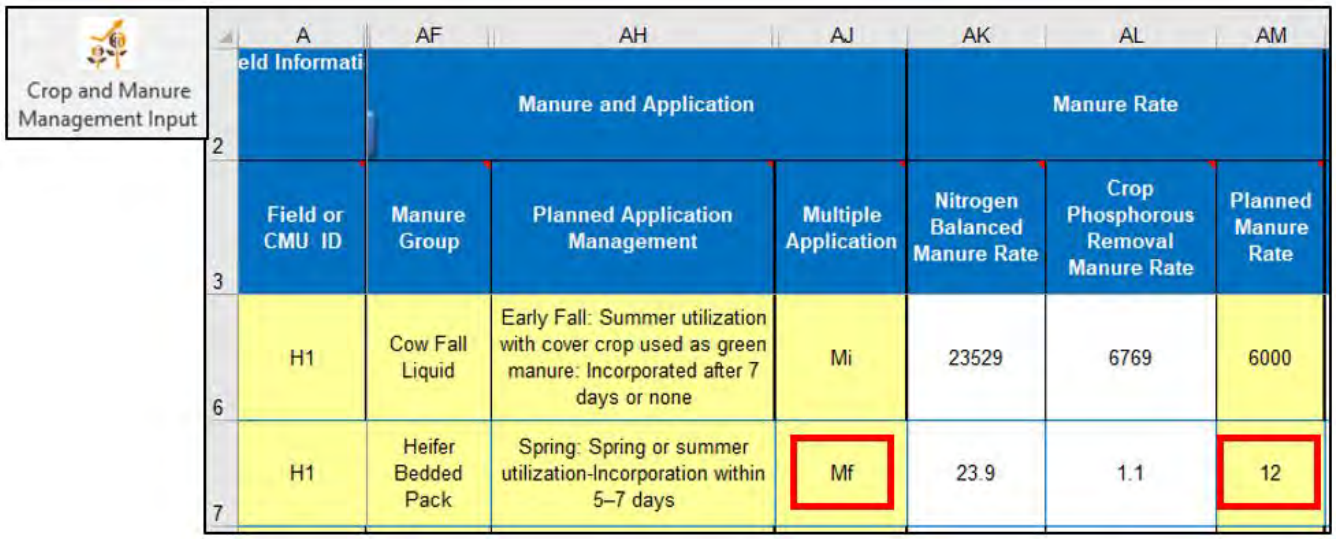
There must always be an “Mi” and “Mf” if there are multiple applications on a field. If there are more than 2 multiple applications, the middle applications will all be designated “M”.

Crop and Manure Management Input

	A	B	O	Q	R	S	T	U	AF	AG	AH	AJ
2	Field Information Go to NMP Index		Crop Information			PSU Recommendations			Manure and Application			
3	Field or CMU ID	Field Count	Crop	Crop Yield	Units	PSU N lbs/A	PSU P_2O_5 lbs/A	PSU K_2O lbs/A	Manure Group	Planned Application Season	Planned Application Management	Multiple Application
6	H1	H1.1	Corn for Silage	25	ton/A	200	0	90	Cow Fall Liquid	Early Fall	Early Fall: Early spring utilization incl. winter crop in double crop system: Incorporated after 7 days or	Mi
7	H1	H1.2	Corn for Silage	25	ton/A	200	0	90	Heifer Bedded Pack	Spring	Spring: Spring or summer utilization-Incorporation within 5–7 days	Mf

2.5. Change the Planned Manure Rate for the added multiple application.

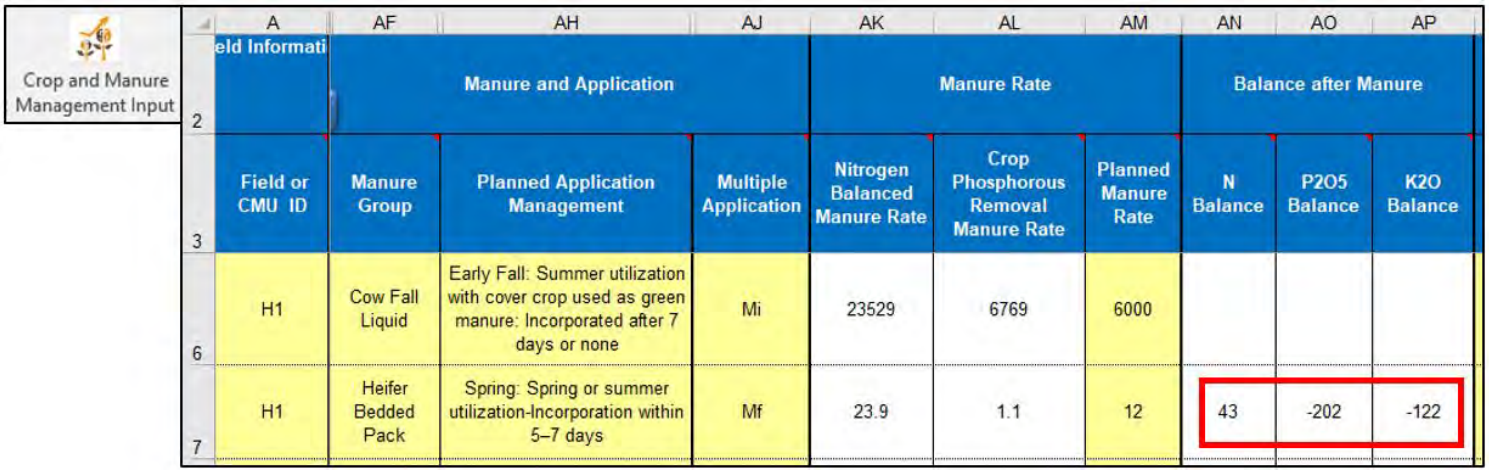
The Nitrogen Balanced Rate and Crop Phosphorous Removal Rate are shown. Remember to enter only the amount of manure. The units don't need to be entered. You don't need to enter tons or gallons.



Crop and Manure Management Input

	A	AF	AH	AJ	AK	AL	AM
2	eld Informati	Manure and Application			Manure Rate		
3	Field or CMU ID	Manure Group	Planned Application Management	Multiple Application	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate
6	H1	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	Mi	23529	6769	6000
7	H1	Heifer Bedded Pack	Spring: Spring or summer utilization-Incorporation within 5–7 days	Mf	23.9	1.1	12

Once the fields receive the multiple initial and final designations, the Nutrient Balance after Manure will be blank for the initial manure application and any middle applications. The balance after manure should only appear in the field with the "Mf" designation.



Crop and Manure Management Input

	A	AF	AH	AJ	AK	AL	AM	AN	AO	AP
2	eld Informati	Manure and Application			Manure Rate			Balance after Manure		
3	Field or CMU ID	Manure Group	Planned Application Management	Multiple Application	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance
6	H1	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	Mi	23529	6769	6000			
7	H1	Heifer Bedded Pack	Spring: Spring or summer utilization-Incorporation within 5–7 days	Mf	23.9	1.1	12	43	-202	-122

The Balance after Manure will reflect the nutrient deficit, (positive number) or excess, (negative number).

2.6. Enter any Supplemental Fertilizer values in the final Multiple manure application.

If there is no supplemental fertilizer applied enter a zero "0". The spreadsheet won't calculate properly when working on a plan that's been transferred from a Version 4.x plan without a zero entered here.

Crop and Manure Management Input

	A	AF	AH	AJ	AM	AN	AO	AP	AQ	AR	AS	AV	AW	AX
2	Field Information	Manure and Application				Balance after Manure			Supplemental Fertilizer			Final Nutrient Balance		
3	Field or CMU ID	Manure Group	Planned Application Management	Multiple Application	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance	Suppl. N	Suppl. P2O5	Suppl. K2O	Final N Balance	Final P2O5 Balance	Final K2O Balance
6	H1	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	Mi	6000				0	0	0			
7	H1	Heifer Bedded Pack	Spring: Spring or summer utilization-Incorporation within 5–7 days	Mf	12	43	-202	-122	43	0	0	0	-202	-122

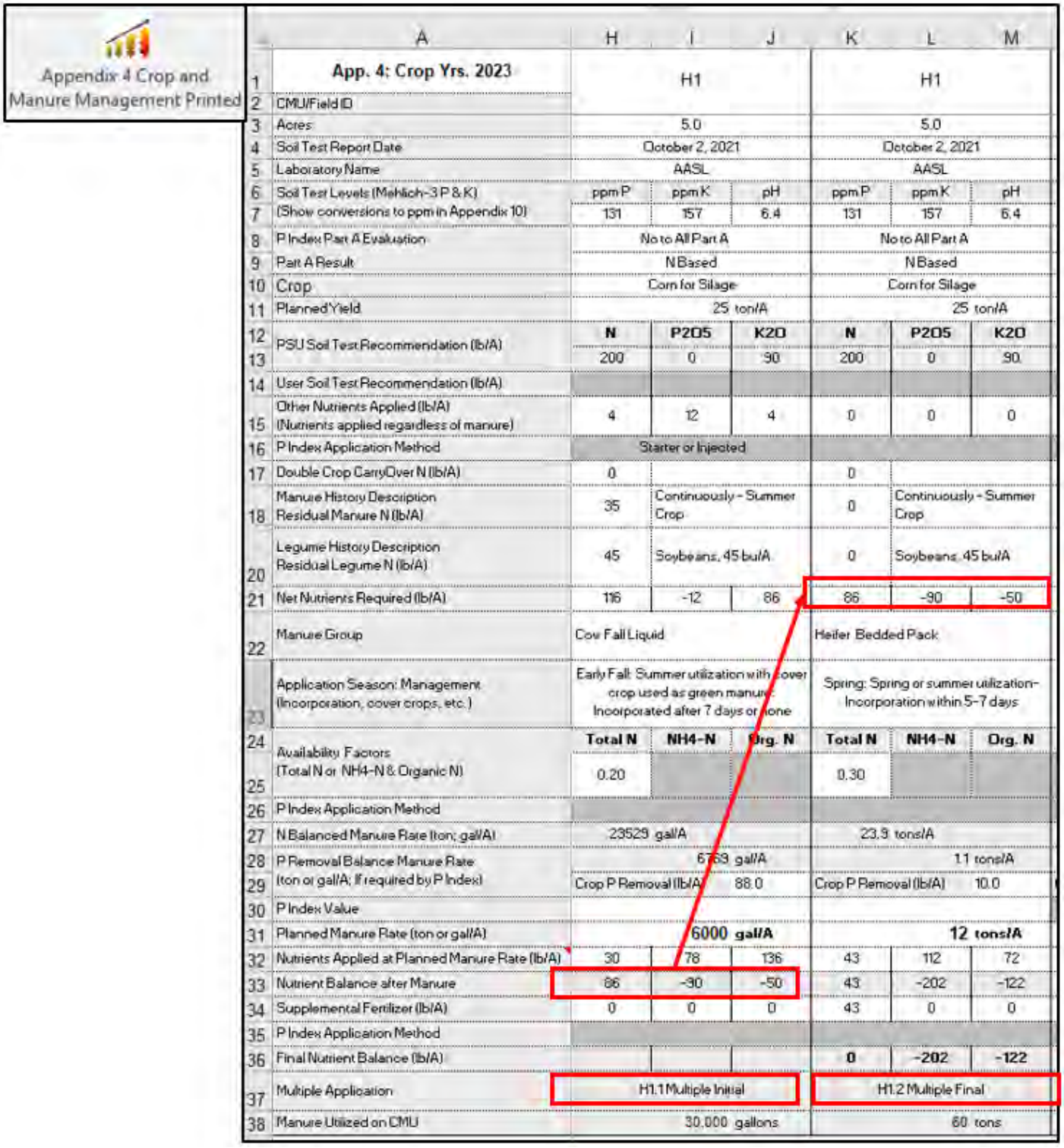
2.7. Add any field notes as applicable.

While it is not required, it is a recommended that notes be added to each multiple application explaining what is planned to the operator. Suggested application notes are included in the Field Notes screenshot below. You can increase the row width if needed.

Crop and Manure Management Input

	A	O	Q	R	AF	AH	AJ	AM	BN	BO
	Field Information	Crop Information			Manure and Application					User Note - Enter notes directly for each Field/CMU here. Note that are repeated can be copied from one CMU and pasted in another.
	Field or CMU ID	Crop	Crop Yield	Units	Manure Group	Planned Application Management	Multiple Application	Planned Manure Rate		Field Notes
	H1	Corn for Silage	25	ton/A	Cow Fall Liquid	Early Fall: Summer utilization with cover crop used as green manure: Incorporated after 7 days or none	Mi	6000		This field will receive multiple applications of manure. 1st application is Cow Fall Liquid in fall.
	H1	Corn for Silage	25	ton/A	Heifer Bedded Pack	Spring: Spring or summer utilization-Incorporation within 5–7 days	Mf	12		This field will receive multiple applications of manure. 2nd application is Heifer Barn Bedded Pack manure applied in the in the spring.

2.8. This is how a multiple application is displayed in the printed Appendix 4 Crop & Manure Management section that's submitted for review and approval.

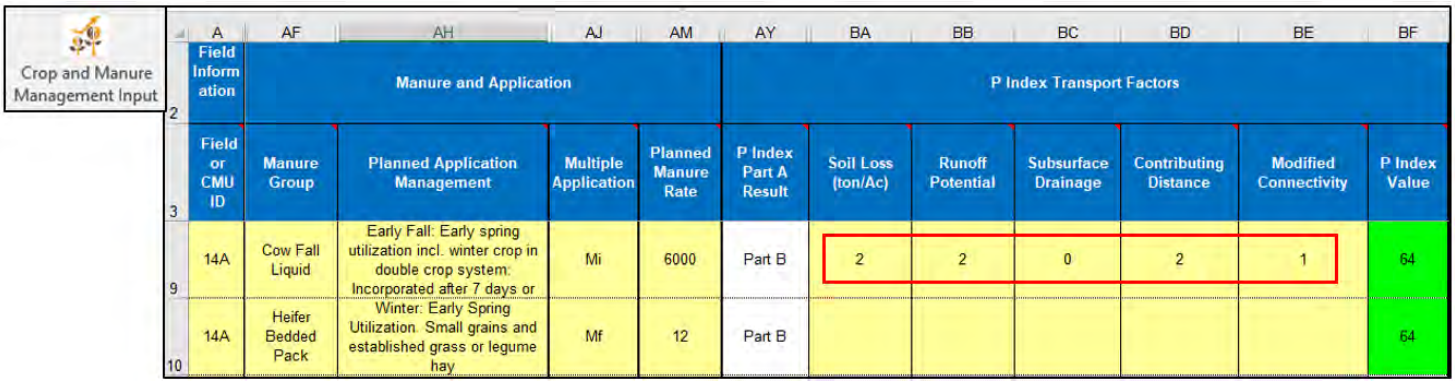


	A	H	I	J	K	L	M
1	App. 4: Crop Yrs. 2023	H1			H1		
2	CMU/Field ID						
3	Acres	5.0			5.0		
4	Soil Test Report Date	October 2, 2021			October 2, 2021		
5	Laboratory Name	AASL			AASL		
6	Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH	ppm P	ppm K	pH
7	(Show conversions to ppm in Appendix 10)	131	157	6.4	131	157	6.4
8	P Index Part A Evaluation	No to All Part A			No to All Part A		
9	Part A Result	N Based			N Based		
10	Crop	Corn for Silage			Corn for Silage		
11	Planned Yield	25 ton/A			25 ton/A		
12	PSU Soil Test Recommendation (lb/A)	N	P2O5	K2O	N	P2O5	K2O
13		200	0	90	200	0	90
14	User Soil Test Recommendation (lb/A)						
15	Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	4	12	4	0	0	0
16	P Index Application Method	Starter or Injected					
17	Double Crop CarryOver N (lb/A)	0			0		
18	Manure History Description Residual Manure N (lb/A)	35	Continuously - Summer Crop		0	Continuously - Summer Crop	
20	Legume History Description Residual Legume N (lb/A)	45	Soybeans, 45 bu/A		0	Soybeans, 45 bu/A	
21	Net Nutrients Required (lb/A)	116	-12	86	86	-90	-50
22	Manure Group	Cow Fall Liquid			Heifer Bedded Pack		
23	Application Season: Management (Incorporation, cover crops, etc.)	Early Fall: Summer utilization with cover crop used as green manure Incorporated after 7 days or none			Spring: Spring or summer utilization- Incorporation within 5-7 days		
24	Availability Factors (Total N or NH4-N & Organic N)	Total N	NH4-N	Org. N	Total N	NH4-N	Org. N
25		0.20			0.30		
26	P Index Application Method						
27	N Balanced Manure Rate (ton; gal/A)	23529 gal/A			23.9 tons/A		
28	P Removal Balance Manure Rate (ton or gal/A; if required by P Index)	6769 gal/A			1.1 tons/A		
29		Crop P Removal (lb/A)	88.0		Crop P Removal (lb/A)	10.0	
30	P Index Value						
31	Planned Manure Rate (ton or gal/A)	6000 gal/A			12 tons/A		
32	Nutrients Applied at Planned Manure Rate (lb/A)	30	78	136	43	112	72
33	Nutrient Balance after Manure	86	-90	-50	43	-202	-122
34	Supplemental Fertilizer (lb/A)	0	0	0	43	0	0
35	P Index Application Method						
36	Final Nutrient Balance (lb/A)				0	-202	-122
37	Multiple Application	H1.1 Multiple Initial			H1.2 Multiple Final		
38	Manure Utilized on CMU	30,000 gallons			60 tons		

The Crop Nutrient Balance after Manure in the initial multiple becomes the Crop Net Nutrients required in the final multiple. The multiple application designation appears at the bottom of the CMU / Field ID.

3. Notes:

3.1. Multiple Applications on P Index Fields - The ***transport factors for a P Index Part B field must be in the initial multiple manure application***. It doesn't matter if they are repeated or not in the middle or final multiple applications.

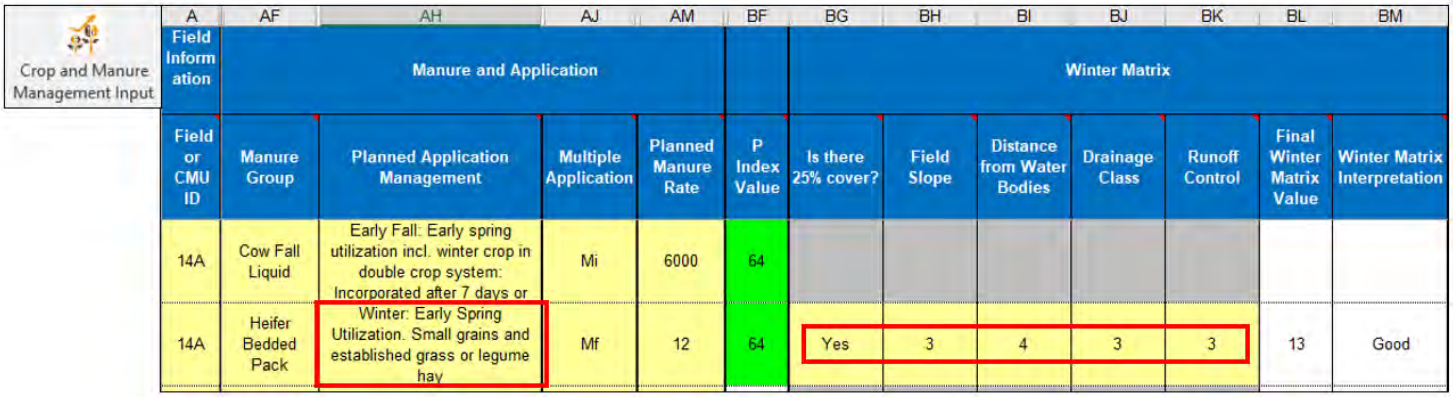


Crop and Manure Management Input

	A	AF	AH	AJ	AM	AY	BA	BB	BC	BD	BE	BF
2	Field Information	Manure and Application				P Index Transport Factors						
3	Field or CMU ID	Manure Group	Planned Application Management	Multiple Application	Planned Manure Rate	P Index Part A Result	Soil Loss (ton/Ac)	Runoff Potential	Subsurface Drainage	Contributing Distance	Modified Connectivity	P Index Value
9	14A	Cow Fall Liquid	Early Fall: Early spring utilization incl. winter crop in double crop system: Incorporated after 7 days or	Mi	6000	Part B	2	2	0	2	1	64
10	14A	Heifer Bedded Pack	Winter: Early Spring Utilization. Small grains and established grass or legume hay	Mf	12	Part B						64

Remember that a P Index Part B field can have a maximum of six instances of a field in order to properly calculate a P Index score.

3.2. Multiple Applications on a field evaluated in the Winter Matrix – The Winter Matrix Evaluation factors must be entered in the multiple containing the Planned Application Season of "Winter" or "Winter 1.2-12". In the example below, the second application is in the winter, so that is where the winter matrix must be completed.



Crop and Manure Management Input

A	AF	AH	AJ	AM	BF	BG	BH	BI	BJ	BK	BL	BM
Field Information	Manure and Application					Winter Matrix						
Field or CMU ID	Manure Group	Planned Application Management	Multiple Application	Planned Manure Rate	P Index Value	Is there 25% cover?	Field Slope	Distance from Water Bodies	Drainage Class	Runoff Control	Final Winter Matrix Value	Winter Matrix Interpretation
14A	Cow Fall Liquid	Early Fall: Early spring utilization incl. winter crop in double crop system: Incorporated after 7 days or	Mi	6000	64							
14A	Heifer Bedded Pack	Winter: Early Spring Utilization. Small grains and established grass or legume hay	Mf	12	64	Yes	3	4	3	3	13	Good

How to complete a Multiple Manure Application in Appendix 4 Input

3.3. **Multiple Applications on Legumes –** When completing multiple manure applications on a Legume "with manure", the crop balance after manure will display differently in Appendix 4 Input and the Printed Appendix 4 Crop & Manure Management Section.

Multiple Applications on Legumes **in Appendix 4 Input:**
Balance after Manure will show the amount of Nitrogen that can be utilized by the legume. It will also show the Phosphorous and P2O5 and K20 balance, (positive value = deficit of crop need and negative value = excess of crop need).

The Supplemental N cell is formatted to turn grey if the crop is a legume. This is because the legume can utilize the Nitrogen but doesn't need it.

Crop and Manure Management Input

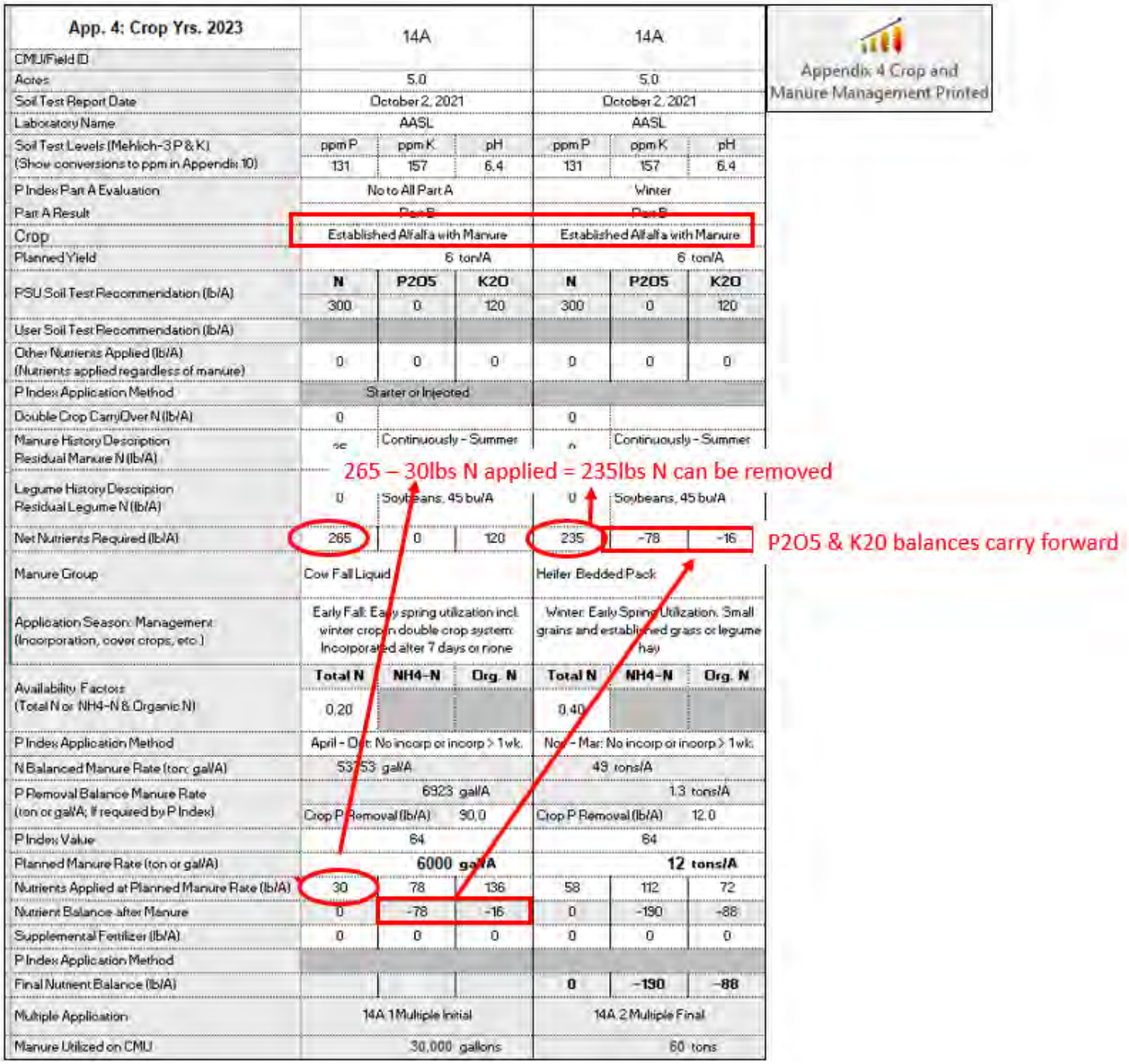
Field Information		Crop Information	Manure and Application					Manure Rate			Balance after Manure			
Field or CMU ID	Field Count	Crop	Manure Group	Planned Application Season	Planned Application Management	P Index Application Method	Multiple/ Split Application	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance	Suppl. N
14A	14A.1	Established Alfalfa with Manure	Cow Fall Liquid	Early Fall	Early Fall: Early spring utilization incl. winter crop in double crop system: Incorporated after 7 days or none	April - Oct: No incorp or incorp > 1 wk.	Mi	53753	6923	6000				0
14A	14A.2	Established Alfalfa with Manure	Heifer Bedded Pack	Winter	Winter: Early Spring Utililization. Small grains and established grass or legume hay	Nov - Mar: No incorp or incorp > 1 wk.	Mf	49	1.3	12	177	-190	-88	0

Multiple Applications on Legumes

In the Printed Appendix 4 Crop & Manure Management Section:

The nitrogen balance after manure for the initial manure application is zero for a legume "with manure" since it doesn't need it. The legume can still utilize it so the Net Nutrients Required for the next manure application is calculated by subtracting the nitrogen applied in the initial application from the net nitrogen required in the initial application (see below).

The P_2O_5 and K_2O balance after manure are transferred from the net nutrients required in the initial application to the net nutrients required in the next multiple application.

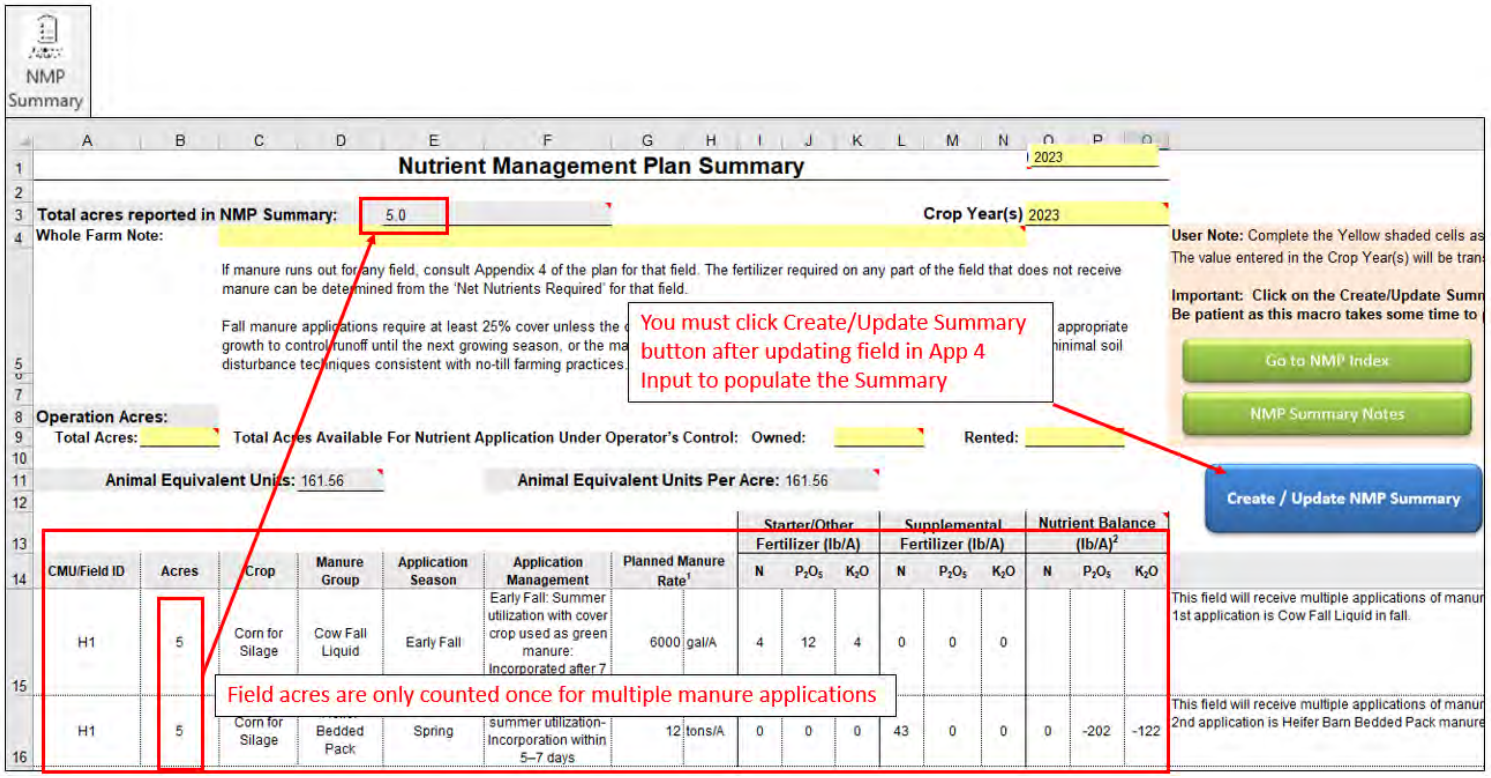


App. 4: Crop Yrs. 2023	14A			14A		
CMU/Field ID						
Acres	5.0			5.0		
Soil Test Report Date	October 2, 2021			October 2, 2021		
Laboratory Name	AASL			AASL		
Soil Test Levels (Mehlich-3 P & K) (Show conversions to ppm in Appendix 10)	ppm P	ppm K	pH	ppm P	ppm K	pH
	131	157	6.4	131	157	6.4
P Index Part A Evaluation	No to All Part A			Winter		
Part A Result	Part B			Part B		
Crop	Established Alfalfa with Manure			Established Alfalfa with Manure		
Planned Yield	6 ton/A			6 ton/A		
PSU Soil Test Recommendation (lb/A)	N	P2O5	K2O	N	P2O5	K2O
	300	0	120	300	0	120
User Soil Test Recommendation (lb/A)						
Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0	0	0	0
P Index Application Method	Starter or Injected					
Double Crop CarryOver N (lb/A)	0			0		
Manure History Description Residual Manure N (lb/A)	se	Continuously - Summer		n	Continuously - Summer	
Legume History Description Residual Legume N (lb/A)	0	Soybeans, 45 bu/A		0	Soybeans, 45 bu/A	
Net Nutrients Required (lb/A)	265	0	120	235	-78	-16
Manure Group	Cow Fall Liquid			Heifer Bedded Pack		
Application Season: Management (Incorporation, cover crops, etc.)	Early Fall: Early spring utilization incl. winter crop in double crop system: Incorporated after 7 days or none			Winter: Early Spring Utilization. Small grains and established grass or legume hay		
Availability Factors (Total N or NH4-N & Organic N)	Total N	NH4-N	Org. N	Total N	NH4-N	Org. N
	0.20			0.40		
P Index Application Method	April - Oct: No incorp or incorp > 1 wk.			Nov - Mar: No incorp or incorp > 1 wk.		
N Balanced Manure Rate (ton; gal/A)	5353 gal/A			49 tons/A		
P Removal Balance Manure Rate (ton or gal/A; if required by P Index)	6923 gal/A			1.3 tons/A		
	Crop P Removal (lb/A) 90.0			Crop P Removal (lb/A) 12.0		
P Index Value	64			64		
Planned Manure Rate (ton or gal/A)	6000 gal/A			12 tons/A		
Nutrients Applied at Planned Manure Rate (lb/A)	30	78	136	58	112	72
Nutrient Balance after Manure	0	-78	-16	0	-190	-88
Supplemental Fertilizer (lb/A)	0	0	0	0	0	0
P Index Application Method						
Final Nutrient Balance (lb/A)				0	-190	-88
Multiple Application	14A.1 Multiple Initial			14A.2 Multiple Final		
Manure Utilized on CMU	30,000 gallons			60 tons		

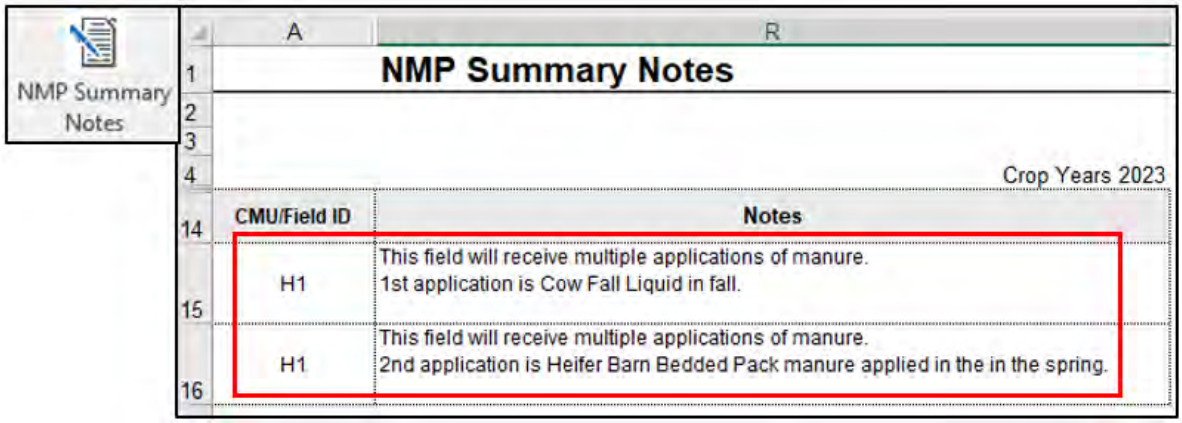
3.4. How Multiple Applications appear in the NMP Summary

Each Multiple Application is listed as a separate row in the NMP Summary. Fields receiving multiple applications of manure are counted just once in the Total acres reported in the NMP Summary if **the field names are exactly the same for each multiple.**

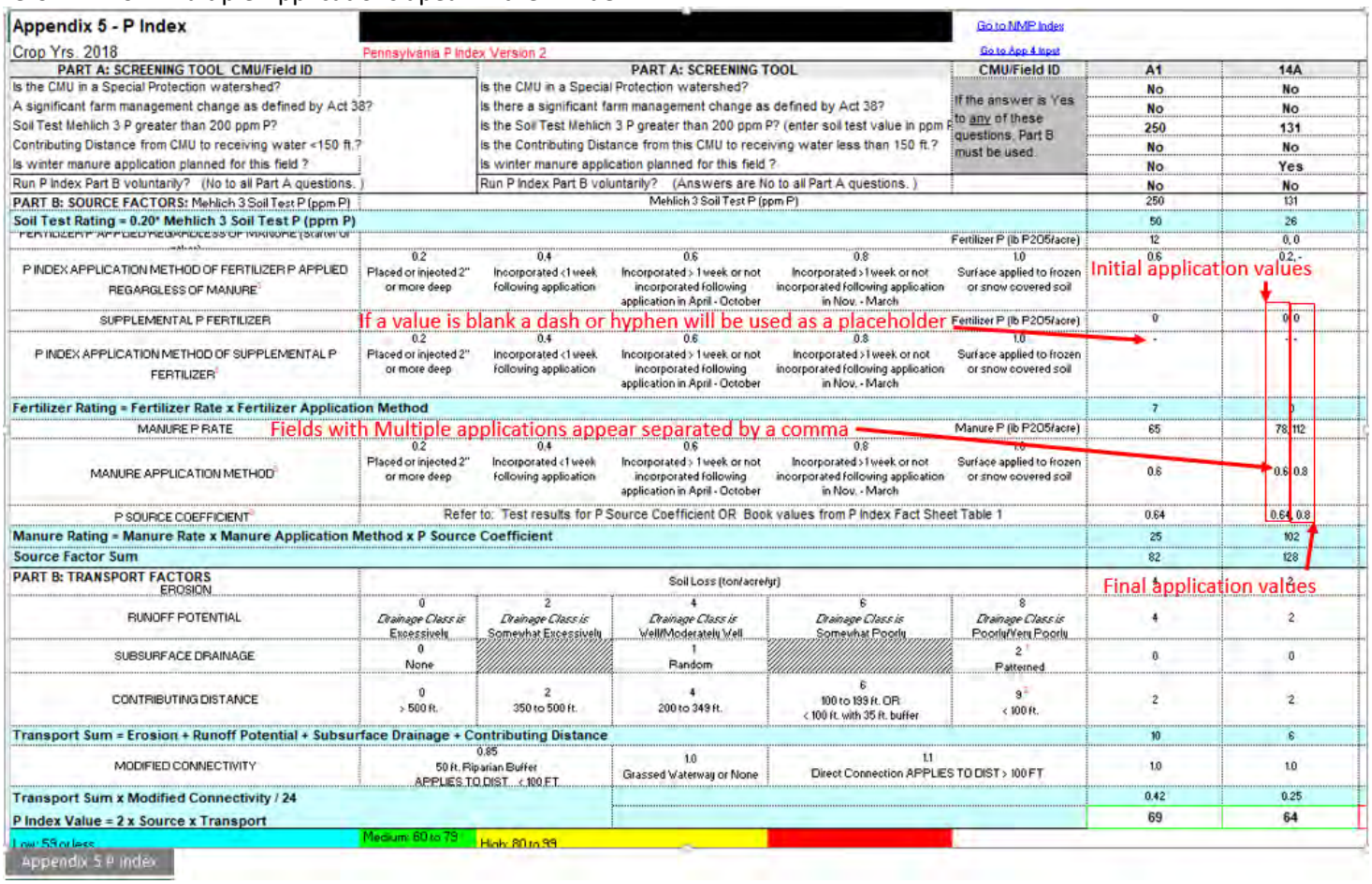
Field names that look the same can be different. If you type a field name and press the space bar after typing a name for one of the multiple applications then Excel will treat it as a separate field. The field acres would be counted twice in the Total acres reported in the NMP Summary.



3.5. How Multiple Applications appear in the NMP Summary Notes



3.6. How Multiple Applications apear in the P Index



Appendix 5 - P Index

Crop Yrs. 2018

Pennsylvania P Index Version 2

Go to NMP Index

Go to App 4 Input

PART A: SCREENING TOOL CMU/Field ID							A1	14A
Is the CMU in a Special Protection watershed?							No	No
A significant farm management change as defined by Act 38?							No	No
Soil Test Mehlich 3 P greater than 200 ppm P?							250	131
Contributing Distance from CMU to receiving water <150 ft.?							No	No
Is winter manure application planned for this field ?							No	Yes
Run P Index Part B voluntarily? (No to all Part A questions.)							No	No
PART B: SOURCE FACTORS: Mehlich 3 Soil Test P (ppm P)							250	131
Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)							50	26
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)						Fertilizer P (lb P2O5/acre)	12	0, 0
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARGLESS OF MANURE	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil		0.6	0.2, -
SUPPLEMENTAL P FERTILIZER						Fertilizer P (lb P2O5/acre)	0	0, 0
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil		-	- , -
Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method							7	0
MANURE P RATE						Manure P (lb P2O5/acre)	65	78, 112
MANURE APPLICATION METHOD	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week following application	0.6 Incorporated > 1 week or not incorporated following application in April - October	0.8 Incorporated >1 week or not incorporated following application in Nov. - March	1.0 Surface applied to frozen or snow covered soil		0.6	0.6, 0.8
P SOURCE COEFFICIENT	Refer to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Table 1						0.64	0.64, 0.8
Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient							25	102
Source Factor Sum							82	128
PART B: TRANSPORT FACTORS EROSION	Soil Loss (ton/acre/yr)						2	2
RUNOFF POTENTIAL	0 *Drainage Class is* Excessively	2 *Drainage Class is* Somewhat Excessively	4 *Drainage Class is* Well/Moderately Well	6 *Drainage Class is* Somewhat Poorly	8 *Drainage Class is* Poorly/Very Poorly		4	2
SUBSURFACE DRAINAGE	0 None		1 Random		2 Patterned		0	0
CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with 35 ft. buffer	9 < 100 ft.		2	2
Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance							10	6
MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST. < 100 FT		1.0 Grassed Waterway or None	1.1 Direct Connection APPLIES TO DIST > 100 FT			1.0	1.0
Transport Sum x Modified Connectivity / 24							0.42	0.25
P Index Value = 2 x Source x Transport							69	64
Low: 59 or less	Medium: 60 to 79	High: 80 to 99						

Initial application values

If a value is blank a dash or hyphen will be used as a placeholder

Fields with Multiple applications appear separated by a comma

Final application values

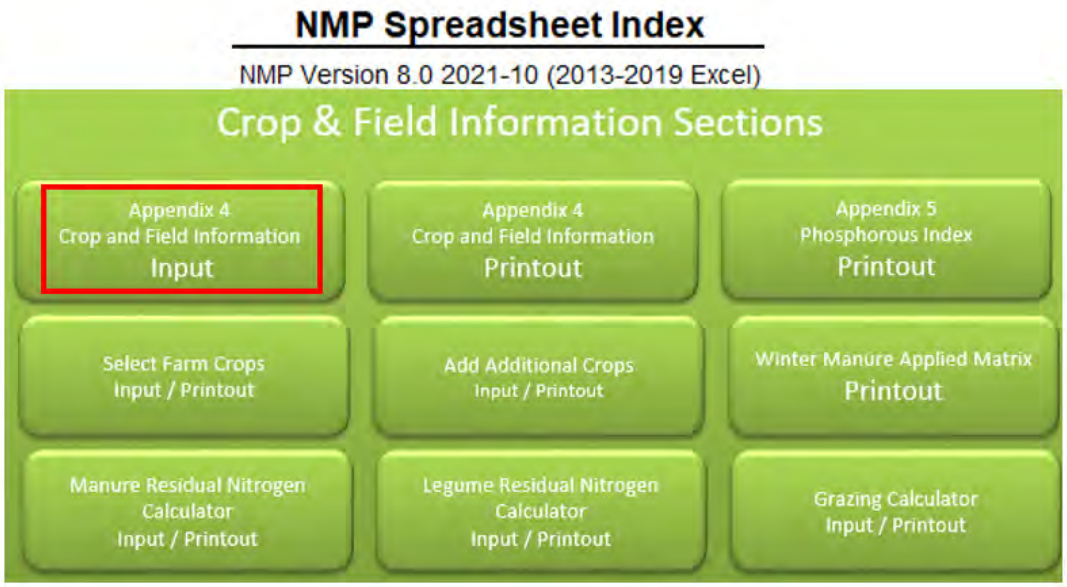
Prepared by Don Orner | Research Technologist | Penn State Extension – Nutrient Management

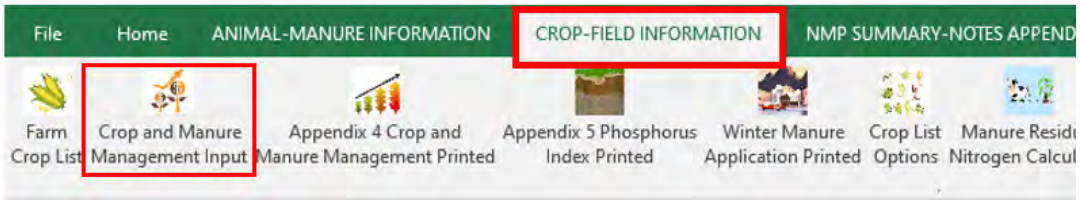
How to complete a Double Crop in NMP Appendix 4 Input

Purpose:

This procedure describes how to complete a Double Crop in Appendix 4 Input. If you have not yet completed a field in Appendix 4 Input and need, help then please refer to the guidance document: How to Complete Appendix 4 Input worksheet.

Look for a navigation button in the NMP Spreadsheet or a toolbar ribbon icon that looks like the screenshot below:





Double Crop Application Limitations

Nitrogen based planning

The maximum number of field replicates on a double crop is limited to ten replicates for nitrogen based planning. For example, there could be 5 manure applications on each crop in a double cropped field.

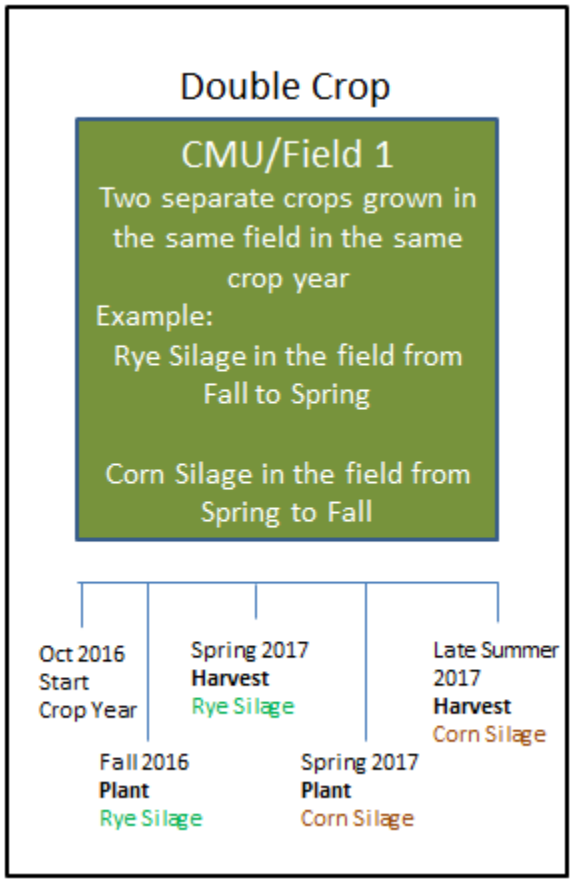
P Index Part B planning

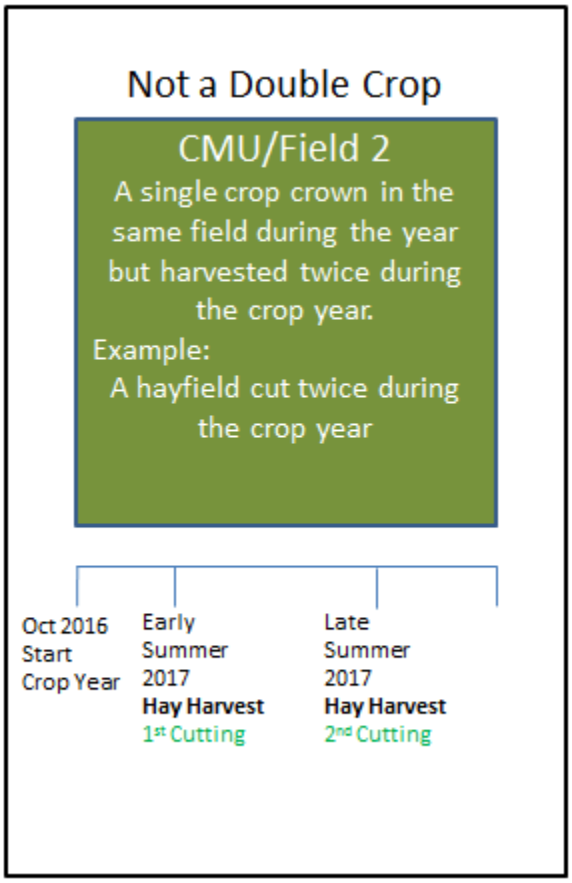
The maximum number of multiples or replicates is limited to six replicates for P Index Part B based planning. This could be 3 manure applications on each crop in a double cropped field.

How to complete a Double Crop in NMP Appendix 4 Input

A double crop is described as growing two separate and distinct crops on a field during a crop year. Different crops on the same field during a crop year. They are designated as a "Winter Crop" and a "Summer Crop" in a double crop.

One example would be a field where small grain silage is followed by corn silage in the same crop year. Small grain silage, ("Winter Crop"), is planted in the fall at the beginning of the crop year and is harvested in the spring. Corn for Silage, ("Summer Crop"), is then planted in the spring in the same field and during the same crop year.





Another example would be a field of Alfalfa that will have a cutting taken off in the spring then corn is planted in the same field after the 1st cutting of alfalfa. They are two different crops grown in the same field and during the same crop year.

In the example below, a field will be planted in small grain silage in the fall and harvested in the spring. Corn for silage will then be planted on the same field after harvesting the small grain silage.

The small grain silage is the winter crop in a double crop.
The corn for silage is the summer crop in a double crop.

The two points below are critical to make the calculations work properly:

- **When planning a double crop, the winter crop must be entered before the summer crop in Appendix 4 Input for the calculations to work properly.**

- **The field Ids must be the same for both instances of the field**

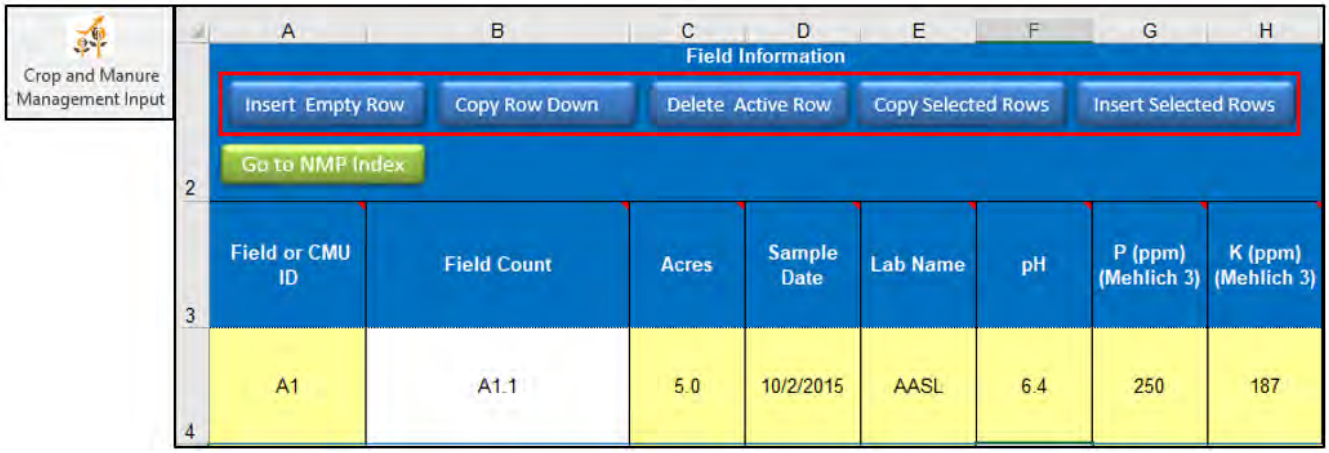
How to complete a Double Crop in NMP Appendix 4 Input

Enter the field and information for the Winter Crop like any other field in Appendix 4 Input. After entering the information, copy and paste the winter crop field that will become the Summer Crop.

The example will begin by showing you how to copy and paste the winter crop row. It will show you the cells to change to complete a summer crop. Finally, it will demonstrate how the double crop should appear when completed properly.

1. Modify Rows Buttons

There are buttons in the Field Information section of App 4 Input to modify the rows.



Clicking on the buttons will perform the following functions:

Insert Empty Row - Add an empty row <u>below</u> the active or selected row.

Copy Row Down - Copy the selected row down below the active row.

Delete Active Row - Delete the selected row.

Copy Selected Rows - Copy a group of contiguous rows. (used to copy an existing multiple or double crop field).

A dialog box will alert you that the rows were successfully copied.

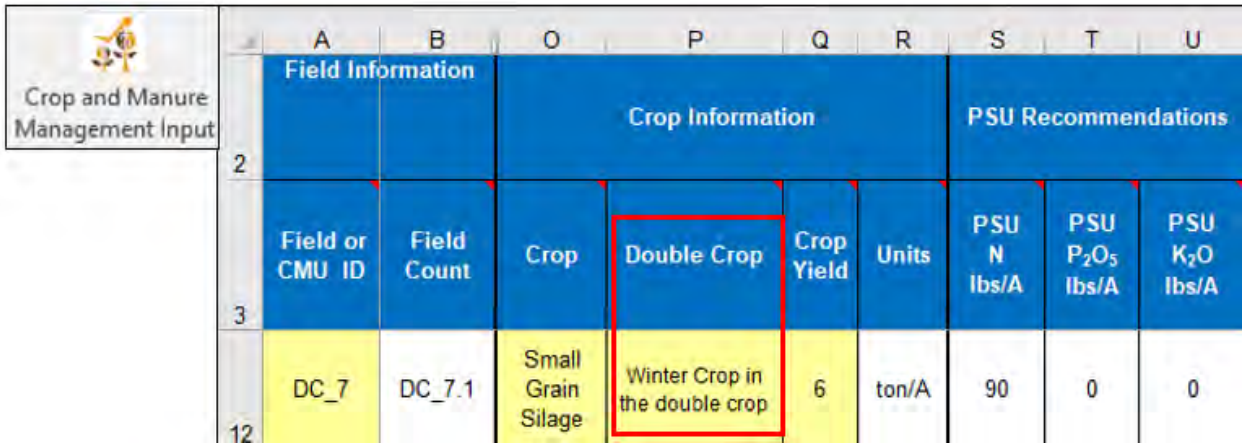
Insert Selected Rows - Paste a group of contiguous rows above the active row <u>after</u> the paste the Copied Selected.

Rows button was used. The currently copied selected rows can be pasted many times without re-selecting the rows again. For example, a double crop with multiple manure applications can be selected then pasted many times without reselecting the rows.

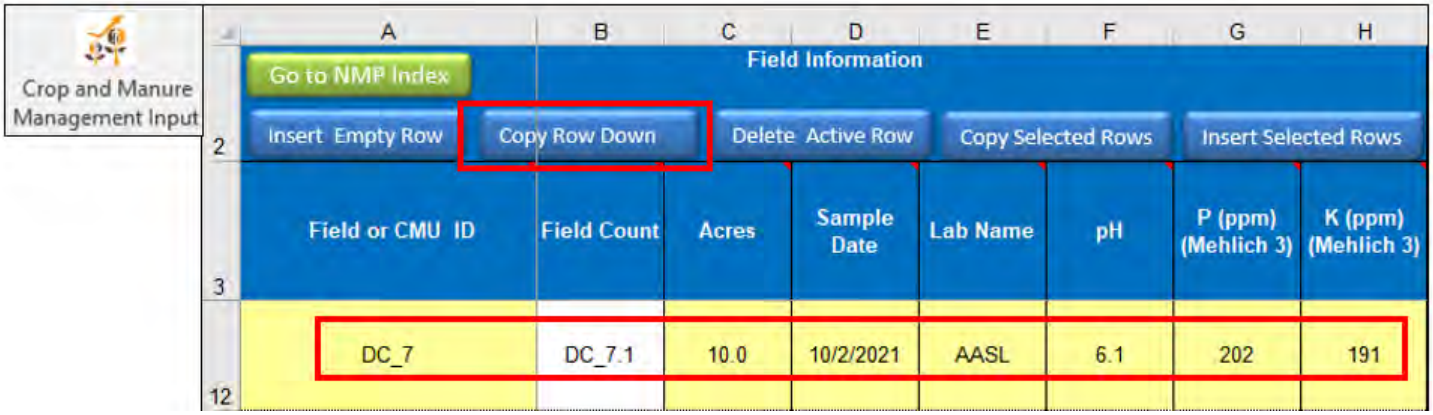
The procedure will step through adding each field section and changing the appropriate selections for each double crop.

2. Procedure

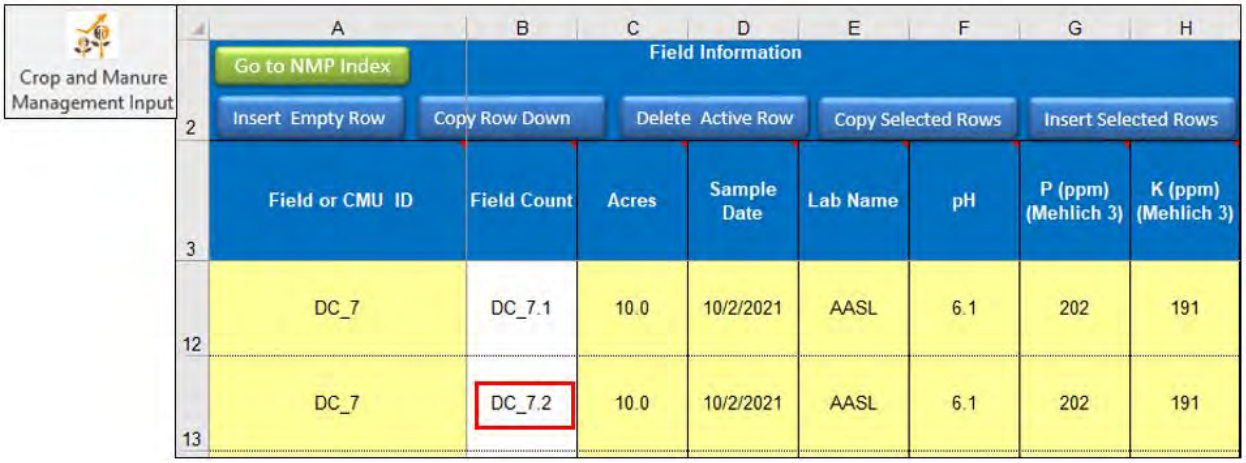
2.1. Complete the winter crop in a double crop entire row of field information. Be sure to select the Winter Crop in the double Crop designation.



2.2. Click in any cell within the winter crop row to select the field row to be completed for a for a double crop and click on the copy row down button.



The selected row will be copied down to the next row.



The copied field will have the field counter increased to the next replicate number.
In this example, the "Field Count" column indicate the field name with a ".2". This means they are recognized as the same field. It indicates it is the 2nd instance of the field, and will appropriately carryover nutrient balance after manure.

The Field ID must be identical for both instances of a field double crop for the calculations to work properly.

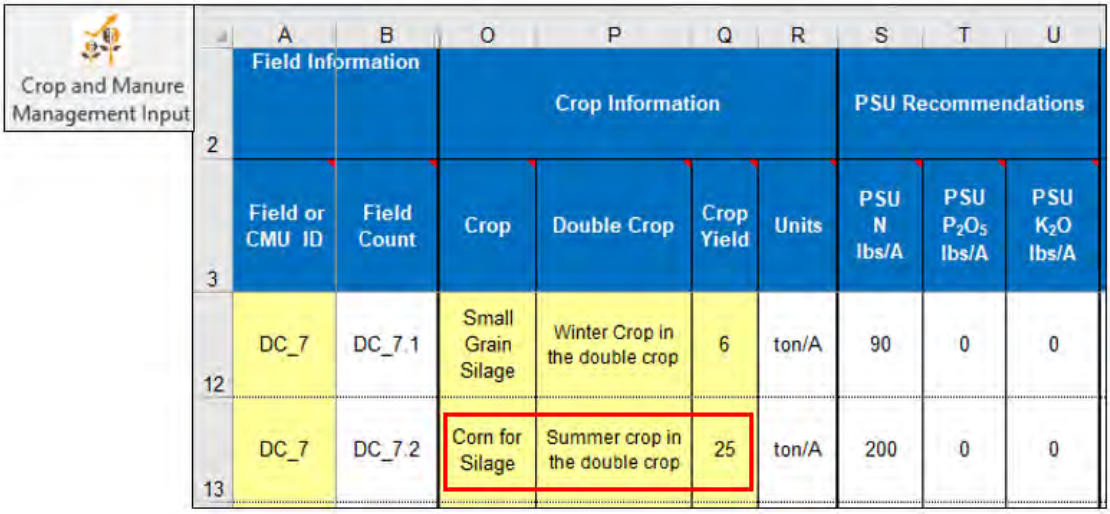
The "Field Count" column must indicate the field name with a .2. This means they are recognized as the same field. It indicates it is the 2nd instance of the field, and will appropriately assign the double crop nitrogen carryover and report the field acres only once in the Total acres reported in the NMP Summary.

2.3. Complete the Crop Information Section for the Summer Crop in a Double Crop

2.3.1. Crop – Select the crop from the dropdown list, in our example Small Grain Silage is the Winter Crop and Corn for Silage is the Summer Crop

2.3.2. Double Crop Selection – This selection is key to having a double crop scenario work properly. Select the appropriate double crop designation from the dropdown list. Choose either "Winter crop in a double crop" or "Summer crop in a double crop" from the dropdown list. Remember a winter crop always needs to be completed first before a summer crop in a double crop scenario.

2.3.3. Yield – Enter the expected crop yield. After you select the crop and yield the worksheet will assign the appropriate crop units and PSU soil test recommendations. (User recommendations similar to PSU recommendations can be used too.)

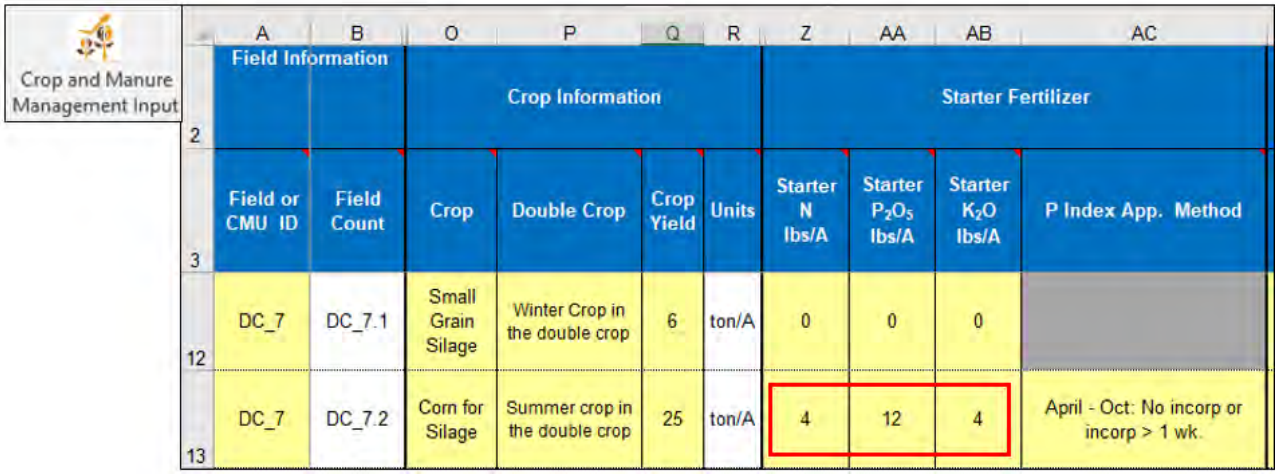


	A	B	O	P	Q	R	S	T	U
2	Field Information		Crop Information				PSU Recommendations		
3	Field or CMU ID	Field Count	Crop	Double Crop	Crop Yield	Units	PSU N lbs/A	PSU P_2O_5 lbs/A	PSU K_2O lbs/A
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	6	ton/A	90	0	0
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	25	ton/A	200	0	0

2.4. Update the starter or other fertilizer information.

2.4.1. Starter Fertilizer - When completing a double crop, any starter or other fertilizer needs to be entered for each crop grown during the crop year. If no starter or other fertilizer is used then enter zeros for the starter fertilizer.

2.4.2. Starter P Index Application Method - If starter Phosphorous is used and the field is a P Index Part B field then the P Index Application Method will need to be completed.



Crop and Manure Management Input

	A	B	O	P	Q	R	Z	AA	AB	AC
2	Field Information		Crop Information				Starter Fertilizer			
3	Field or CMU ID	Field Count	Crop	Double Crop	Crop Yield	Units	Starter N lbs/A	Starter P_2O_5 lbs/A	Starter K_2O lbs/A	P Index App. Method
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	6	ton/A	0	0	0	
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	25	ton/A	4	12	4	April - Oct: No incorp or incorp > 1 wk.

2.5. Complete the Field Residual and Carryover Nitrogen History

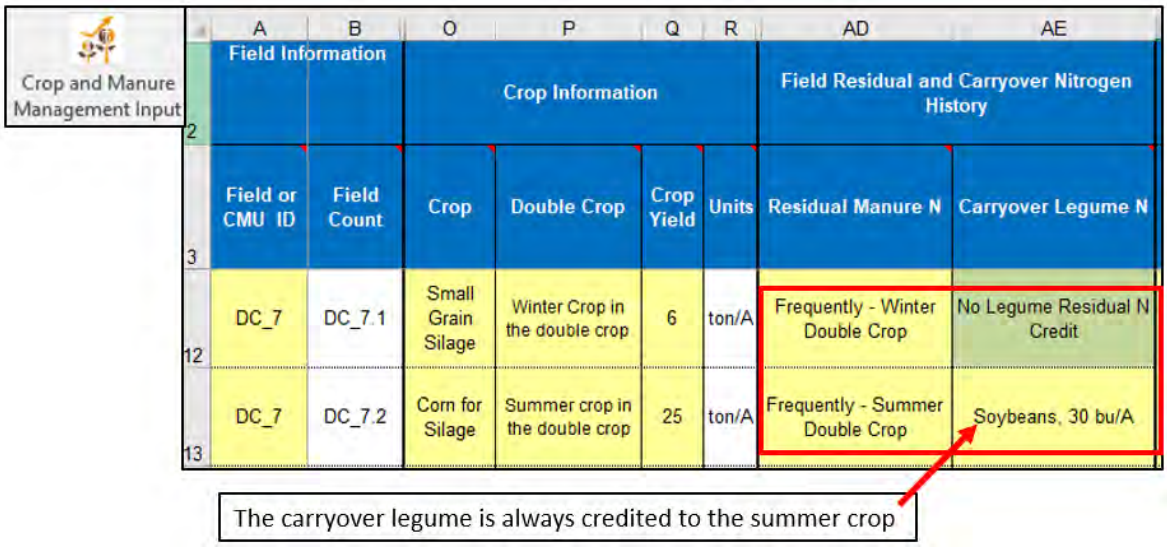
2.5.1. Residual Manure N

Select the appropriate Residual Manure Nitrogen history. It's important to select the history that ends with the appropriate "Winter Double Crop or "Summer Double Crop" designation.

2.5.2. Carryover Legume N

- Legume nitrogen is only credited to summer annual crops.
- The cell will be yellow if the crop is a summer annual.
- The cell will be shaded light green if the crop IS NOT a summer annual. Legume crops do not receive a carryover legume N credit.

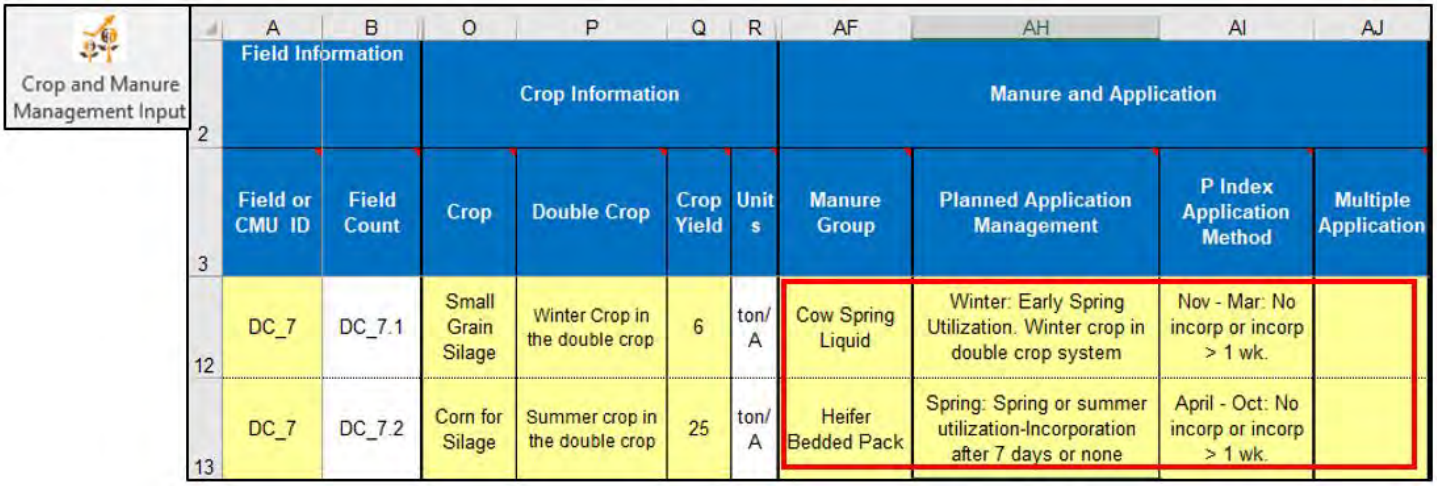
- Winter Crop in a double crop: Select "No Legume Residual N Credit" or leave it blank.
- Summer Crop in a double crop: Select to appropriate previous legume field history.



2.6. Complete the Manure and Application Information for the Winter and Summer Crop

2.6.1. Select the Manure group, Application Season, and Application Management for the Winter Crop and Summer Crop

2.6.2. Multiple applications can be completed on double crops.



2.7. Manure Rate - Nitrogen Balanced Rate, Crop Phosphorous Removal Manure Rate, and Planned Manure Rate

2.7.1. Nitrogen Balanced Rate – This is the amount manure that would be needed to meet the crops Nitrogen needs. (White cells =no data entry)

2.7.2. Crop Phosphorous Removal Manure Rate – This is the amount of manure that will replace the P removed from the field by the crops accounting for all other P applied (White cells =no data entry)

2.7.3. Planned Manure Rate – Enter the planned manure rate. If no manure is to be applied than enter a Zero and "No Manure Applied" will display in the NMP Summary for the field Planned Manure Rate

Crop and Manure Management Input

	A	B	O	P	AF	AH	AI	AK	AL	AM
2	Field Information		Crop Information		Manure and Application			Manure Rate		
3	Field or CMU ID	Field Count	Crop	Double Crop	Manure Group	Planned Application Management	P Index Application Method	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	Cow Spring Liquid	Winter: Early Spring Utilization. Winter crop in double crop system	Nov - Mar: No incorp or incorp > 1 wk.	6803	8125	6000
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	Heifer Bedded Pack	Spring: Spring or summer utilization-Incorporation after 7 days or none	April - Oct: No incorp or incorp > 1 wk.	48.3	3.6	10

2.8. Balance After Manure, Supplemental Fertilizer, and Final Nutrient Balance

2.8.1. Balance after Manure – Both the Summer Crop and Winter Crop will have a balance after manure listed because they are separate crops.

This is the nutrient balance after manure. A positive number indicates additional nutrients are required. A negative number indicates an excess nutrient balance. (White cells =no data entry).

2.8.2. Supplemental Fertilizer – Both the Summer Crop and Winter Crop will have a supplemental balance after manure listed because they are separate crops.

Enter any supplemental fertilizer values here. <u>If there is no supplemental fertilizer applied enter a zero "0" in each of the cells or the spreadsheet won't calculate properly when working on a plan that's been transferred from a Version 4.x plan.</u>

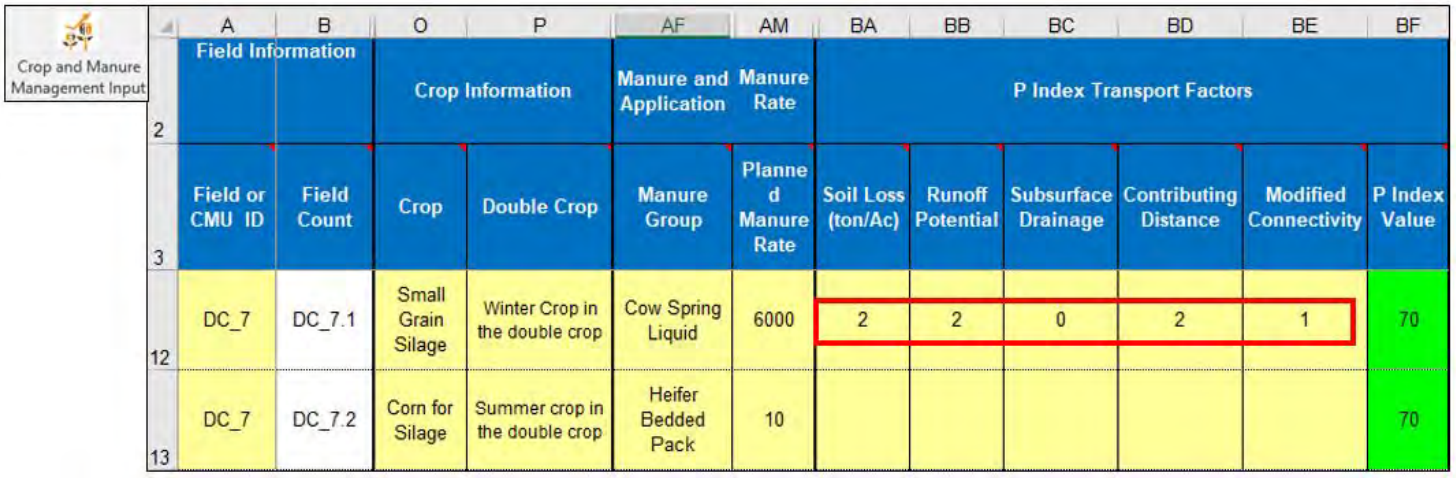
2.8.3. Final Nutrient Balance – The final nutrient balances for N, P_2O_5, and K_20 are calculated values. (White cells =no data entry). The "Final N Balance" can never be negative.

Crop and Manure Management Input

	A	B	O	P	AF	AM	AN	AO	AP	AQ	AR	AS	AV	AW	AX
2	Field Information		Crop Information		Manure and Application	Manure Rate	Balance after Manure			Supplemental Fertilizer			Final Nutrient Balance		
3	Field or CMU ID	Field Count	Crop	Double Crop	Manure Group	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance	Suppl. N	Suppl. P2O5	Suppl - K2O	Final N Balance	Final P2O5 Balance	Final K2O Balance
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	Cow Spring Liquid	6000	10	-96	-128	10	0	0	0	-96	-128
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	Heifer Bedded Pack	10	92	-202	-192	92	0	0	0	-202	-192

2.9. P Index Transport Factors – The transport factors only need to be entered in the first instance of a field. It doesn't matter if they are in the other instances of a field**.**

Complete the P index transport factors. The soil loss is a typed entry. The others transport factors have a note to remind you of the selections and are drop down box selections or you can enter them by typing the number. Transport factors can be copied and pasted from other fields as well.



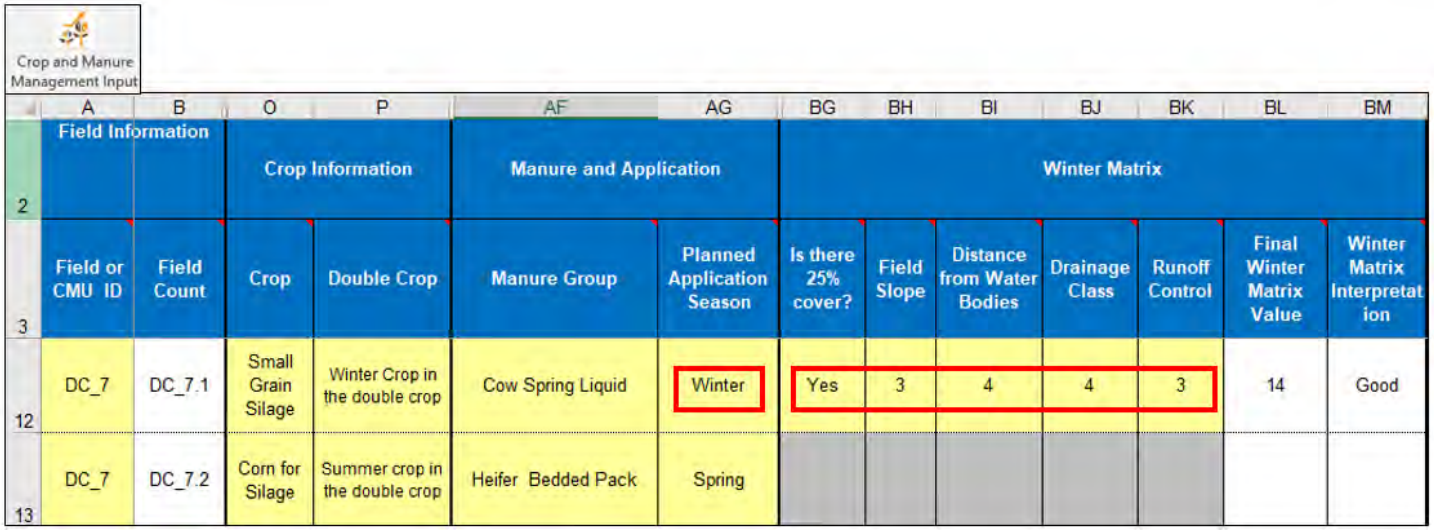
	A	B	O	P	AF	AM	BA	BB	BC	BD	BE	BF
2	Field Information		Crop Information		Manure and Application	Manure Rate	P Index Transport Factors					
3	Field or CMU ID	Field Count	Crop	Double Crop	Manure Group	Planned Manure Rate	Soil Loss (ton/Ac)	Runoff Potential	Subsurface Drainage	Contributing Distance	Modified Connectivity	P Index Value
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	Cow Spring Liquid	6000	2	2	0	2	1	70
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	Heifer Bedded Pack	10						70

Multiple Applications on Double Crops and the P Index - The transport factors for a P Index Part B field must be in in the first instance of a field. It doesn't matter if they are in the middle or final multiple applications.

<u>Remember that a P Index Part B field can have a maximum of six instances of a field in order to properly calculate a P Index score.</u>

For Example, you could have a double crop with 3 multiple manure applications on the Winter Crop and 3 multiple manure applications on the Summer Crop. Or you could have a double crop with 1 manure application on the Winter Crop and 5 multiple manure applications on the Summer Crop. You can have any combination just no more than six instances of a field for the P Index to work properly.

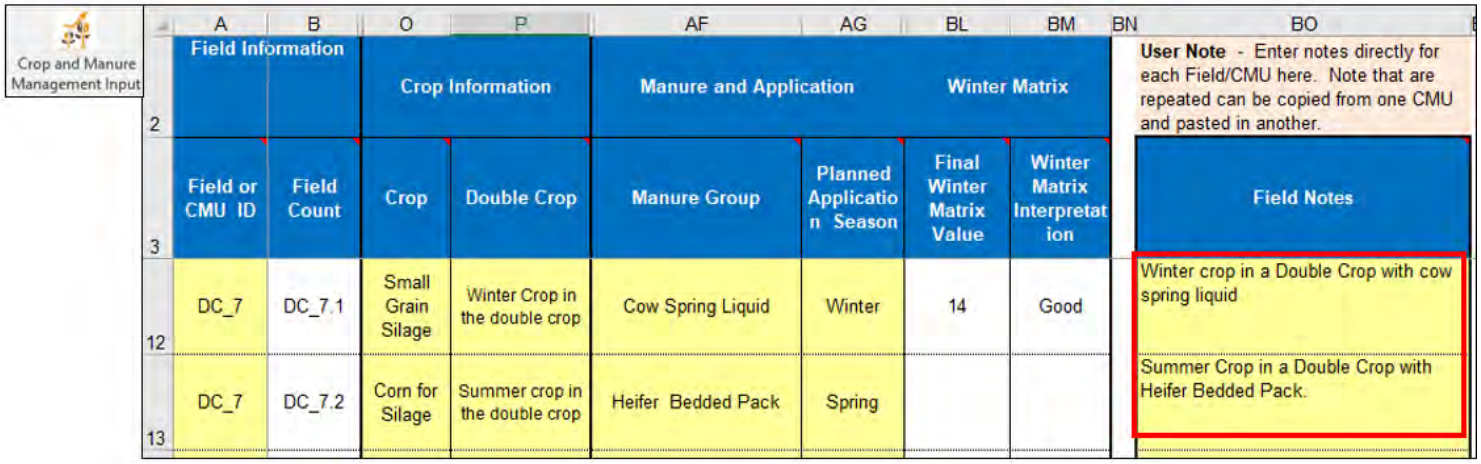
2.10. Double Crops on a field evaluated in the Winter Matrix – The Winter Matrix Evaluation factors must be entered in the Double Crop containing the Planned Application Season of "Winter" or "Winter 1.2-12".



	A	B	O	P	AF	AG	BG	BH	BI	BJ	BK	BL	BM
2	Field Information		Crop Information		Manure and Application		Winter Matrix						
3	Field or CMU ID	Field Count	Crop	Double Crop	Manure Group	Planned Application Season	Is there 25% cover?	Field Slope	Distance from Water Bodies	Drainage Class	Runoff Control	Final Winter Matrix Value	Winter Matrix Interpretation
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	Cow Spring Liquid	Winter	Yes	3	4	4	3	14	Good
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	Heifer Bedded Pack	Spring							

2.11. Add any field notes as applicable.

While it is not required, it is a recommended that notes be added to each double crop explaining what is planned to the operator. Suggested application notes are included in the Field Notes screenshot below. You can increase the row width if needed.

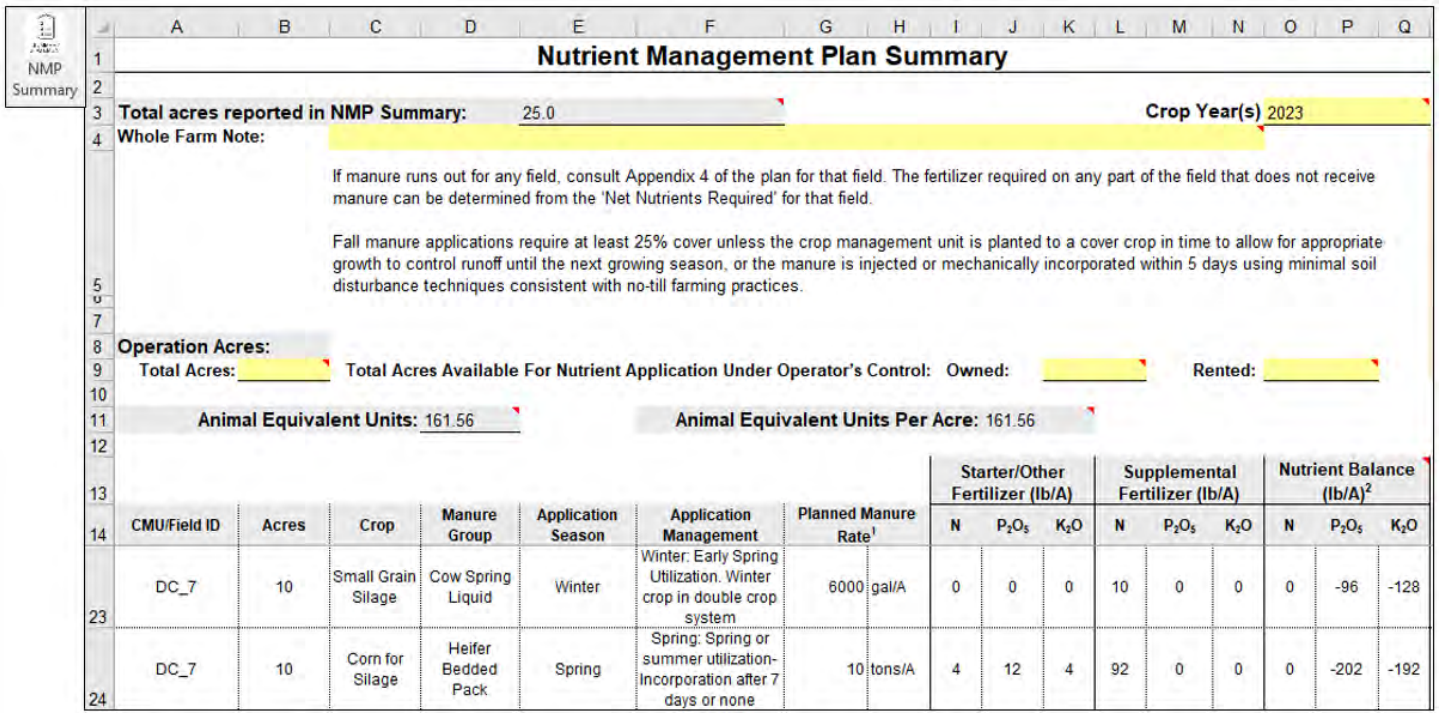


Crop and Manure Management Input

	A	B	O	P	AF	AG	BL	BM	BN	BO
2	Field Information		Crop Information		Manure and Application		Winter Matrix		User Note - Enter notes directly for each Field/CMU here. Note that are repeated can be copied from one CMU and pasted in another.	
3	Field or CMU ID	Field Count	Crop	Double Crop	Manure Group	Planned Application Season	Final Winter Matrix Value	Winter Matrix Interpretation		Field Notes
12	DC_7	DC_7.1	Small Grain Silage	Winter Crop in the double crop	Cow Spring Liquid	Winter	14	Good		Winter crop in a Double Crop with cow spring liquid
13	DC_7	DC_7.2	Corn for Silage	Summer crop in the double crop	Heifer Bedded Pack	Spring				Summer Crop in a Double Crop with Heifer Bedded Pack.

How to complete a Double Crop in NMP Appendix 4 Input

3. How the Double Crop appears in the NMP Summary



NMP Summary

Nutrient Management Plan Summary

Total acres reported in NMP Summary: 25.0 **Crop Year(s)** 2023

Whole Farm Note:

If manure runs out for any field, consult Appendix 4 of the plan for that field. The fertilizer required on any part of the field that does not receive manure can be determined from the 'Net Nutrients Required' for that field.

Fall manure applications require at least 25% cover unless the crop management unit is planted to a cover crop in time to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

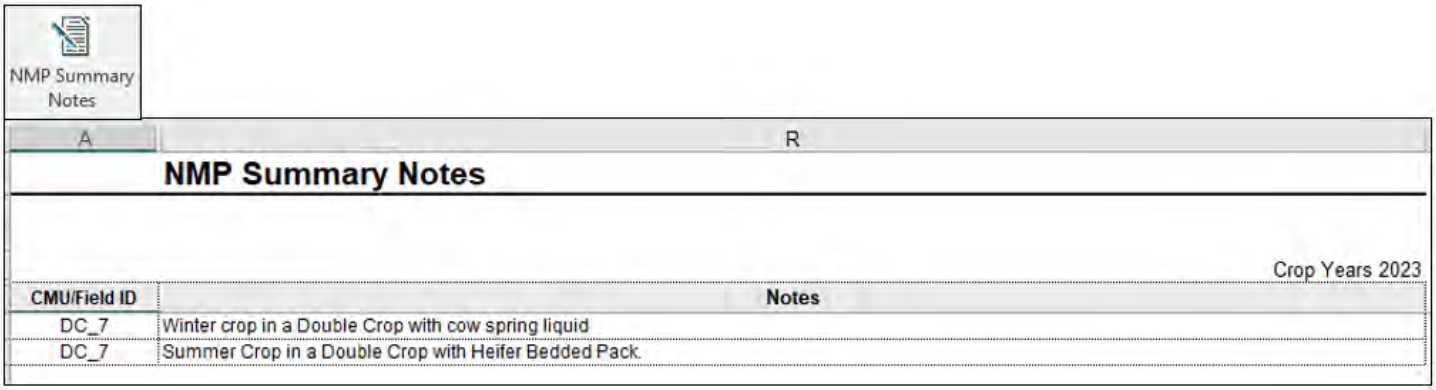
Operation Acres:

Total Acres: **Total Acres Available For Nutrient Application Under Operator's Control:** **Owned:** **Rented:**

Animal Equivalent Units: 161.56 **Animal Equivalent Units Per Acre:** 161.56

								Starter/Other Fertilizer (lb/A)			Supplemental Fertilizer (lb/A)			Nutrient Balance (lb/A)[2]		
CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
DC_7	10	Small Grain Silage	Cow Spring Liquid	Winter	Winter: Early Spring Utilization. Winter crop in double crop system	6000	gal/A	0	0	0	10	0	0	0	-96	-128
DC_7	10	Corn for Silage	Heifer Bedded Pack	Spring	Spring: Spring or summer utilization-incorporation after 7 days or none	10	tons/A	4	12	4	92	0	0	0	-202	-192

4. How the Double Crop appears in the NMP Summary Notes



NMP Summary Notes

NMP Summary Notes

Crop Years 2023

CMU/Field ID	Notes
DC_7	Winter crop in a Double Crop with cow spring liquid
DC_7	Summer Crop in a Double Crop with Heifer Bedded Pack.

How to complete a Double Crop in NMP Appendix 4 Input

4.1. How the Double Crop appears in Appendix 4 Crop & Manure Management Section

App. 4: Crop Yrs. 2023	DC_7			DC_7			
CMU/Field ID							
Acres	10.0			10.0			
Soil Test Report Date	October 2, 2021			October 2, 2021			
Laboratory Name	AASL			AASL			
Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH	ppm P	ppm K	pH	
(Show conversions to ppm in Appendix 10)	202	191	6.1	202	191	6.1	
P Index Part A Evaluation	Winter Soil Test P			Soil Test P			If a manure application season of "Winter or "Winter 1.2-12" is selected then "Winter will be added to the Part A evaluation result.
Part A Result	Part B			Part B			
Crop	Small Grain Silage			Corn for Silage			Lists the winter and summer crop double crop
Planned Yield	6 ton/A			25 ton/A			
PSU Soil Test Recommendation (lb/A)	**N**	**P2O5**	**K2O**	**N**	**P2O5**	**K2O**	
	90	0	0	200	0	0	The individual crops have different recommendations
User Soil Test Recommendation (lb/A)							
Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0	4	12	4	Other nutrients applied will be different. Can have Other Nutrients Applied for both Winter and Summer
P Index Application Method				April - Oct: No incorp or incorp > 1 wk.			
							The Manure Nitrogen Carryover from the Winter Crop
Net Nutrients Required (lb/A)	83	0	0	116	-108	-132	The Net Nutrients Required for P2O5 and K2O for the Summer Crop includes the Winter Crop deficit / excess. **P2O5 Net Nutrients Required** for the Summer Crop = 0 lbs PSU Recs + 96 lbs. excess from the Small Grain Silage Winter Double Crop + 12 lbs. Other Nutrients Applied = 108 lbs P2O5 excess. K20 Net NutrientsRequired for the Summer Crop = 0 lbs. PSU Recs + 128 lbs. excess from Small Grain Silage Winrter Double Crop + 4 lbs. Other Nutrients Applied = 132 lbs. K2O excess.
Manure Group	Cow Spring Liquid			Heifer Bedded Pack			The Manure Group applied to each crop.
Application Season: Management (Incorporation, cover crops, etc.)	Winter: Early Spring Utilization. Winter crop in double crop system			Spring: Spring or summer utilization-Incorporation after 7 days or none			
Availability Factors (Total N or NH4-N & Organic N)	**Total N**	**NH4-N**	**Org. N**	**Total N**	**NH4-N**	**Org. N**	
	0.40			0.20			
P Index Application Method	Nov - Mar: No incorp or incorp > 1 wk.			April - Oct: No incorp or incorp > 1 wk.			
N Balanced Manure Rate (ton; gal/A)	6803 gal/A			48.3 tons/A			
P Removal Balance Manure Rate (ton or gal/A; If required by P Index)	8125 gal/A			3.6 tons/A			
	Crop P Removal (lb/A) 130.0			Crop P Removal (lb/A) 34.0			Crop P Removal (lb/A)
P Index Value	70			70			
Planned Manure Rate (ton or gal/A)	**6000 gal/A**			**10 tons/A**			A double crop can have "No Manure Applied" for either of the crops too.
Nutrients Applied at Planned Manure Rate (lb/A)	73	96	128	24	94	60	
Nutrient Balance after Manure	10	-96	-128	92	-202	-192	
Supplemental Fertilizer (lb/A)	10	0	0	92	0	0	
P Index Application Method							
Final Nutrient Balance (lb/A)	**0**	**-96**	**-128**	**0**	**-202**	**-192**	Excess Nitrogen can't be applied in excess of the winter crop needs and used for the summer crop. The Double Crop N carryover is the only N applied to the Winter Crop that is credited to the summer crop.
Multiple Application							
Manure Utilized on CMU	60,000 gallons			100 tons			

4.2. How the Double Crop appears in Appendix P Index

Appendix 5 - P Index

Crop Yrs. 2017

Pennsylvania P Index Version 2

Explanation of P Index Results and possible Errors

		PART A: SCREENING TOOL					CMU/Field ID	DC_7	The field will be automatically be entered in the P Index if the answer is Yes to any of the Part B questions in Appendix 4 Input.
P Index Rating: Values	Nutrient Applicat	Is the CMU in a Special Protection watershed?					If the answer is Yes to any of these questions, Part B must be used.	No	In a Double Crop the Field Id, Part A questions, and Mechlich 3 Soil Test P apply to the field so they are listed just once.
Low: 59 or less	Nitrogen based n	Is there a significant farm management change as defined by Act 38?						No	
Medium: 60 to 79	Nitrogen based n	Is the Soil Test Mehlich 3 P greater than 200 ppm P? (enter soil test value in ppm P)						202	
High: 80 to 99	Phosphorus limit	Is the Contributing Distance from this CMU to a receiving water less than 150 ft.?						No	
		Is winter manure application planned for this field ?						Yes	
Very High: 100 or greate	No Phosphorus a	Run P Index Part B voluntarily? (Answers are No to all Pa						No	
PART B: SOURCE FACTORS SOIL TEST		Mehlich 3 Soil Test P (ppm P)						202	
		Soil Test Rating = 0.20* Mehlich 3 Soil Test P (ppm P)						40	
FERTILIZER P APPLIED REGARDLESS OF MANURE (Starter or other)		Fertilizer P (lb P2O5/acre)						0, 12	The fertilizer and application methods are displayed separately and separated by a comma for the Winter Crop and Summer Crop.
P INDEX APPLICATION METHOD OF FERTILIZER P APPLIED REGARGLESS OF MANURE[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1	0.6 Incorporated > 1 week or not incorporated	0.8 Incorporated >1 week or not incorporated following	1.0 Surface applied to frozen or snow covered soil			-, 0.2	Any Multiple Manure Applications on the double crop will be displayed separately as well.
SUPPLEMENTAL P FERTILIZER		Fertilizer P (lb P2O5/acre)						0, 0	A dash or hyphen is a placeholder and that means a particular criteria was not applied. For Example if "Fertilizer P Applied" is zero, then the application method will have a hyphen.
P INDEX APPLICATION METHOD OF SUPPLEMENTAL P FERTILIZER[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporat	0.6 Incorporated > 1 week or not	0.8 Incorporated >1 week or not incorporated	1.0 Surface applied to frozen or snow covered			-, -	Error Note: if there is a fertilizer rate and there is no corresponding method factor then an "E" will be displayed.
		Fertilizer Rating = Fertilizer Rate x Fertilizer Application Method						2	The Rating for each fertilizer application is calculated separately and rounded to the nearest whole number then added together. Error Note: "Check Fert" will appear if the Starter Fertilizer P application method is missing.
MANURE P RATE		Manure P (lb P2O5/acre)						96, 94	The Manure P rate, Application Method, and PSC from each manure application is listed separately and separated by a comma.
MANURE APPLICATION METHOD[3]	0.2 Placed or injected 2" or more deep	0.4 Incorporated <1 week followi	0.6 Incorporated > 1 week or not incorporated	0.8 Incorporated >1 week or not incorporated following	1.0 Surface applied to frozen or snow covered soil			0.8, 0.6	A dash or hyphen is a placeholder and means that a particular criteria was not applied. For Example if "Manure P Rate" is zero is then the application method will have a dash or hyphen..
P SOURCE COEFFICIENT[3]	r to: Test results for P Source Coefficient OR Book values from P Index Fact Sheet Ta							0.61, 0.8	Error Note: If there is a manure rate and there is no corresponding application method or PSC, it will display an "E".
		Manure Rating = Manure Rate x Manure Application Method x P Source Coefficient						92	The Rating for each manure application is calculated separately and rounded to the nearest whole number. The Manure Rating for each manure application is then added together. Error Note: Check Manure will appear if the any of the following criteria are missing; manure rate, application method, or PSC value.
		Source Factor Sum						135	Soil Test Rating + Fertilizer Rating + Manure Rating
PART B: TRANSPORT FACTO EROSION		Soil Loss (ton/acre/yr)						2	In a Double Crop the Part B Transport Factors apply to the field so they are listed just once.
RUNOFF POTENTIAL	0 *Drainage Class is* Excessively	2 *Drainage Class*	4 *Drainage Class is* Well/Moderat	6 *Drainage Class is* Somewhat	8 *Drainage Class is* Poorly/Very			2	
SUBSURFACE DRAINAGE	0 None		1 Random		2 [1] Patterned			0	
CONTRIBUTING DISTANCE	0 > 500 ft.	2 350 to 500 ft.	4 200 to 349 ft.	6 100 to 199 ft. OR < 100 ft. with	9 [2] < 100 ft.			2	
Transport Sum = Erosion + Runoff Potential + Subsurface Drainage + Contributing Distance								6	
MODIFIED CONNECTIVITY	0.85 50 ft. Riparian Buffer APPLIES TO DIST < 100 FT		1.0 Grassed Waterway or None		1.1 Direct Connection APPLIES TO DIST > 100 FT			1.0	In a Double Crop the Modified Connectivity applies to the field so they are listed just once.
		Transport Sum x Modified Connectivity / 24						0.25	
		P Index Value = 2 x Source x Transport						67	A P Index Score will be displayed when all required information is complete. "PI Incomplete" will appear if a value needed is missing. Look in the columns above for errors.

Winter Crop

Summer Crop

[1] OR rapidly permeable soil near a stream

[2] "9" factor does not apply to fields receiving manu

[3] Error Note: if there is a manure or fertilizer rate and there is no corresponding method factor or PSC, it w

4.3. How the Double Crop appears in the Winter Manure Application Matrix

PA Technical Manual Supplement 10: Winter Manure Application Matrix

Crop Years 2017

User Notes for the Winter Manure Application Matrix

1. Under Act 38, any one of the following conditions meets the "winter" definition - see §83.201.
   - December 15 to February 28
   - Frozen ground (4 inch depth)
   - Snow-covered ground
2. All setbacks including those specific to winter manure application must be followed - see §83.294 (f) and (g).
   - No winter manure application within 100 ft. of an above ground agricultural drainage inlet where surface flow is toward the inlet.
   - No winter manure application within 100 ft. of a wetland (identified on National Wetland Inventory Maps) within the 100 year floodplain of an Exceptional Value stream segment if surface flow is toward the wetland.
3. Fields receiving winter manure applications must have 25% cover or an established cover crop - see §83.294 (g).

A field will only appear in the Winter Application Matrix if Winter or Winter 1.2-12 elected as the manure application season in App 4 Input

Verify the CMU meets the required cover conditions described in User Note 3.

CMU/Field ID	DC_7	
Does the CMU have 25% cover or an established cover crop?	Yes	

	Evaluation Criteria Descriptions and Ranking Values					
	4	3	2[b]	1[c]	DC_7	
Field Slope	< 4 %	4 - 8%	9 - 15%	> 15%	3	
Distance from Water Bodies[a]	> 350 ft.	350 - 200 ft.	199 - 100 ft.	<100 ft.	4	
Drainage Class Determined using Phosphorus Index Drainage Class Determination	Somewhat Excessively OR Excessively	Well OR Moderately Well	Somewhat Poorly	Poorly OR Very Poorly	4	
Runoff Control	Recommended conservation practices are in place. **Very low potential for concentrated flow.**	Some conservation practices are in place. **Low potential for concentrated flow.**	Some conservation practices are in place. **Moderate potential for concentrated flow.**	No conservation practices are in place **High potential for concentrated flow.**	3	
					14	
					Good	

[a] Includes Perennial and Intermittent streams with defined bed and bank, Lakes, Ponds, Open sinkholes, and Active private and public water sources.
[b] If a field receives a rating of "2" in any two categories the field is not recommended for winter application regardless of the final field Ranking Value.
[c] If a field receives a rating of "1" in any one category the field is not recommended for winter application regardless of the final field Ranking Value.

Recommended Winter Manure Application Prioritization		
Ranking Value	*Ranking Category*	*Recommendation for Winter Manure Spreading Prioritization*
Greater than 12	Good	These fields should receive first priority for winter manure application.
8 to 12	Fair	These fields should receive second priority for winter manure application.
Less than 8	Poor	These fields are not recommended for winter manure application.

How to Complete the NMP Summary and NMP Summary Notes Worksheet

Purpose and Overview:

This procedure provides an overview and details how to complete Nutrient Management Plan, (NMP) Summary worksheet. The NMP Summary includes application rates listed for fields or crop management unit for all nutrient sources applied to meet crop nutrient needs for all fields on the entire operation (owned and rented acres). It includes a Whole Farm Note, the Crop Year(s), Operation Acres, Animal Equivalent Units, (AEU) and Animal Equivalent Units per Acre.

The NMP Summary worksheet requires data entry so it has a yellow colored sheet tab in the NMP Excel workbook.

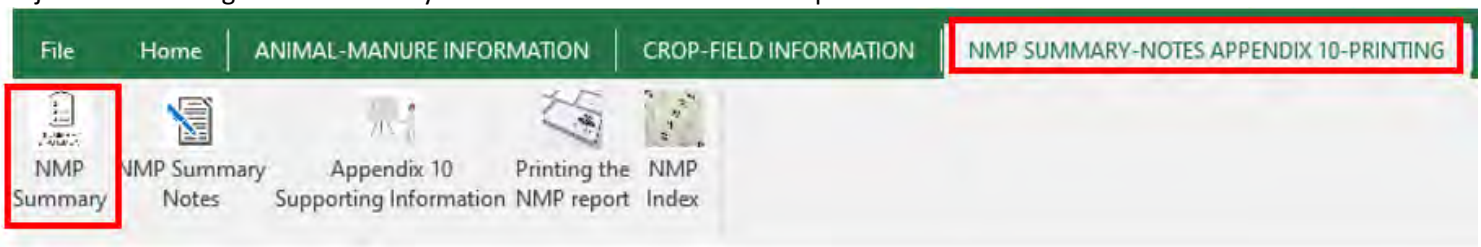
The NMP Summary Notes worksheet is a separate tab in the Excel workbook but it is populated when completing the NMP Summary.

The NMP Summary is provided to help the farmer implement the plan on individual fields. Planners are encouraged to use the notes section to provide additional explanation or clarification to the farmer. Common examples are manure application setbacks, multiple manure applications or double cropping scenarios. Refer to the Pennsylvania Nutrient Management Act Program Technical Manual for NMP Summary Notes Requirements.

The NMP Summary Notes worksheet information is transferred information therefore it has a grey colored sheet tab in the NMP Excel workbook.

Look for a navigation button in the NMP Spreadsheet or a toolbar ribbon icon that looks like the screenshot below:

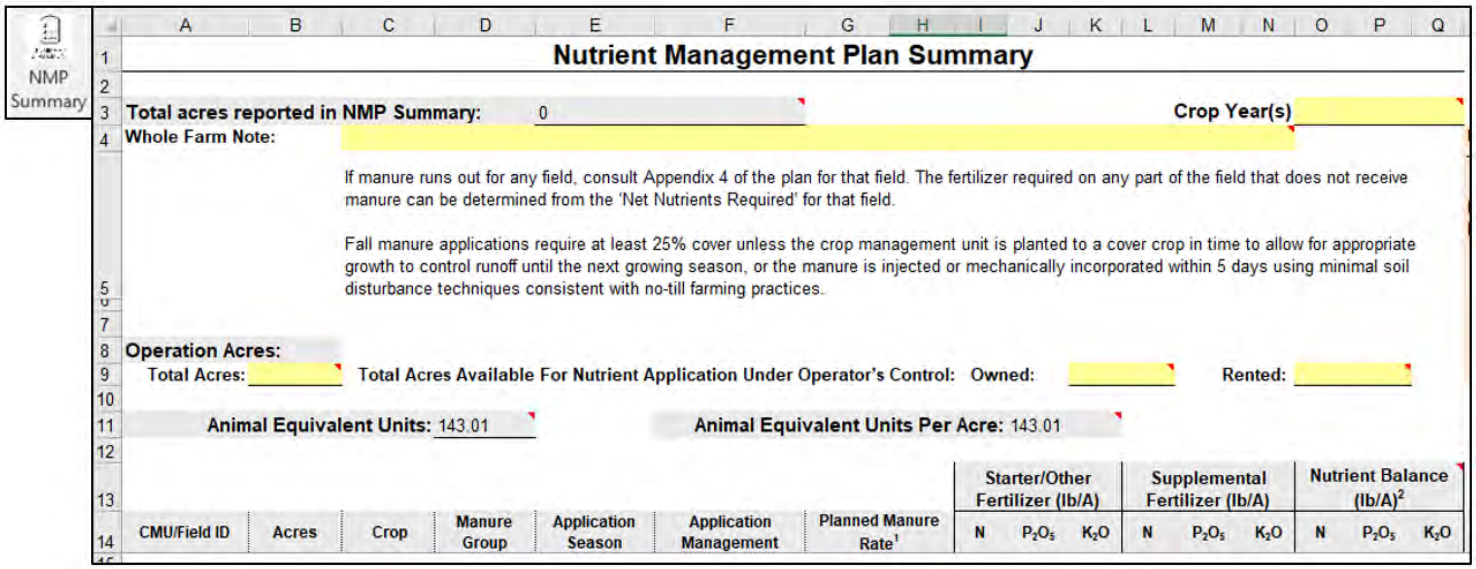
Or just scroll through the tabs until you find it. The tab in the NMP Spreadsheet that looks like this:



How to Complete the NMP Summary and NMP Summary Notes Worksheet

1. Layout and Completion of the NMP Summary worksheet

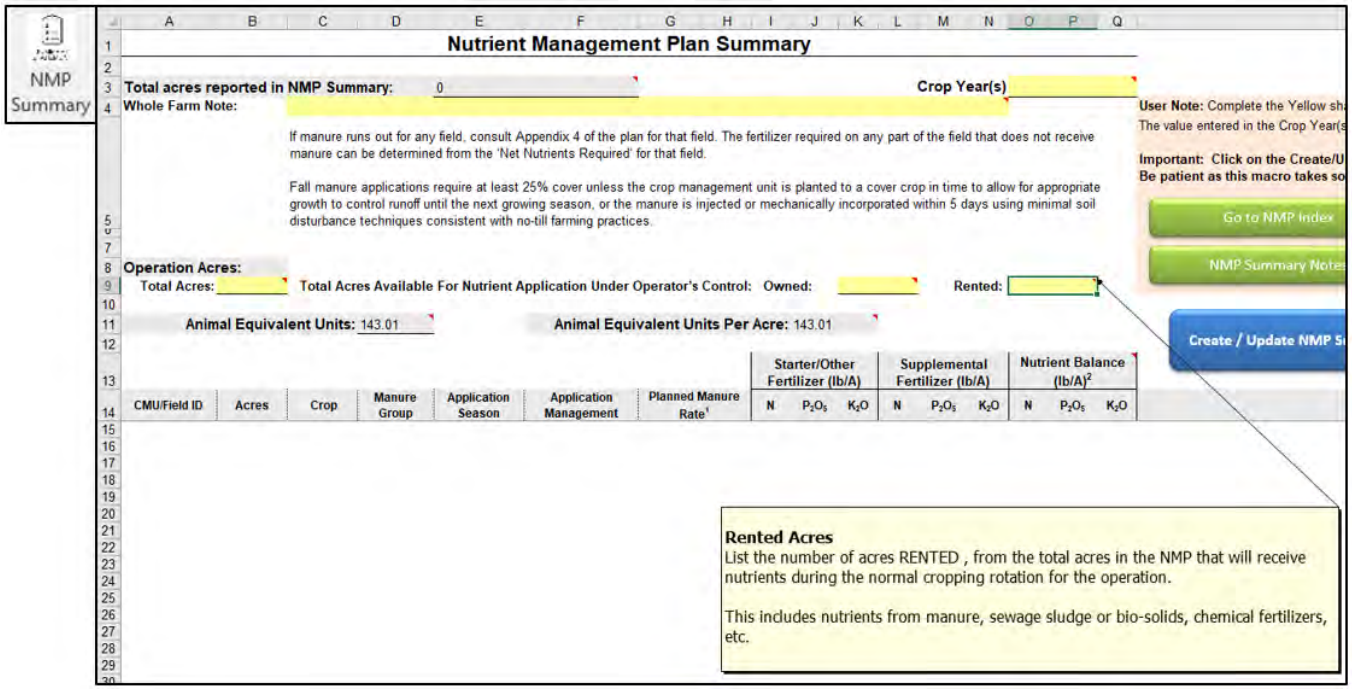
1.1. Layout of the worksheet and overview



Yellow cells are completed with the appropriate information
Grey cells are calculated automatically.
CMU/Field ID information and field summary notes are populated after clicking on the Create/Update Summary Button

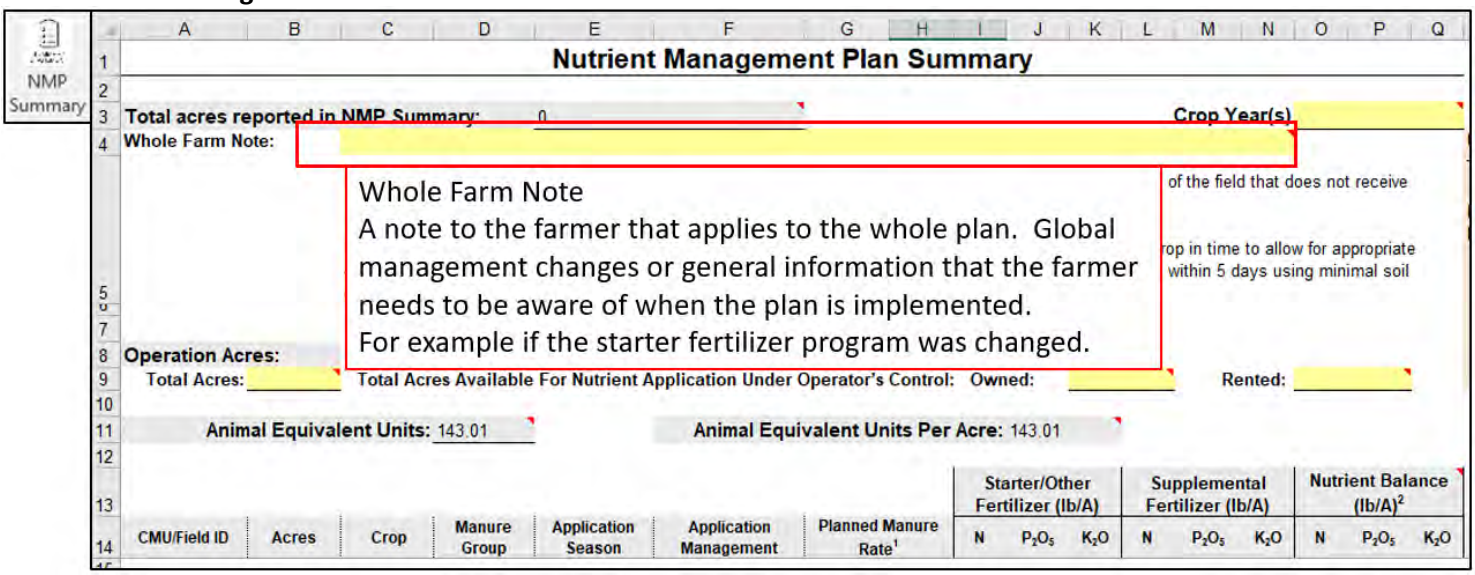
1.2. Cell Information Notes

The cells with red triangles have helpful notes included to help you understand what needs to be entered or what the cell data is used for. For example when you click in the Crop Years cell the following message will appear:



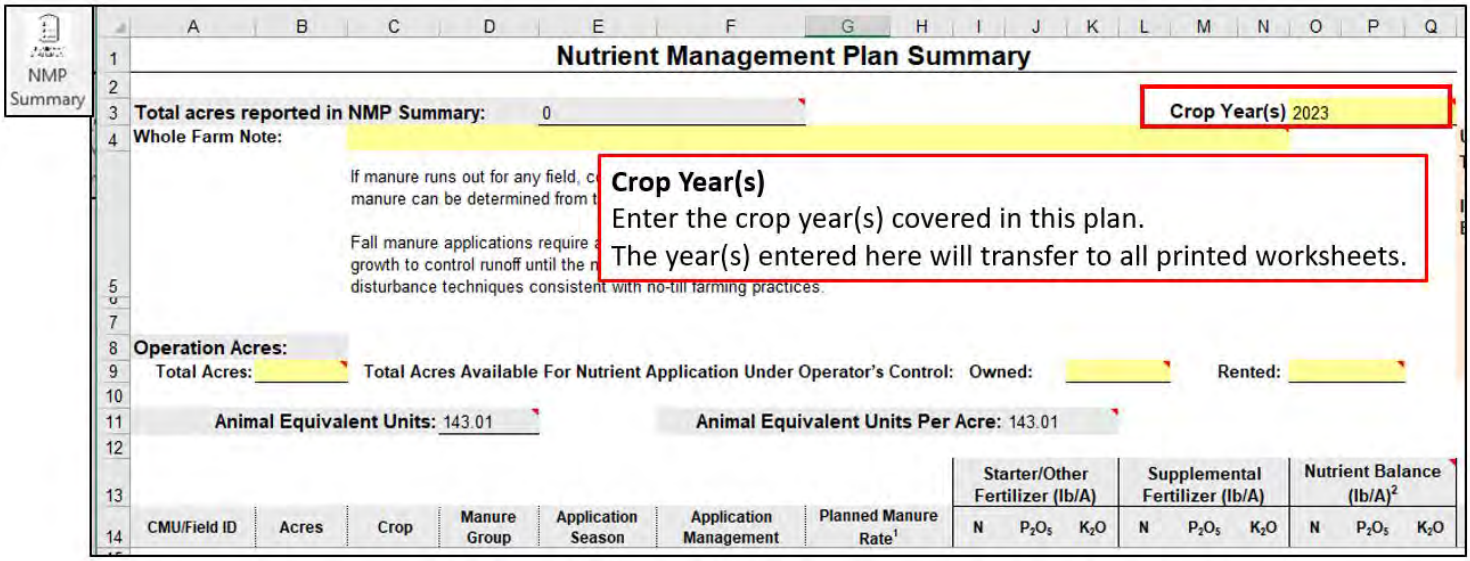
2. Completing the yellow input cells

2.1. Nutrient Management Plan Whole Farm Notes



2.2. Crop Year(s)

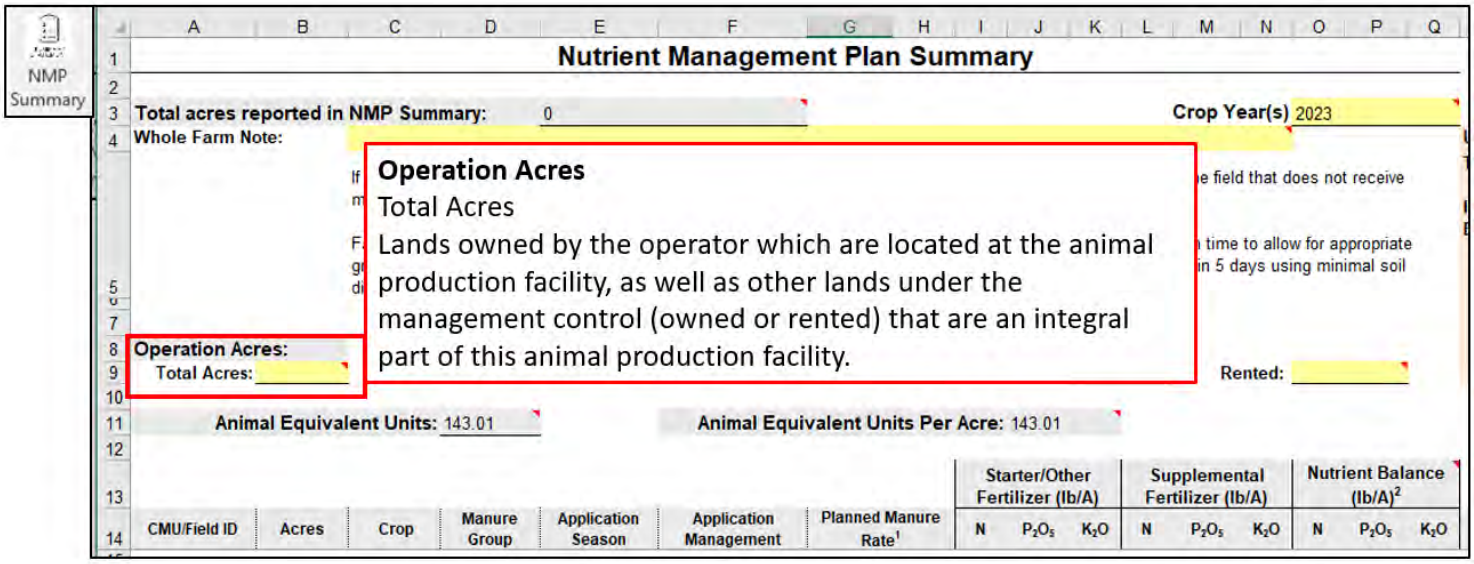
Enter the crop years(s) covered in this plan. The year(s) entered here will transfer to all printed worksheets.



2.3. Operation Total Acres

The NMP is to include all the lands that are an integral part of this animal operation. These lands may be different from those lands counted in the AEU/acre calculation.

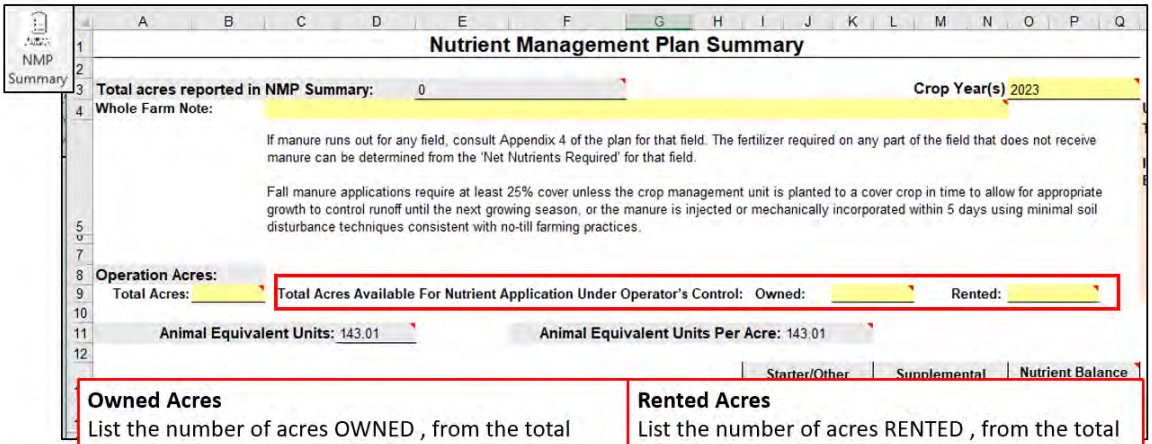
Total Acres



2.4. Total Acres Available For Nutrient Application Under Operator's Control: Owned and Rented

Owned Acres: List the number of acres OWNED, from the total acres in the NMP that will receive nutrients during the normal cropping rotation for the operation. This includes nutrients from manure, sewage sludge or bio-solids, chemical fertilizers, etc.

Rented Acres: List the number of acres RENTED, from the total acres in the NMP that will receive nutrients during the normal cropping rotation for the operation. This includes nutrients from manure, sewage sludge or bio-solids, chemical fertilizers, etc.



Owned Acres
List the number of acres OWNED , from the total acres in the NMP that will receive nutrients during the normal cropping rotation for the operation.

This includes nutrients from manure, sewage sludge or bio-solids, chemical fertilizers, etc.

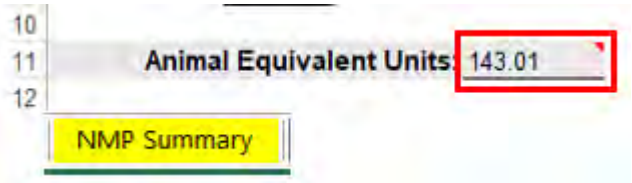
Rented Acres
List the number of acres RENTED , from the total acres in the NMP that will receive nutrients during the normal cropping rotation for the operation.

This includes nutrients from manure, sewage sludge or bio-solids, chemical fertilizers, etc.

How to Complete the NMP Summary and NMP Summary Notes Worksheet

2.5. Animal Equivalent Units

The AEU's shown is the sum of all AEU's from all manure groups from the Appendix 3 Manure Group Information Tab.

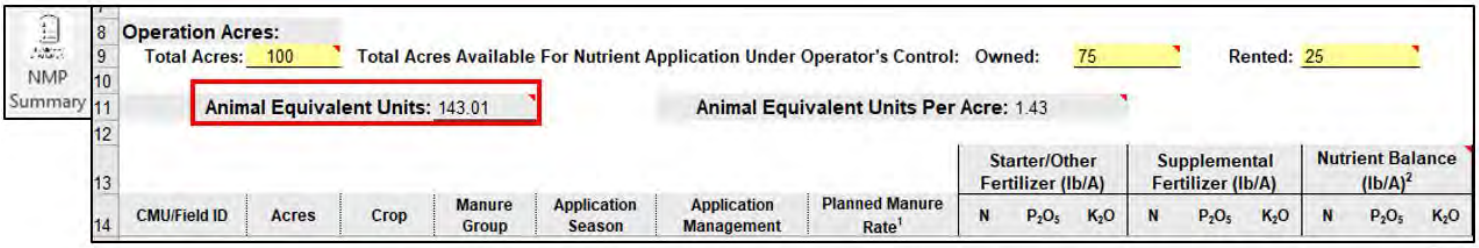


In the example:

The sum of the Cow Fall Liquid and Cow Spring Liquid Manure Group AEU's in Appendix 3 Manure Group Info. Tab divided by the total acres owned and rented in the NMP Summary.

2.6. Animal Equivalent Units per Acre

The AEU's shown is the sum of all AEU's from all manure groups in Appendix 3 Manure Group Info. Tab.



Animal Equivalent Units
The AEU's shown is the sum of all AEU's from all manure groups in Appendix 3 Manure Group Info. Tab.

Appendix 3 Manure Group Information Printed

Appendix 3 Manure Group Information Crop Yrs. 2023	Cow Fall Liquid	Cow Spring Liquid
Manure Report Date (note if averaging several reports)	9/15/2017	3/28/2017
Laboratory Name	AASL	AASL
Manure Type	Dairy	Dairy
Manure Unit (lbs/ton or 1000 gal)	lb/1000 gal	lb/1000 gal
Total Nitrogen (N) (lbs/ton or 1000 gal)	20.5	18.9
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	8.3	7.4
Total Organic N (lbs/ton or 1000 gal)	12.20	11.50
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	10.4	9.6
Total Potash (K_2O) (lbs/ton or 1000 gal)	18.2	16.8
Percent Solids	5.5	6.7
PSC Value (analytical or book value)	0.8	0.8
Percent Moisture	94.50	93.30
Manure Group AEU's	71.51	71.51

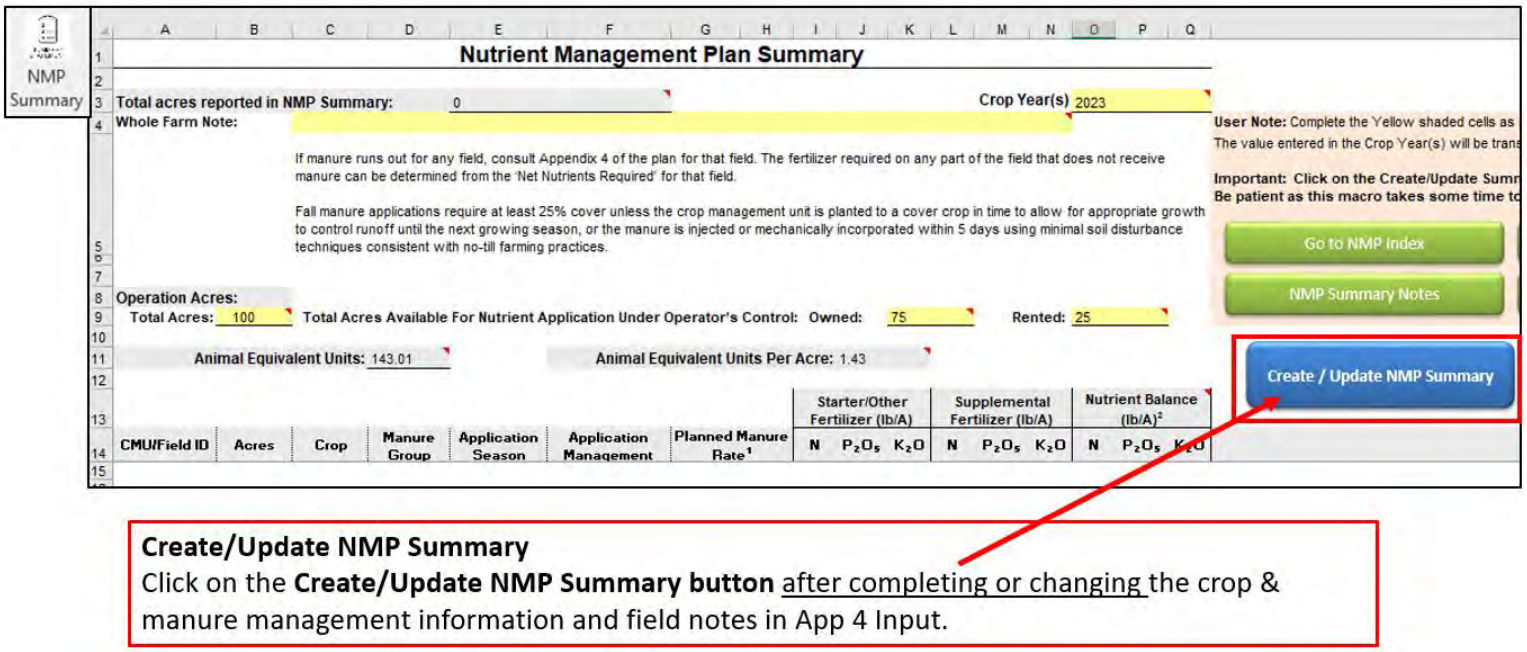
Animal Equivalent Units
= 71.51 AEU's Cow Fall Liquid Manure Group + 71.51 AEU's Cow Spring Liquid Manure
143.02 AEU's
100 Acres(75 owned + 25 rented)

= 143.02 Aeu's ÷ 100 Acres = **1.43 AEU's per Acre**

2.7. Populating the NMP Summary and Summary Notes

Click on the Create/Update NMP Summary button after completing or changing the crop & manure management information and field notes in App 4 Input. This will populate or fill in the NMP Summary and the NMP Summary Notes worksheets.

After the Summary is updated the Total Acres reported in the summary will be populated automatically.



Create/Update NMP Summary
Click on the **Create/Update NMP Summary button** after completing or changing the crop & manure management information and field notes in App 4 Input.

How to Complete the NMP Summary and NMP Summary Notes Worksheet

NMP Summary

Nutrient Management Plan Summary

Total acres reported in NMP Summary: 37.0 **Crop Year(s)** 2023

Whole Farm Note:

If manure runs out for any field, consult Appendix 4 of the plan for that field. The fertilizer required on any part of the field that does not receive manure can be determined from the 'Net Nutrients Required' for that field.

Fall manure applications require at least 25% cover unless the crop management unit is planted to a cover crop in time to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

Operation Acres:

Total Acres: 100 **Total Acres Available For Nutrient Application Under Operator's Control: Owned:** 75 **Rented:** 25

Animal Equivalent Units: 143.01 **Animal Equivalent Units Per Acre:** 1.43

CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]		Starter/Other Fertilizer (lb/A) N	Starter/Other Fertilizer (lb/A) P_2O_5	Starter/Other Fertilizer (lb/A) K_2O	Supplemental Fertilizer (lb/A) N	Supplemental Fertilizer (lb/A) P_2O_5	Supplemental Fertilizer (lb/A) K_2O	Nutrient Balance (lb/A)[2] N	Nutrient Balance (lb/A)[2] P_2O_5	Nutrient Balance (lb/A)[2] K_2O
A1	5	Corn for Silage	Cow Fall Liquid	Early Fall	Early Fall: Summer utilization with no cover crop; All methods of incorporation	3900	gal/A	4	12	4	0	0	0			
A1	5	Corn for Silage	Cow Fall Liquid	Spring	Spring: Spring or summer utilization- Incorporation after 7 days or none	3900	gal/A	0	0	0	84	0	0	0	-94	-126
A2	4	Established Mixed Grasses	Cow Spring Liquid	Spring	Spring: Spring or summer utilization- Incorporation after 7 days or none	3900	gal/A	0	0	0	0	0	0			
A2	4	Established Mixed Grasses	Cow Spring Liquid	Summer	Summer: Summer utilization- Incorporation after 7 days or none	3900	gal/A	0	0	0	185	0	0	0	-74	-52

Positive numbers represent nutrient deficit values and Negative numbers represent nutrient excess values.

2.8. NMP Summary Notes

Remember the NMP Summary Notes is transferred from the Appendix 4 Input Sheet. Nothing is entered in this worksheet.

NMP Summary Notes

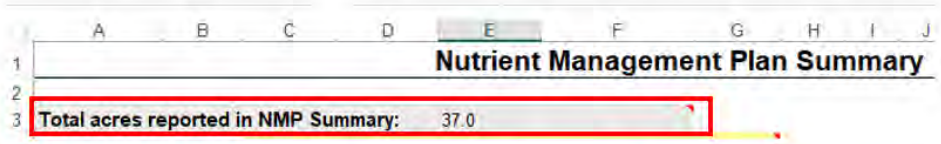
NMP Summary Notes

Crop Years 2023

CMU/Field ID	Notes
A1	
A1	
A2	
A2	
A3	
A3	
A4	25% Ground cover must be present for winter application.
A4	
A5	
A6	
A7	drys cow are grazed from April to September with 24 hr unrestriced access and are fed and watered at the barn.
A7	dry cows are grazed October with 24 hr unrestriced access and are fed and watered at the barn.

2.9. Total acres reported in NMP Summary

This cell is filled in after you click on the Create/Update Summary button. The Total Acres reported is a sum of all the fields entered into App 4 Input sheet. Double cropped fields and fields with multiple manure applications are counted only once if they are completed correctly.

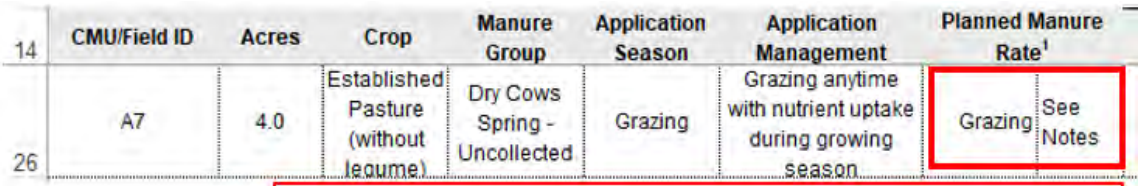


	A	B	C	D	E	F	G	H	I	J
1					Nutrient Management Plan Summary					
2										
3	Total acres reported in NMP Summary:				37.0					

The Total Acres reported is a sum of all the fields entered into App 4 Input sheet. It is filled in after you click on the Create/Update Summary button. Double cropped fields and fields with multiple manure applications are counted only once if they are completed correctly.

2.10. Planned Manure Rates on fields with Grazing

Notice the planned manure rate for uncollected manure from animal on pasture states “Grazing See Notes”. The amount of uncollected manure is based on the days and hours /day on pasture. This information will be transferred from where it was entered in App 4 Input to the NMP Summary Notes.

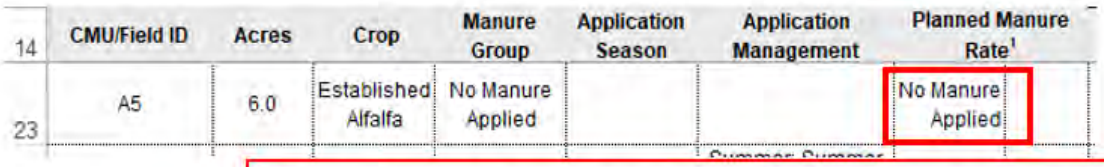


14	CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]	
26	A7	4.0	Established Pasture (without legume)	Dry Cows Spring - Uncollected	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	See Notes

Planned Manure Rates for grazing animals will be listed as “Grazing See Notes”

2.11. Planned manure rate when no manure is applied

If no manure is planned to be applied to a field. The recommended guidance is to enter a zero in App 4 Input. If it is zero or left blank in App 4 Input, the planned manure rate will state “No Manure Applied”.



14	CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]	
23	A5	6.0	Established Alfalfa	No Manure Applied			No Manure Applied	

If the planned manure rate entered in App 4 Input is blank or zero then “No manure Applied”, will be displayed.

Prepared by Don Orner | Research Technologist | Penn State Extension – Nutrient Management

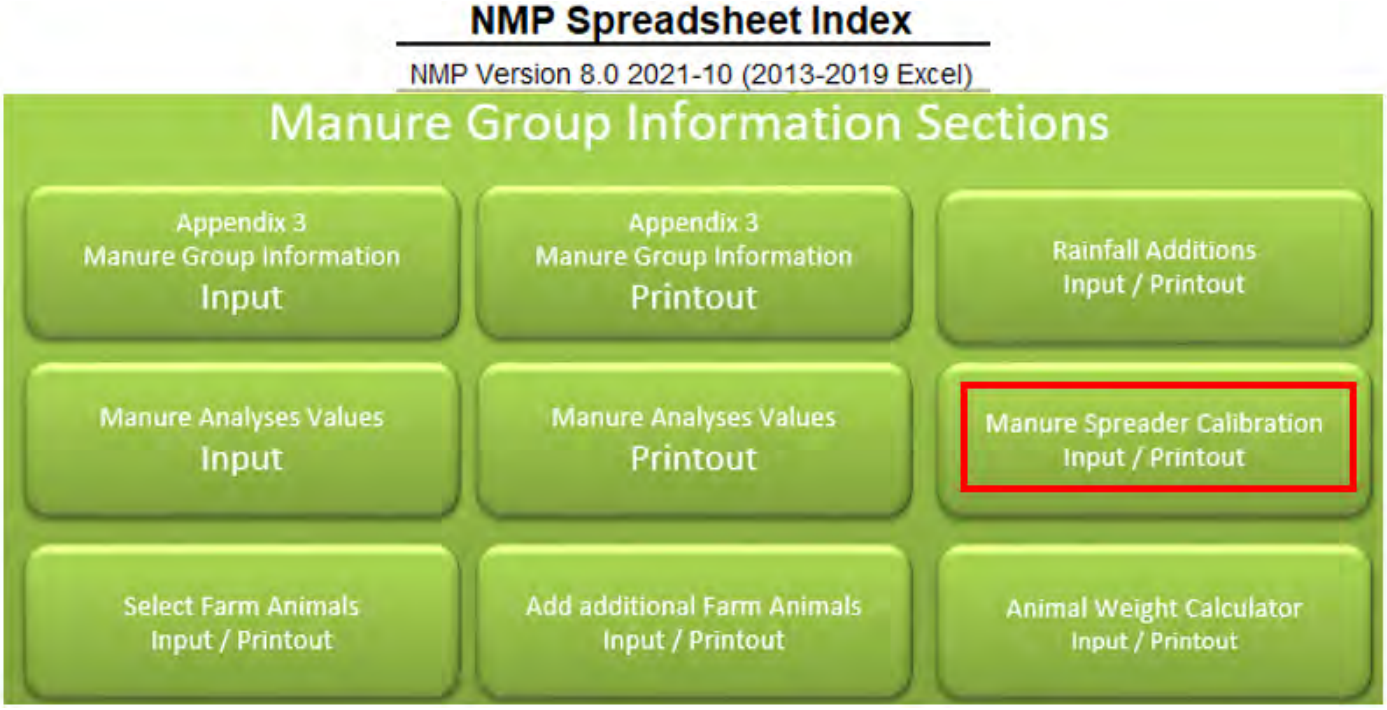
How to Complete the Manure Spreader Calibration Table

Purpose and Overview:

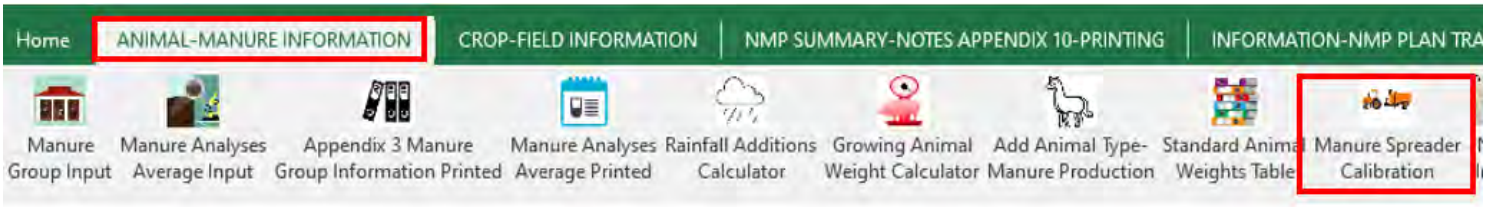
This procedure provides an overview and details how to complete the Manure Spreader Calibration Table.

The Manure Spreader Calibration worksheet requires data entry so it has a yellow colored sheet tab in the NMP Excel workbook.

You can find the Manure Spreader Calibration Worksheet by looking in the Manure Group Information Section in the NMP Spreadsheet Index



Or look for the toolbar ribbon at Animal-Manure Information the top of your screen. The Manure Spreader Calibration Icon looks like this:

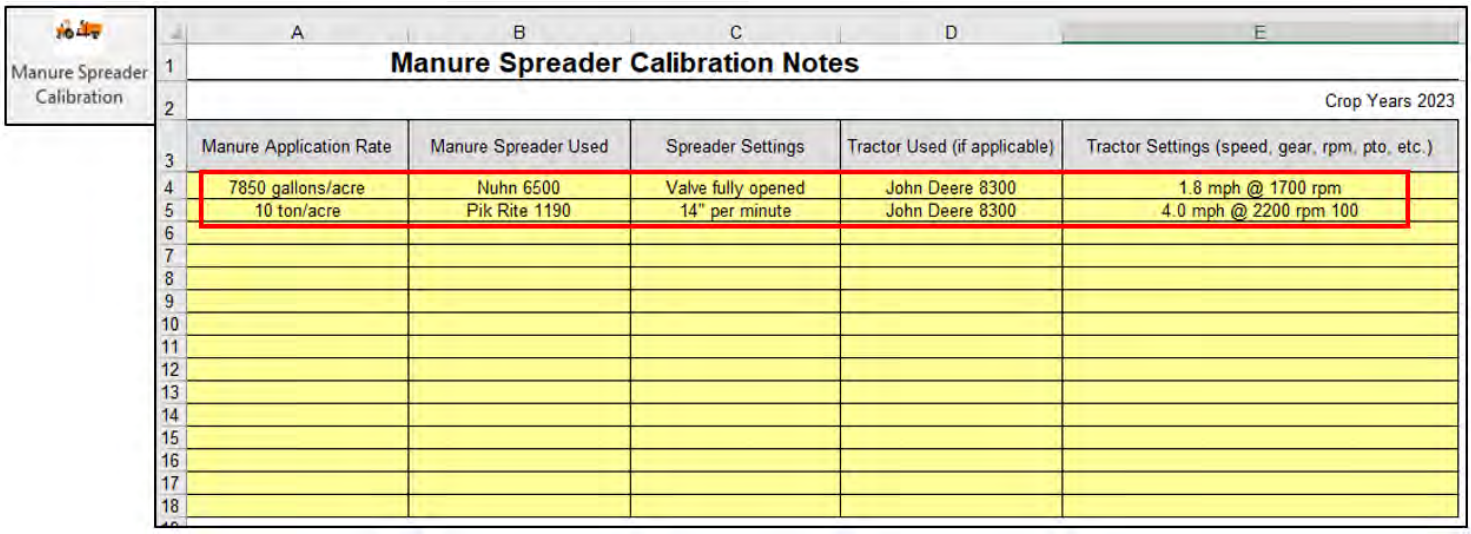


How to Complete the Manure Spreader Calibration Table

1. Layout and Completion of the Manure Spreader Calibration Table

For each planned manure application rate listed in the nutrient management plan the equipment and settings used to obtain that calibrated rate are recorded in the table.

The “Manure Spreader Calibration Notes” table provides an accessible reference for the farmer or other applicators to use to find the appropriate equipment and settings used to achieve the various manure application rates included in the nutrient management plan.



	A	B	C	D	E
1	**Manure Spreader Calibration Notes**				
2					Crop Years 2023
3	Manure Application Rate	Manure Spreader Used	Spreader Settings	Tractor Used (if applicable)	Tractor Settings (speed, gear, rpm, pto, etc.)
4	7850 gallons/acre	Nuhn 6500	Valve fully opened	John Deere 8300	1.8 mph @ 1700 rpm
5	10 ton/acre	Pik Rite 1190	14" per minute	John Deere 8300	4.0 mph @ 2200 rpm 100
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

The Crop Years is automatically transferred from the NMP Summary.

The same table is printed out for submission with the Nutrient Management Plan.

Prepared by Don Orner | Research Technologist | Penn State Extension – Nutrient Management

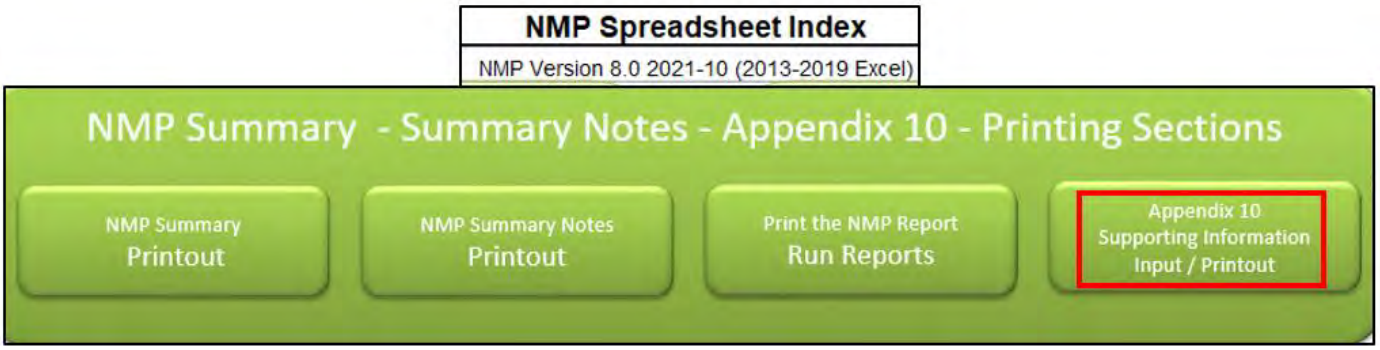
How to Complete Appendix 10 Supporting Information

Purpose and Overview:

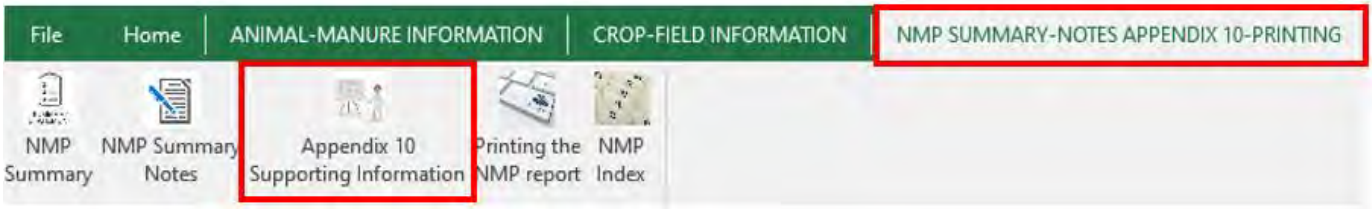
This procedure provides an overview and details how to use the Appendix 10 Supporting Information Page.

The Appendix 10 page is to be printed and can also be used to provide a cover page to place supplemental information or to record information relevant to the nutrient management plan.

You can find the Appendix 10 Supporting Information Worksheet page by looking in the NMP Summary – Summary Notes – Appendix 10 – and Printing section of the NMP Spreadsheet Index

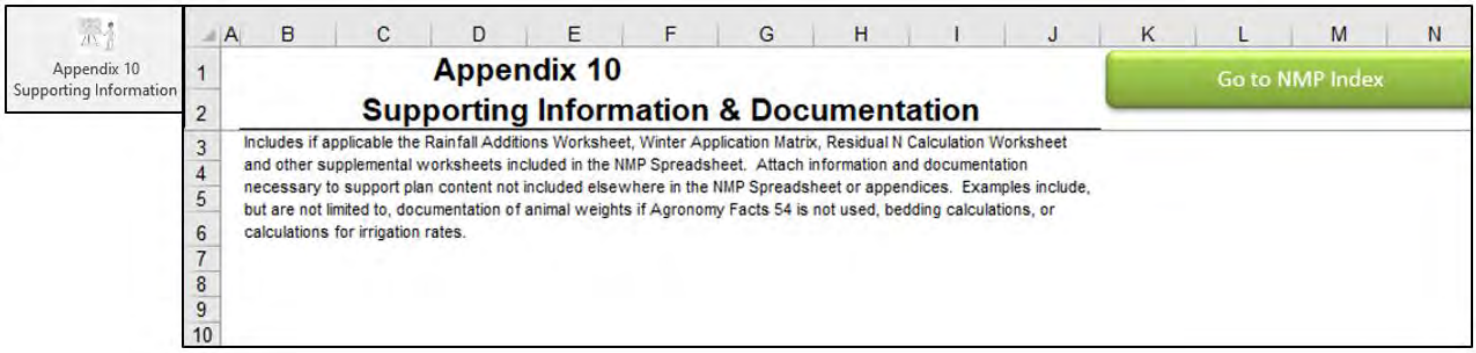


Or look for the toolbar ribbon at the top of your screen. The Appendix 10 Supporting Information Icon looks like this:



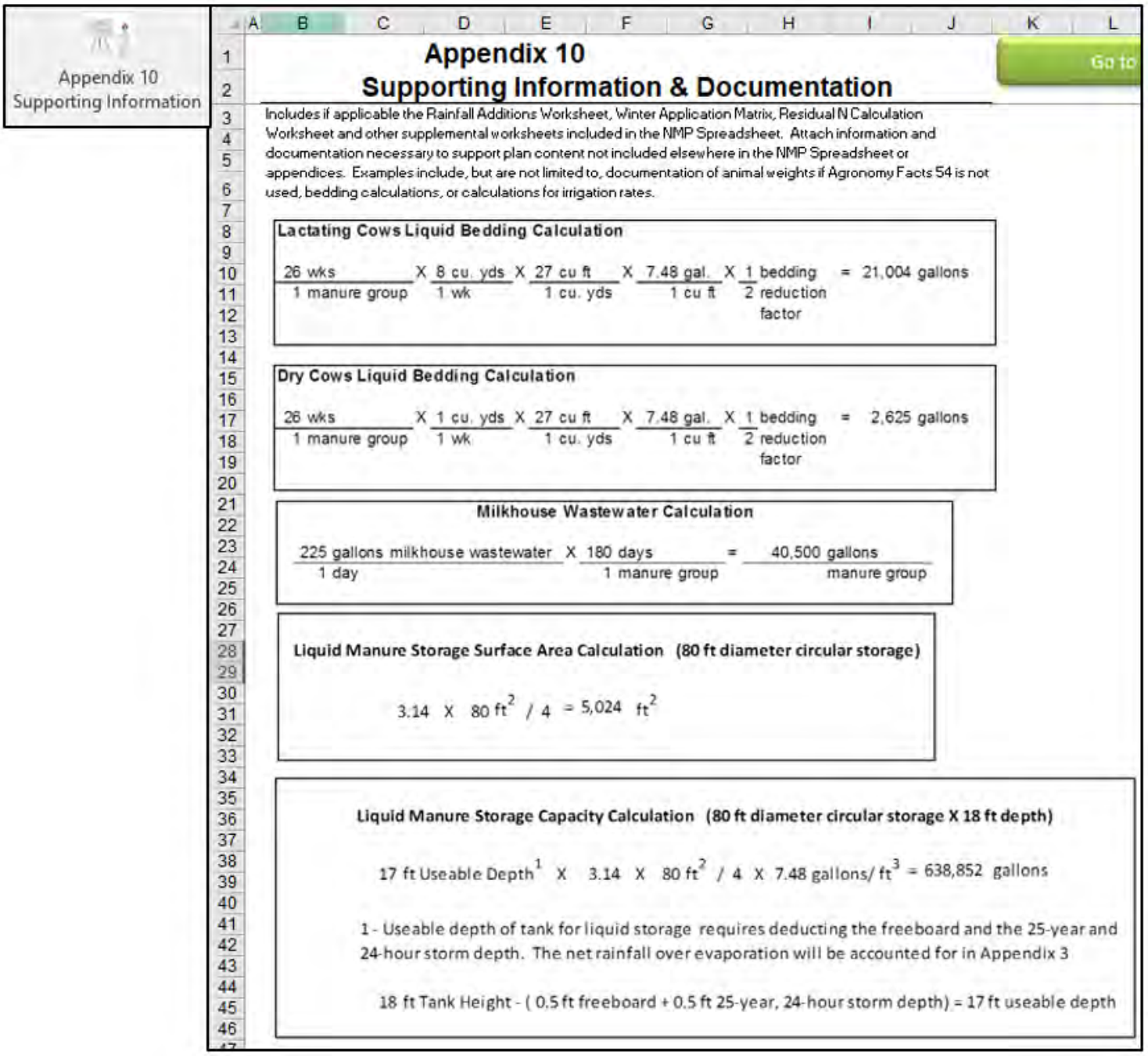
1. Layout and Completion of the Appendix 10 Supporting Information

The Appendix 10 Excel worksheet is to be printed as a cover page for supporting information. Information to be included in in Appendix 10 includes if applicable the Rainfall Additions Worksheet, Winter Application Matrix, Residual N Calculation Worksheet and other supplemental worksheets included in the NMP Spreadsheet. Attach information and documentation necessary to support plan content not included elsewhere in the NMP Spreadsheet or appendices. Examples include, but are not limited to, documentation of animal weights if Agronomy Facts 54 is not used, bedding calculations, or calculations for irrigation rates.



How to Complete Appendix 10 Supporting Information

Appendix 10 worksheet is unlocked and can be used to for if desired. The page printout area may need to be defined by the planner if an area larger than is shown below is used.



How to Print the Excel NMP Sections

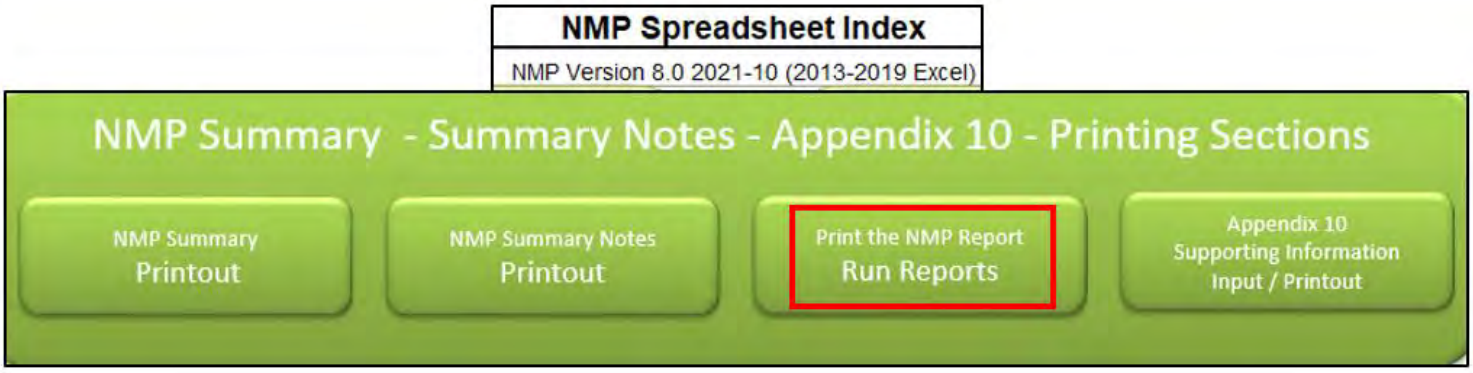
Purpose and Overview:

The NMP Word document is printed like any other Word document. This procedure provides an overview and details how to print the NMP sections in the Excel file. Printing of NMP Appendices 3, 4, 5, Winter Manure Application Matrix and associated worksheets is completed using a print macro. The print macro will determine how much of each section is completed and only print the completed portions of each Section.

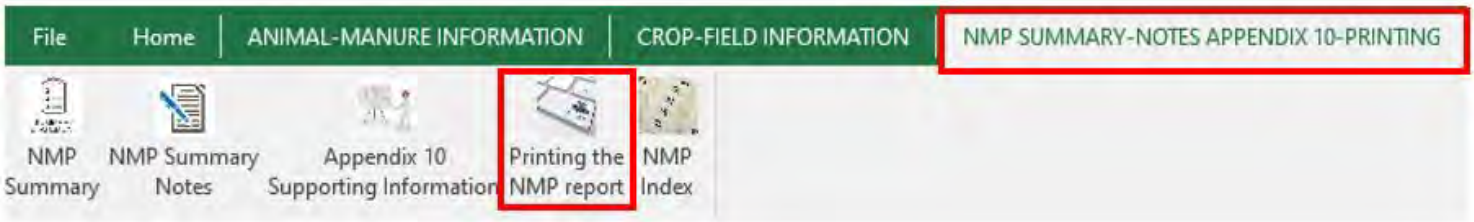
For example, if Appendix 3 Manure Group Information section has six manure groups and 5 animal groups completed then only the completed manure groups and relevant animal groups will be printed. If the Appendix 4 Crop and Field Information section has 319 fields completed, then only the 319 completed fields will be printed. Smaller associated worksheets such as the user added crop page will only fill just a single page.

Don't try to print the individual worksheets from the respective pages. This will not set the print areas to include all completed entries in each section

You can find the Print Worksheet page by looking in the NMP Summary – Summary Notes – Appendix 10 – and Printing section of the NMP Spreadsheet Index



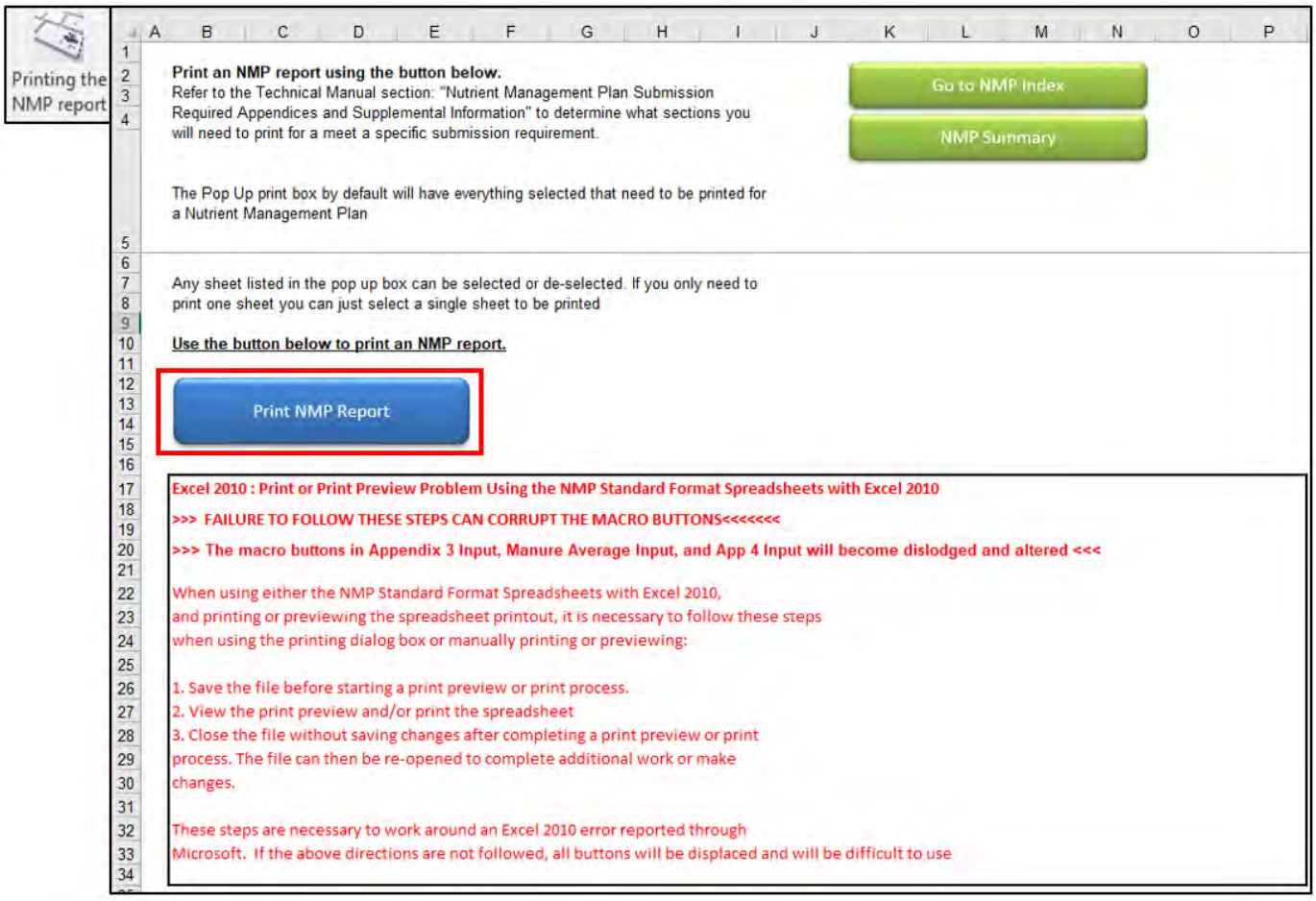
Or look for the toolbar ribbon at the top of your screen. The Print NMP Report Icon looks like this:



How to Print the Excel NMP Sections

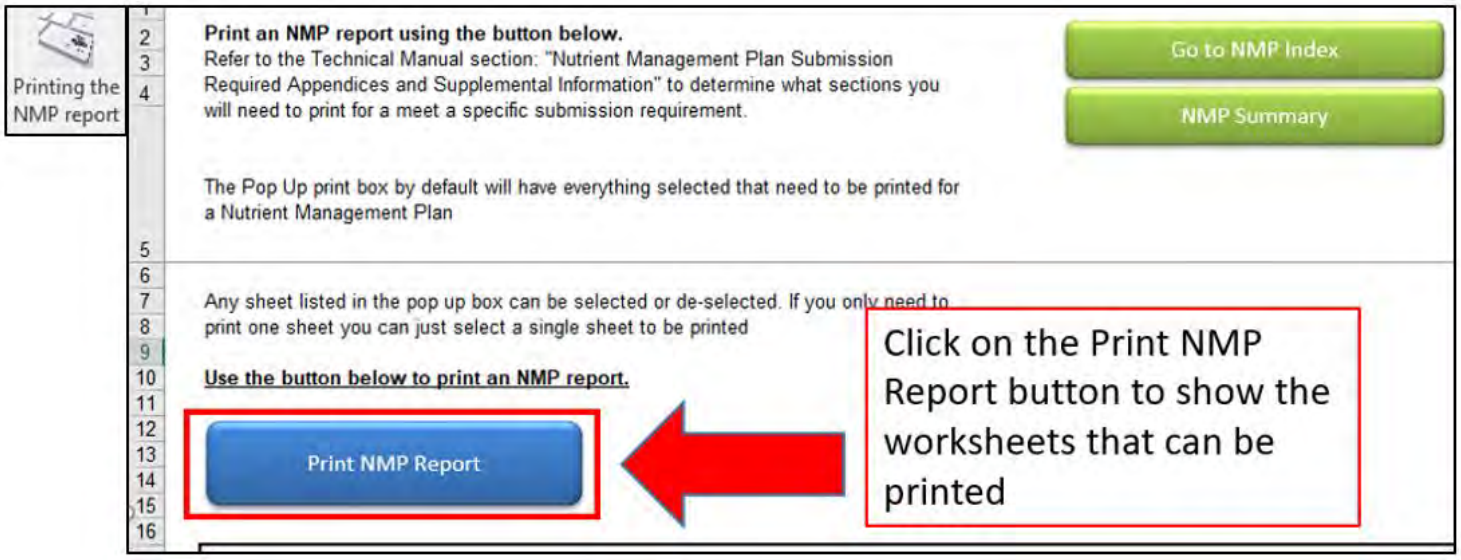
1. Layout and Completion of the Print NMP Report Page

The report printing page is very simple to use. There are user notes and a Print NMP Report Button to initiate the print macro.



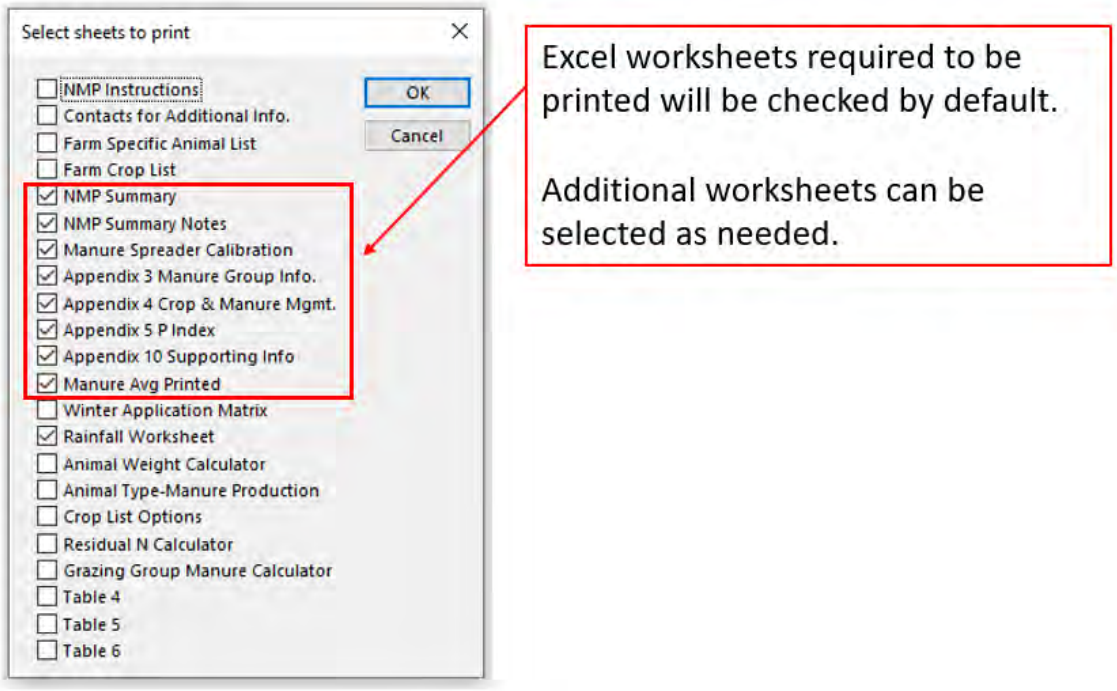
2. Procedure to print the Excel Section of a NMP

2.1. Click on the Print NMP Report button to show the worksheets that can be printed.



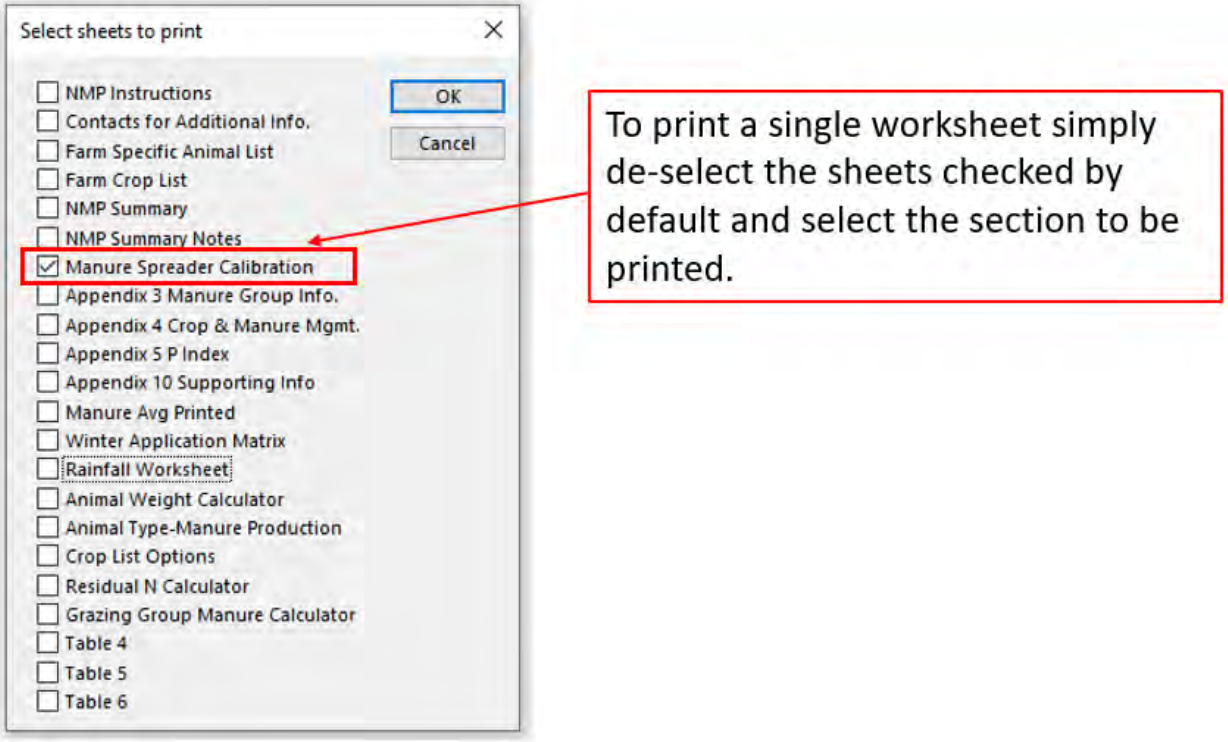
2.2. Selecting the worksheets to print

After clicking the button, it will update the NMP Summary. A pop up box will then appear and list all worksheets available for printing. Excel worksheets required to be printed for the first year submission are already checked by default.



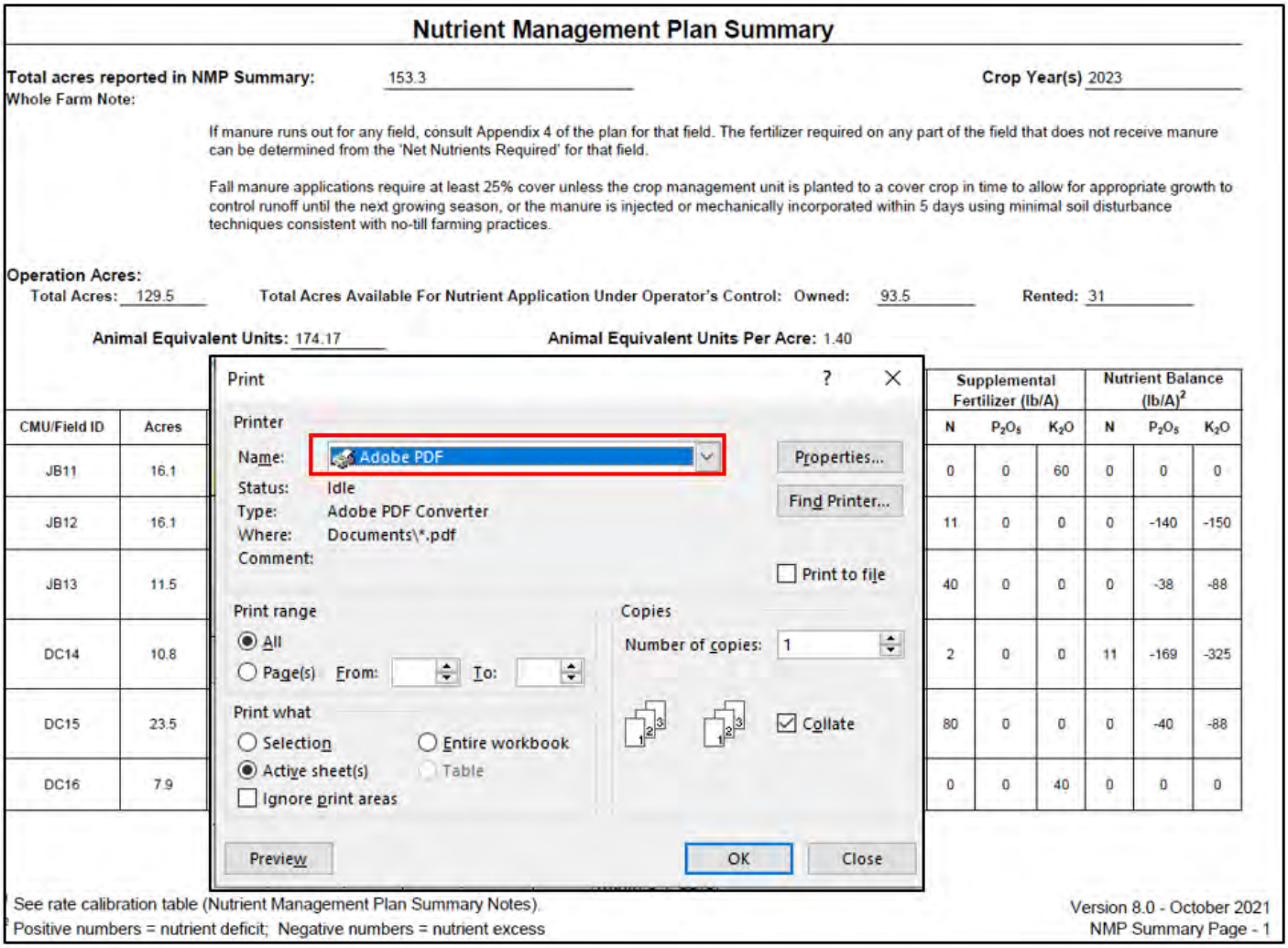
2.3. Printing a single worksheet

If a particular section was updated, then that section can be printed by itself by just selecting the particular worksheet to be printed and de-selecting the sections that don't need to be printed.



2.4. Printing

The best practice is to print the Excel worksheets as a pdf. Then send the PDF file of the NMP to the printer. This is because all print drivers are slightly different in sizing the worksheets for printing. Some print drivers will cause the row and column breaks to vary and inadvertently push columns onto a second page.

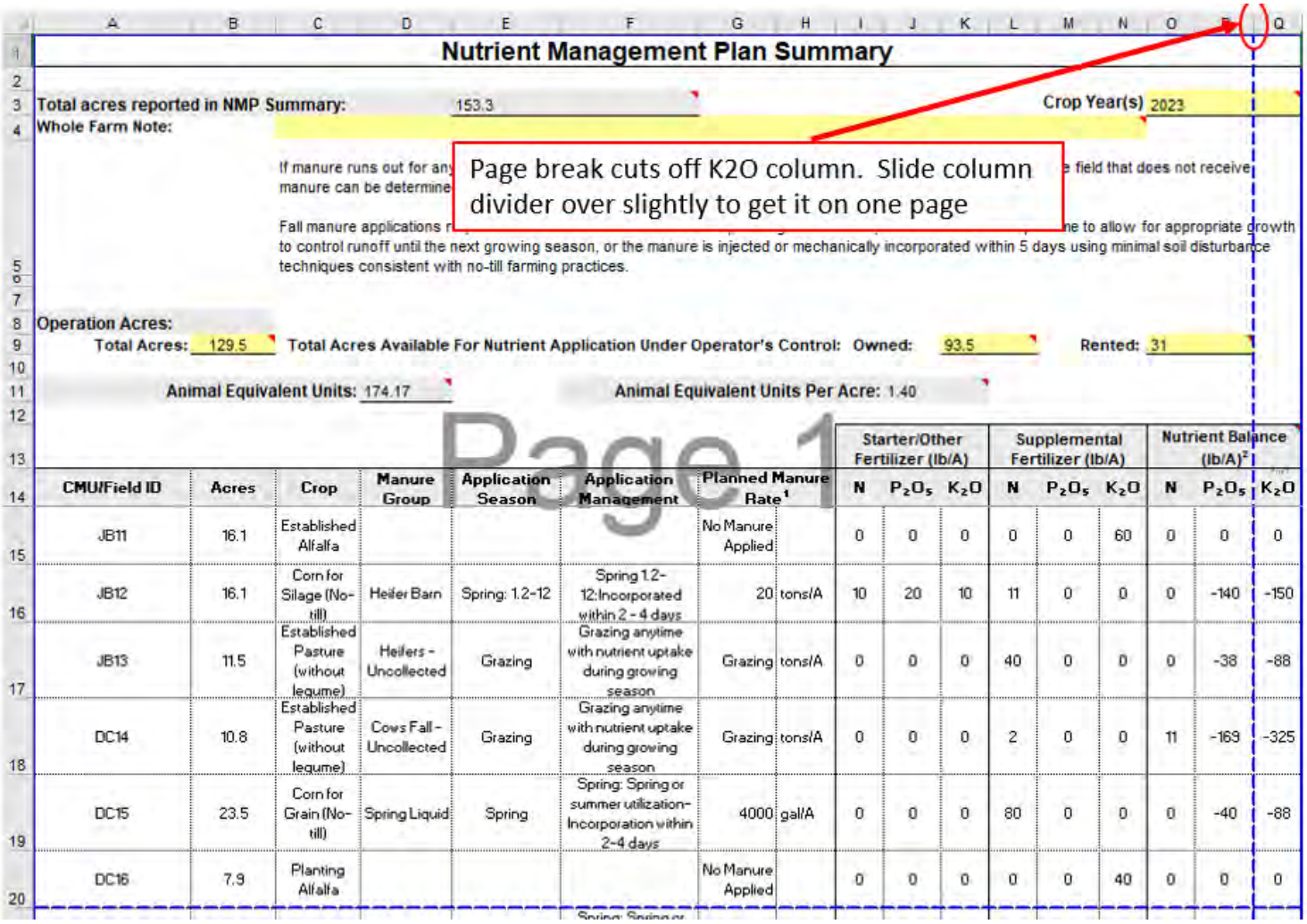


2.5. Possible Printing issues

Some print drivers will cause the row and column breaks to vary and inadvertently push columns onto a second page. As a last resort try tweaking row width. (be very cautious when doing this.)

Rows and Columns widths can be tweaked to fit on a page. In the example below, the K2O column is cut off the page. The column divider can be slightly adjusted to get back on one page. Contact me if you have page break issues and need help.

Remember that If you print the pages as a PDF then print the PDF file you should not have this issue.



Nutrient Management Plan Summary

Total acres reported in NMP Summary: 153.3 **Crop Year(s)** 2023

Whole Farm Note:

If manure runs out for any field that does not receive manure can be determine

Fall manure applications ... to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

Operation Acres:

Total Acres: 129.5 **Total Acres Available For Nutrient Application Under Operator's Control: Owned:** 93.5 **Rented:** 31

Animal Equivalent Units: 174.17 **Animal Equivalent Units Per Acre:** 1.40

Page 1

								Starter/Other Fertilizer (lb/A)			Supplemental Fertilizer (lb/A)			Nutrient Balance (lb/A)[2]		
CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]		N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
JB11	16.1	Established Alfalfa				No Manure Applied		0	0	0	0	0	60	0	0	0
JB12	16.1	Corn for Silage (No-till)	Heifer Barn	Spring: 1.2-12	Spring 1.2-12:Incorporated within 2 - 4 days	20	tons/A	10	20	10	11	0	0	0	-140	-150
JB13	11.5	Established Pasture (without legume)	Heifers - Uncollected	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	tons/A	0	0	0	40	0	0	0	-38	-88
DC14	10.8	Established Pasture (without legume)	Cows Fall - Uncollected	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing	tons/A	0	0	0	2	0	0	11	-169	-325
DC15	23.5	Corn for Grain (No-till)	Spring Liquid	Spring	Spring: Spring or summer utilization-Incorporation within 2-4 days	4000	gal/A	0	0	0	80	0	0	0	-40	-88
DC16	7.9	Planting Alfalfa				No Manure Applied		0	0	0	0	0	40	0	0	0

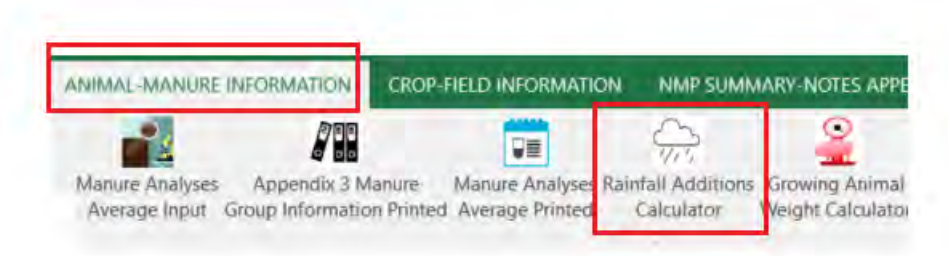
How to Complete the Rainfall Additions Calculator

Purpose:

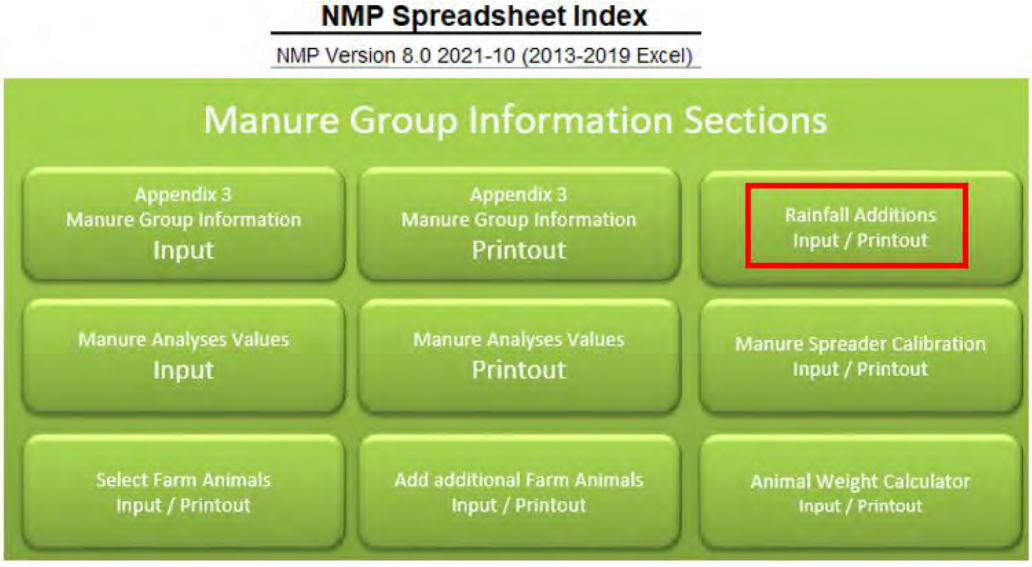
This procedure describes how to complete the optional Rainfall Additions Calculator in the Nutrient Management Plan (NMP) spreadsheet. This worksheet will calculate the amount of rainfall or runoff contributing to a manure storage group.

Whether or not you need to use this worksheet will be addressed when you complete the manure group information, (Appendix 3 Input) section. Only liquid manure groups receiving rainfall or runoff and using the "Calculated" inventory method will have the rainfall additions added to the manure group.

This particular worksheet can be accessed by selecting the Animal-Manure Information tab then Rainfall Additions icon on the toolbar ribbon. The tab in the NMP Spreadsheet that looks like this:



Or you can find it using the hyperlink in the NMP spreadsheet Index:



Procedure

1. Determine if the Rainfall Worksheet needs to be completed when completing Appendix 3 Input

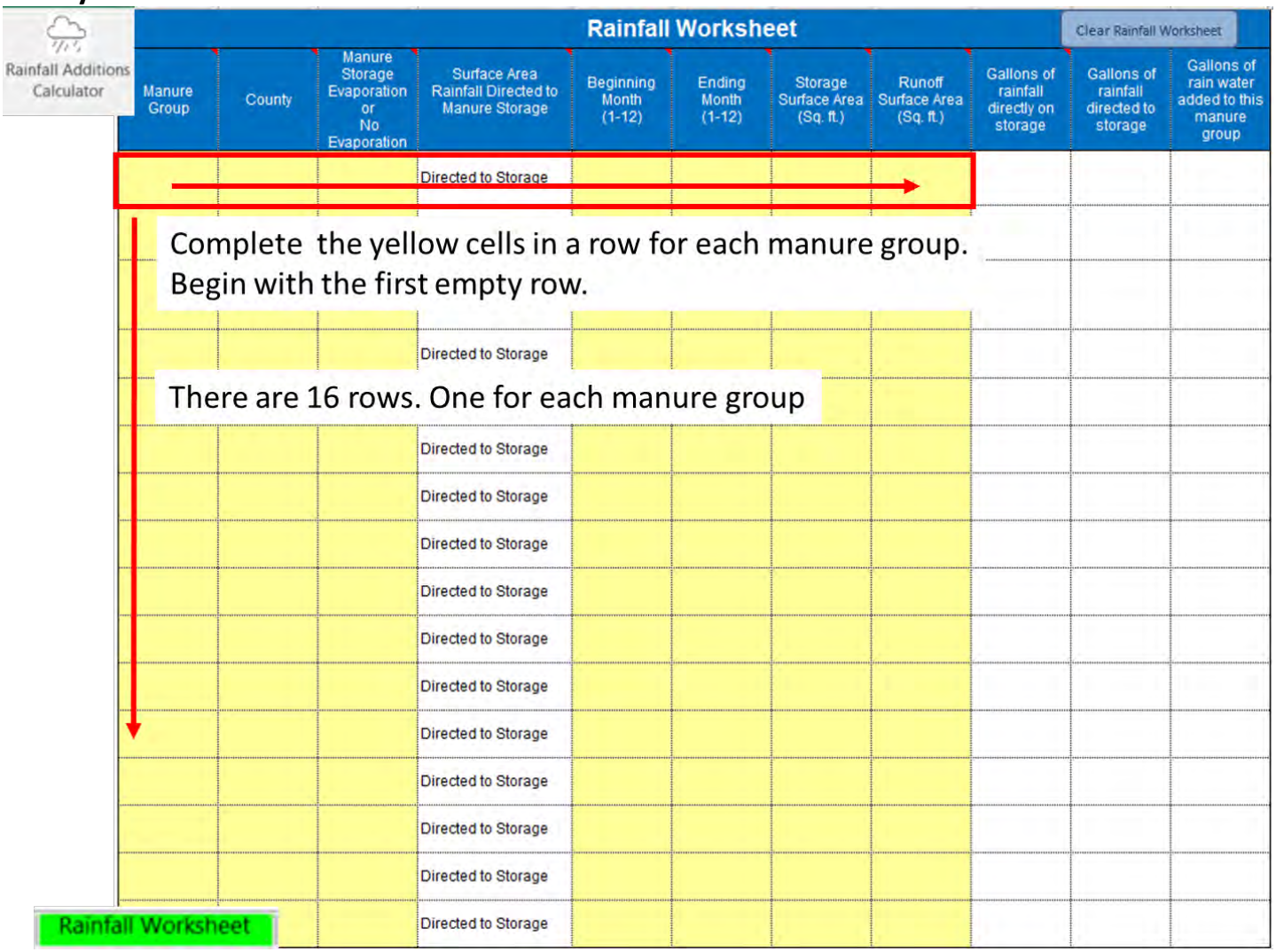
Only manure groups that meet the following criteria need the rainfall worksheet completed.

- The Inventory Method selected is “Calculated”
- The liquid manure storage facility receives and retains rainfall or surface runoff is directed to the manure storage facility.

Manure Groups stored as a solid (manure unit designation of lb/ton) won’t have rainfall amounts calculated.

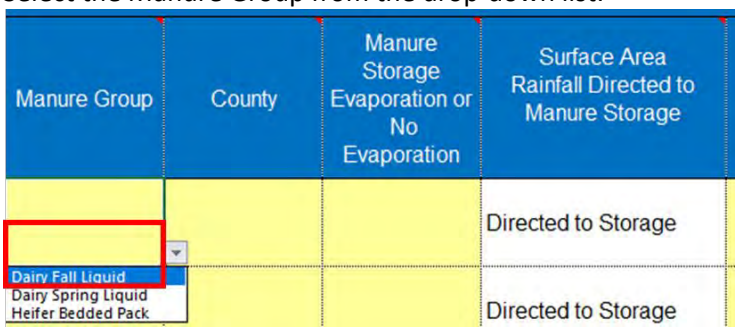
If the manure storage inventory method is calculated and will directly receive rainfall or surface runoff, then complete the Rainfall Worksheet.

2. Layout of the Rainfall worksheet

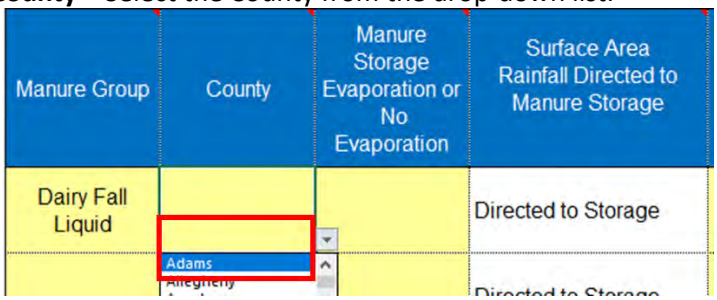


3. Complete the Rainfall Worksheet

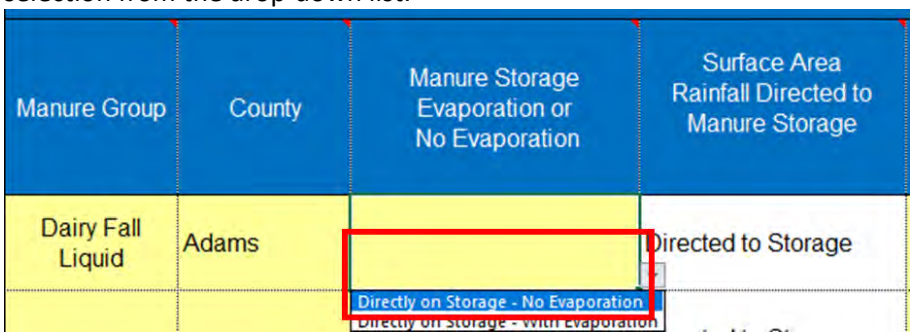
3.1. Select the Manure Group from the drop-down list.



3.2. **County** – Select the County from the drop-down list.

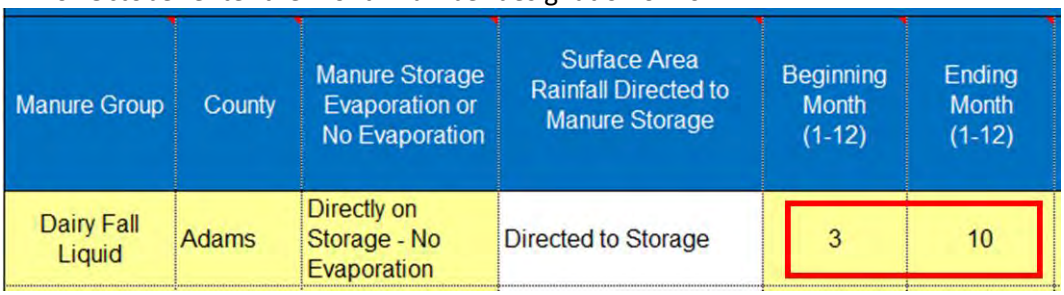


3.3. **Manure Storage Evaporation or No Evaporation** – Select the applicable Evaporation or No Evaporation selection from the drop-down list.



3.4. **Beginning / Ending Months** – Enter the manure group beginning and ending months (numeric number) of the collection period. In this example the manure group is applied in the Fall and the collection period is from March to October.

For March enter the month number designation of 3
For October enter the month number designation of 10



3.5. Storage Surface Area – Calculate and enter the storage surface area. In this example it is a circular storage and has a diameter of 80 ft.
The surface area of a circle is determined by the formula: $\pi * R^2$ or 3.14 X 40 X 40 = 5,024 ft^2. The gallons of rainfall are automatically calculated after the number is typed and you press the enter key. Additional information for calculating storage surface area can be found in the Nutrient Management Technical Manual, Supplement 8

Manure Group	County	Manure Storage Evaporation or No Evaporation	Surface Area Rainfall Directed to Manure Storage	Beginning Month (1-12)	Ending Month (1-12)	Storage Surface Area (Sq. ft.)
Dairy Fall Liquid	Adams	Directly on Storage - No Evaporation	Directed to Storage	3	10	5,024

3.6. Runoff Surface Area – Calculate and enter the runoff surface area. In this example a 75 ft by 75 ft paved dry lot is directed to the manure storage. The surface area calculation is 75 X 75 = 5625 ft^2. The gallons of rainfall is automatically calculated after the number is typed and you press the enter key.
Additional information of calculating storage surface area can be found in the Nutrient Management Technical Manual, Supplement 8

Manure Group	County	Manure Storage Evaporation or No Evaporation	Surface Area Rainfall Directed to Manure Storage	Beginning Month (1-12)	Ending Month (1-12)	Storage Surface Area (Sq. ft.)	Runoff Surface Area (Sq. ft.)
Dairy Fall Liquid	Adams	Directly on Storage - No Evaporation	Directed to Storage	3	10	5,024	5,625

3.7. Rainfall Results
The gallons of rainfall contributing to the manure group will be displayed. This information is automatically transferred to the Appendix 3 Manure Group Information sections.

Manure Group	County	Manure Storage Evaporation or No Evaporation	Surface Area Rainfall Directed to Manure Storage	Beginning Month (1-12)	Ending Month (1-12)	Storage Surface Area (Sq. ft.)	Runoff Surface Area (Sq. ft.)	Gallons of rainfall directly on storage	Gallons of rainfall directed to storage	Gallons of rain water added to this manure group
Dairy Fall Liquid	Adams	Directly on Storage - No Evaporation	Directed to Storage	3	10	5,024	5,625	101,653	63,638	165,291

3.8. Returning to Appendix 3 Input Sheet – After you complete the entries in the rainfall worksheet, click on the Manure Group Input Tab in the toolbar ribbon to complete the manure group information.

3.9. Manure group rainfall contributions are transferred to Appendix 3 Manure Group Input and printout pages

Example of the rainfall contributions transferred to Appendix 3 Manure Group input worksheet

Manure Group Site Description	Manure Group Season Applied	Manure Group Inventory Method	RECORDS: Total Manure Collected Per Manure Group	Total Manure Collected Units	Manure Exported Amount	Manure Exported Units	Total Rainfall and Runoff	Rainfall Units
Concrete Tank	Fall	Calculated		Gallons			165,291	Gallons

Example of the rainfall contributions transferred to <u>printed</u> Appendix 3 Manure Group Information page.

	A	B	C	D
4	**Appendix 3 Manure Group Information Crop Yrs. 2023**	Dairy Fall Liquid		
5	Manure Report Date (note if averaging several reports)	September 25, 2020		
6	Laboratory Name	AASL		
7	Manure Type	Dairy		
8	Manure Unit (lbs/ton or 1000 gal)	lb/1000 gal		
9	Total Nitrogen (N) (lbs/ton or 1000 gal)	20.00		
10	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	10.00		
11	Total Organic N (lbs/ton or 1000 gal)	10.00	Goto NMP Index	
12	Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	15.00	Goto Appendix 3 Input	
13	Total Potash (K_2O) (lbs/ton or 1000 gal)	18.00	Goto Manure Avail Input	
14	Percent Solids	20.00	Grazing Calculator	
15	PSC Value (analytical or book value)	0.80		
16	Percent Moisture	80.00		
17	Manure Group AEU's	66.74		
18	Description: Site & Season Applied	Concrete Tank		Fall
19	Inventory Method	Calculated		
20		Collected Calc.		Uncollected Calc.
21	Manure Group Identification	Dairy Fall Liquid		Dairy Fall Liquid - uncollected
22	CALCULATED: Total Manure Collected Per Manure Group	373,643.0		676.0
23	Units	gallons		Tons
24	RECORDS: Total Manure Collected Per Manure Group			
25	Unit			
26		Collected		Uncollected
27	Manure Used On-Farm	0.0		0.0
28	Units	Gallons		Tons
29	Manure Exported	0.0		
30	Units			
31	Manure Allocation Balance	373,643.0		676.0
32	Units	Gallons		Tons
33	Manure Balance as a Percent of Total Manure Collected	100.0%		
34	Total Rainfall and Runoff	165,291	Gallon	

Total Rainfall and Runoff
The rainfall and runoff information is completed in the Rainfall Worksheet Tab.

Contributiing rainfall is automatically added to the total manure collected per manure group value If:
"Calculated" is selected as the Inventory method in App 3 Input and the rainfall worksheet is completed.

Rainfall and runoff contributions **<u>is not</u>** included if "Records" is selected as the Inventory Method.

Solid manure groups with a lb/ton manure group unit, will not receive rainfall contributions.

How to Complete the Rainfall Additions Calculator

Note: If the Inventory Method is "Records" or the manure group is a solid manure group with the units of lb/ton, you will get a note reminding you that Rainfall does not apply for solid manure or when using farm records.

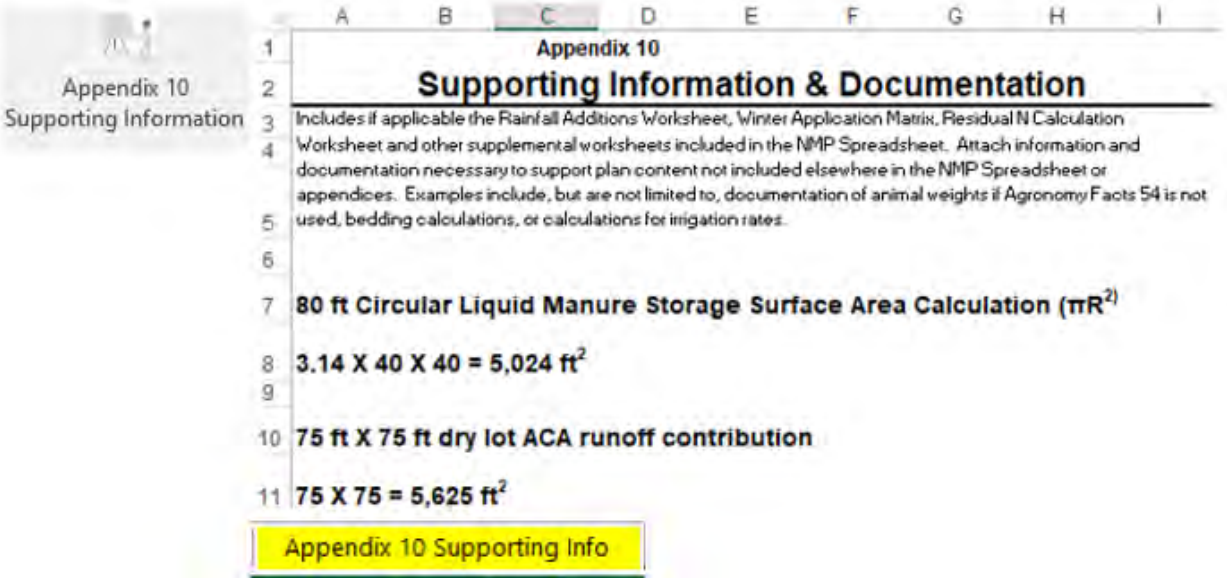
Rainfall Worksheet — Clear Rainfall Worksheet

Manure Group	County	Manure Storage Evaporation or No Evaporation	Surface Area Rainfall Directed to Manure Storage	Beginning Month (1-12)	Ending Month (1-12)	Storage Surface Area (Sq. ft.)	Runoff Surface Area (Sq. ft.)	Gallons of rainfall directly on storage	Gallons of rainfall directed to storage	Gallons of rain water added to this manure group
Dairy Fall Liquid	Adams	Directly on Storage - No Evaporation	Directed to Storage	3	10	5,024	5,625	Does Not Apply when using Farm Records	Does Not Apply when using Farm Records	0

Manure Group Site Description	Manure Group Season Applied	Manure Group Inventory Method	RECORDS: Total Manure Collected Per Manure Group	Total Manure Collected Units	Manure Exported Amount	Manure Exported Units	Total Rainfall and Runoff
Concrete Tank	Fall	Records		Tons			Does Not Apply for solid manure or when using Farm Records

19	Inventory Method	Records		
20		Collected Calc.		Uncollected Calc.
21	Manure Group Identification	Dairy Fall Liquid		Dairy Fall Liquid - uncollected
22	CALCULATED: Total Manure Collected Per Manure Group			676.0
23	Units			Tons
24	RECORDS: Total Manure Collected Per Manure Group	0.0		
25	Unit	Tons		
26		Collected		Uncollected
27	Manure Used On-Farm	0.0		0.0
28	Units	Tons		Tons
29	Manure Exported	0.0		
30	Units			
31	Manure Allocation Balance	0.0		676.0
32	Units	Tons		Tons
33	Manure Balance as a Percent of Total Manure Collected			
34	Total Rainfall and Runoff	0		
35		Does not apply for solid manure or when using farm records		

4. Include the manure storage and surface runoff calculations in Appendix 10



How to Complete the Grazing Manure Calculator Worksheet

Purpose:

This procedure describes how to complete the optional Grazing Group Manure Calculator in the Nutrient Management Plan (NMP) spreadsheet. This worksheet will calculate the amount of uncollected manure generated and the weighted average of the manure nutrients deposited on a pasture by grazing animals. The calculations are based on the animal types using the pasture, the number of days, and the hours per day the animals are on the pasture.

It would be useful for a rotational grazing operation where a herd of cattle with cows, calves, a bull, and finishing cattle rotate through a series of pastures during the year.

Another useful example would be for multiple species using the same pasture. It could be the family farm with a few horses, a cow, some sheep, a few goats, a steer, and a flock of chickens all using the same pasture.

Finally, it would be helpful for horse operations with various animal sizes and turnout time on pasture. A horse operation where the animals range from mini's to draft horses and all have different amounts of turnout time on a pasture.

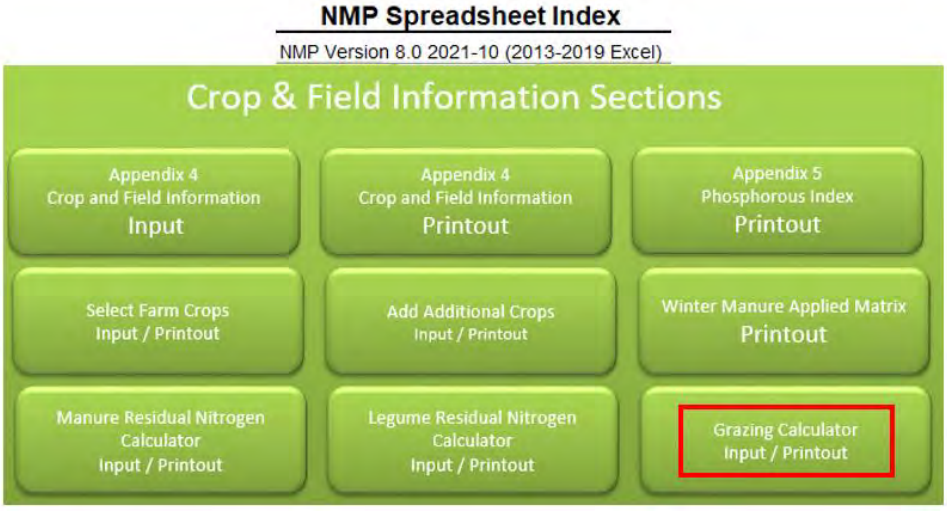
After all the required information is entered, the calculator determines the amount of uncollected manure and manure nutrients deposited on a pasture based book values taken from the Penn State Agronomy Guide and/or Midwest Plan Services. A grazing note is also automatically generated that lists the stocking rate and time on pasture needed to generate the amount of manure determined by the calculator.

Each completed field / grazing group becomes a manure group in Appendix 3.

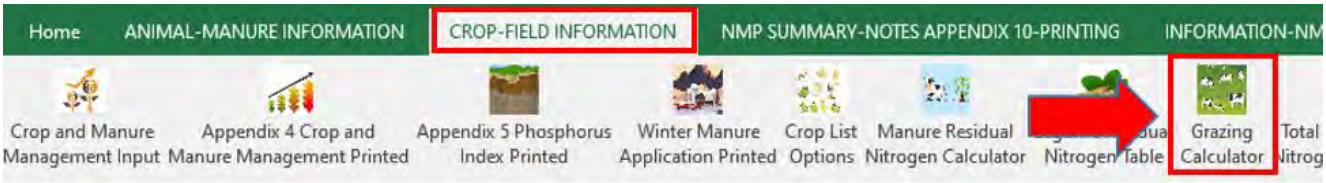
The Grazing Calculator is meant to replace repetitive multiple manure applications of uncollected manure. It is not intended to be used for multiple manure applications of collected manure.

When the Grazing Calculator is used, it is to be printed and included for submission in Appendix 10.

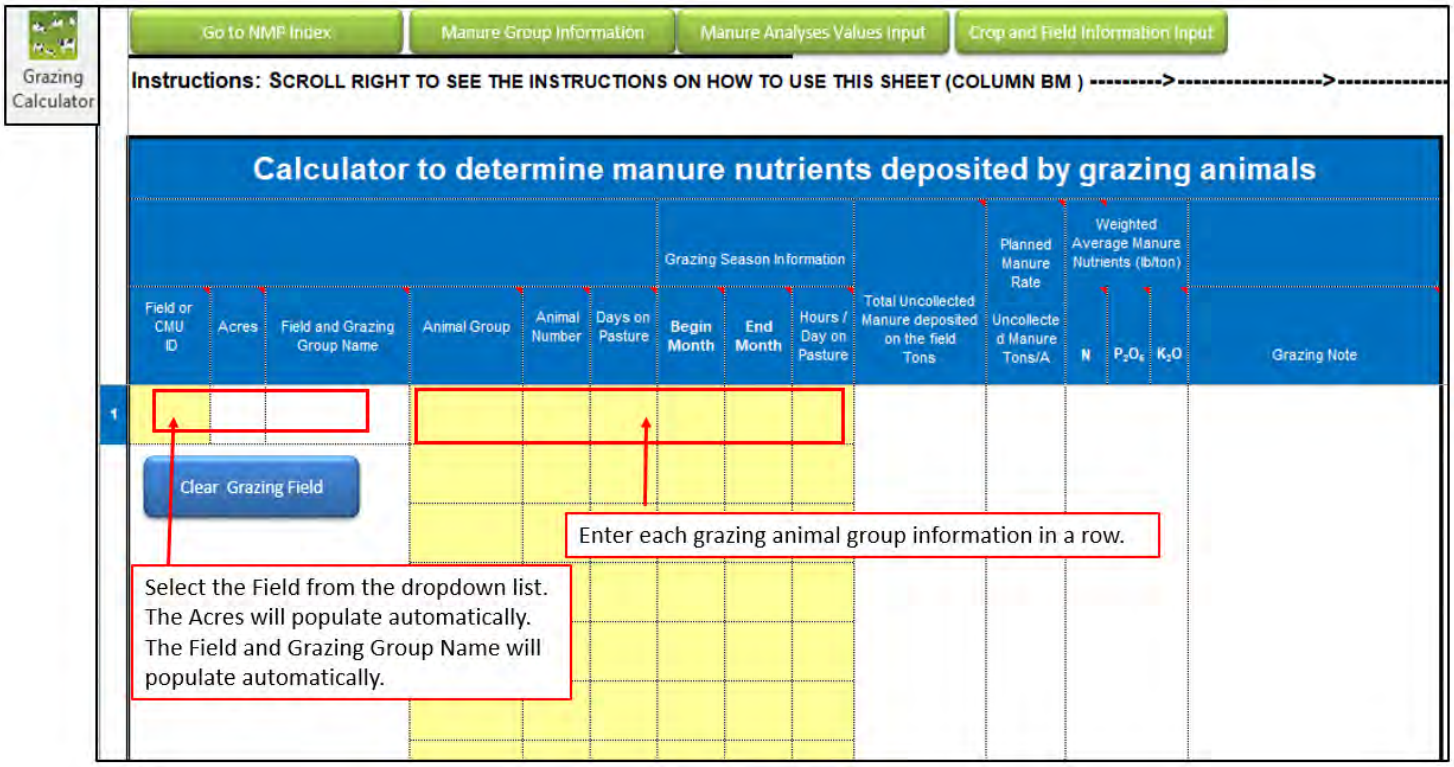
You can find the Grazing Calculator tab by clicking on the "Grazing Calculator" button in the NMP Spreadsheet Index



Or click on the Animal-Manure information tab. Select the Farm Animal List icon that looks like this:



Layout of the Calculator to determine manure nutrients deposited by grazing animals

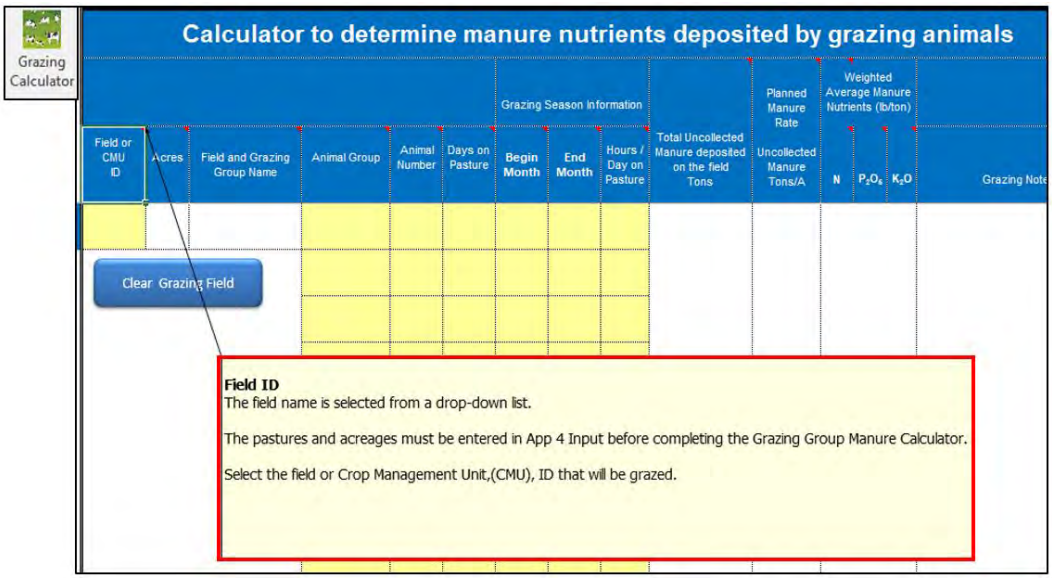


A total of ten pastures can be completed in the grazing calculator.

Helpful notes added in Column Headers

The blue column headers cells with red triangles have helpful notes included to help you understand what needs to be entered or what the cell data is used for. Where you see a red triangle in the cell, there is a note to help explain what should be entered in that column.

When you click in the blue column header "Field or CMU ID", the following pop-up box will appear:



1. Procedure

1.1. Enter the Field Id

Select the field Id from the dropdown list. If there are no fields available in the dropdown list, then complete the Field Information in App 4 Input up to and including selecting the Field Residual and Carryover Nitrogen for each Pasture before completing the Grazing Manure Calculator.

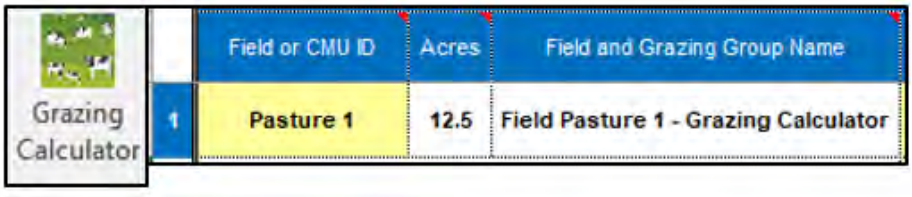
1.2. Field or CMU Id Acres

The field acres will be automatically transferred from Appendix 4 Input.

1.3. Field and Grazing Group Name

The field and grazing group is populated automatically. It will display the Field Id selected from the drop-down list" followed by -Grazing Calculator. The field and grazing group name will eventually be transferred to as a manure group to Appendix 3 Input.

In the example below it is "Field Pasture 1 - Grazing Calculator". <u>A total of ten fields can be completed in the grazing calculator.</u>

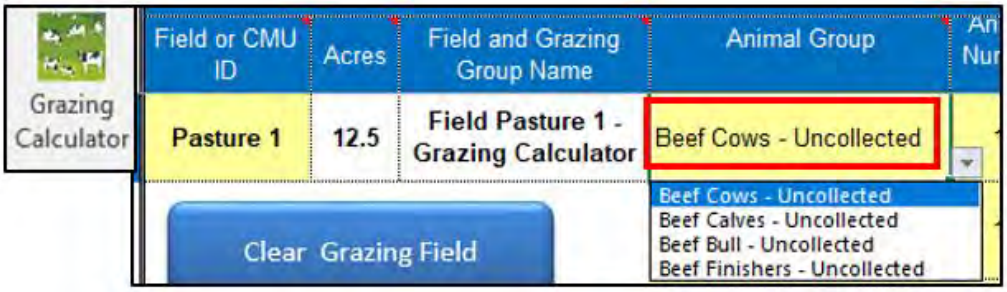


1.4. Enter the animal group information for the first animal type added to the pasture.

To add the first animal type, select the Animal Group, Animal Weight, days on pasture for a season that corresponds to your manure group season, and hours per day on pasture. If thc

1.4.1. Select the Animal Group from the dropdown list

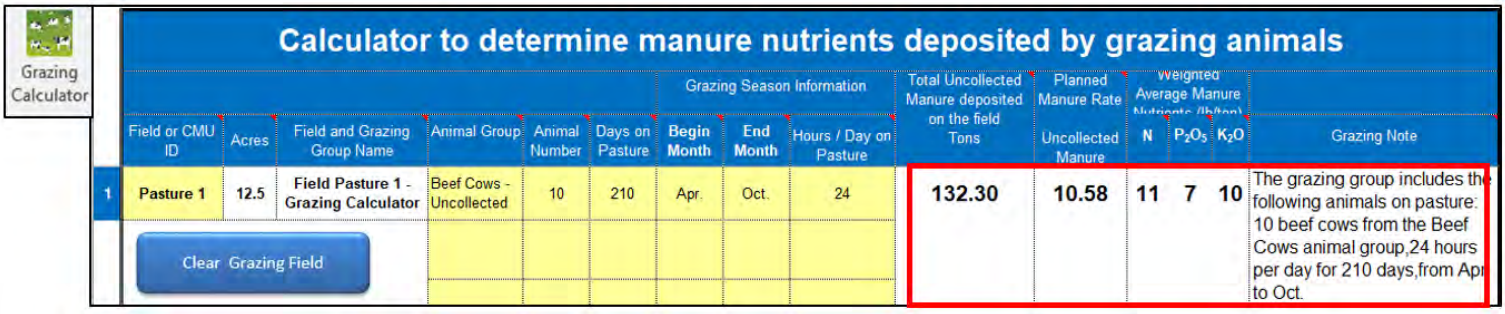
Select the animal group name from the drop down list. The list only includes Animal Groups with uncollected manure listed in Appendix 3 Input. The Animal Group Name cell will turn red if there is more manure allocated than generated in Appendix 3 Input.



1.4.2. Complete the number of animals for the animal group and the grazing season information

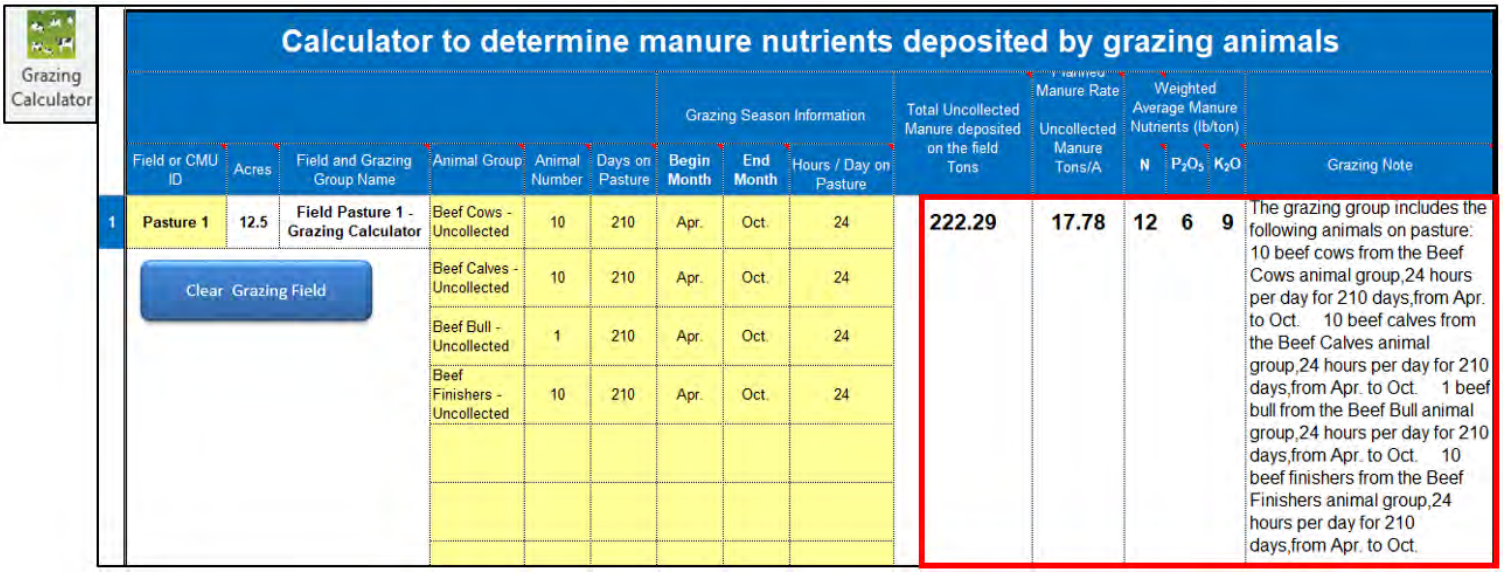
Complete the Animal Number, Days on Pasture, the Beginning and Ending Months, and the Hours per Day the animals will be on that pasture.

1.4.3. The manure production amounts and nutrient value are automatically generated the information for each animal group is completed. A grazing note is also automatically generated after you enter each animal group.



1.5. Complete the remaining animal groups using the pasture during the specified time frame

In this example, the Calves, Bull, and Finisher cattle graze on the same field. All of the animal groups using the pasture are listed. In the screenshot below, the uncollected manure applications, from the Cows, Calves, Bull, and Finisher Animal Groups have been combined to generate one set of manure production values for the group. The total amount of manure generated by the grazing group, and the uncollected manure tons/A is automatically populated. The grazing note lists all the animal groups, hours per day, number of days on this pasture, and the grazing season.



Grazing Calculator

Calculator to determine manure nutrients deposited by grazing animals

	Field or CMU ID	Acres	Field and Grazing Group Name	Animal Group	Animal Number	Days on Pasture	Grazing Season Information: Begin Month	Grazing Season Information: End Month	Hours / Day on Pasture	Total Uncollected Manure deposited on the field Tons	Planned Manure Rate: Uncollected Manure Tons/A	Weighted Average Manure Nutrients (lb/ton): N	P_2O_5	K_2O	Grazing Note
1	Pasture 1	12.5	Field Pasture 1 - Grazing Calculator	Beef Cows - Uncollected	10	210	Apr.	Oct.	24	222.29	17.78	12	6	9	The grazing group includes the following animals on pasture: 10 beef cows from the Beef Cows animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef calves from the Beef Calves animal group,24 hours per day for 210 days,from Apr. to Oct. 1 beef bull from the Beef Bull animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef finishers from the Beef Finishers animal group,24 hours per day for 210 days,from Apr. to Oct.
				Beef Calves - Uncollected	10	210	Apr.	Oct.	24						
				Beef Bull - Uncollected	1	210	Apr.	Oct.	24						
				Beef Finishers - Uncollected	10	210	Apr.	Oct.	24						

Clear Grazing Field

1.6. Complete the grazing information for additional pastures

Up to ten pastures can be completed in the grazing calculator. There is a blue number next to each pasture that can be completed to help keep track of the pasture being used.

2. Summary of Total Uncollected Manure.

2.1. A Summary of the Animal Group days on pasture, tons of manure allocated and generated is automatically populated. T

The Generated values are taken from Appendix 3 Animal Group Uncollected manure amounts.

The goal is to allocate the same amount of uncollected manure that is generated for each animal group.

This is achieved by allocating animal numbers and days on each pasture for each animal group.

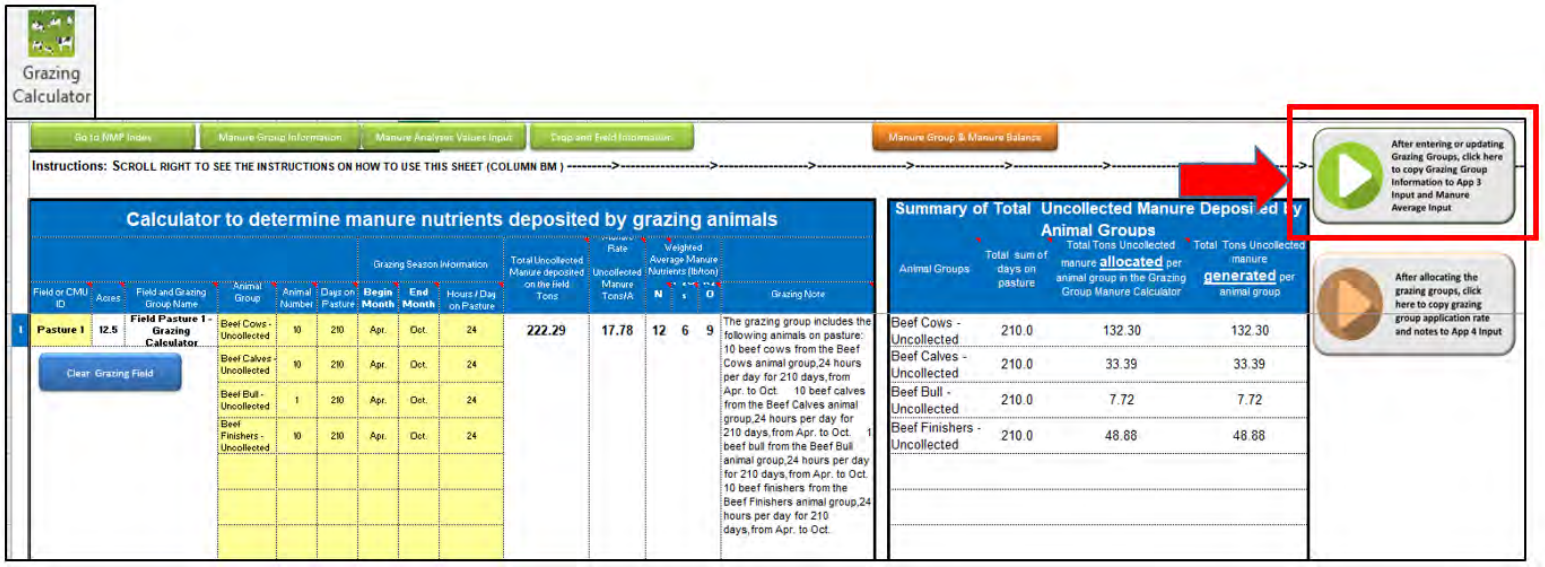
Grazing Calculator

Summary of Total Uncollected Manure Deposited by Animal Groups

Animal Groups	Total sum of days on pasture	Total Tons Uncollected manure **allocated** per animal group in the Grazing Group Manure Calculator	Total Tons Uncollected manure **generated** per animal group
Beef Cows - Uncollected	210.0	132.30	132.30
Beef Calves - Uncollected	210.0	33.39	33.39
Beef Bull - Uncollected	210.0	7.72	7.72
Beef Finishers - Uncollected	210.0	48.88	48.88

3. Transfer the completed information into Appendix 3 Input Worksheet

3.1. After the Grazing Group information is completed then click on the green arrow to transfer the information to Appendix 3 Input and Manure Average Input Worksheets.



3.2. This will create a grazing manure group in Appendix 3 Input. The amount of uncollected manure on the pasture is listed as Records.

Manure Group Input

Manure Group Identification	Manure Report Date (most recent)	Laboratory Name	Manure Type	Manure Unit (lbs/ton or lbs/1000 gal)	Total Nitrogen (N) lbs / ton or lbs / 1000 gal	Ammonium N (NH4-N) lbs / ton or lbs / 1000 gal	Total Phosphate (P2O5) lbs/ton or lbs/1000 gal	Total Potash (K2O) lbs / ton or lbs / 1000 gal	Percent Solids	PSC Value (Enter analytical or book value)	Manure Group Site Description	Manure Group Season Applied	Manure Group Inventory Method	RECORDS: Total Manure Collected Per Manure Group	Total Manure Collected Units
Grazing Beef Herd	Book Values	PSU Agronomy Guide	Other	lb/ton	11.00	0.00	7.00	10.00	12.00	0.80	Records	Grazing	Calculated		Tons
Field Pasture 1 - Grazing Calculator	Uncollected Book	PSU Agronomy Guide	Other	lb/ton	11.76	0.00	6.49	9.49	0.00	0.80	Records	Grazing	Records	222	Tons

3.3. The Manure Analyses Average Input sheet will be automatically updated as well with the grazing group uncollected based on PSU Agronomy Guide values.

Manure Analyses Average Input

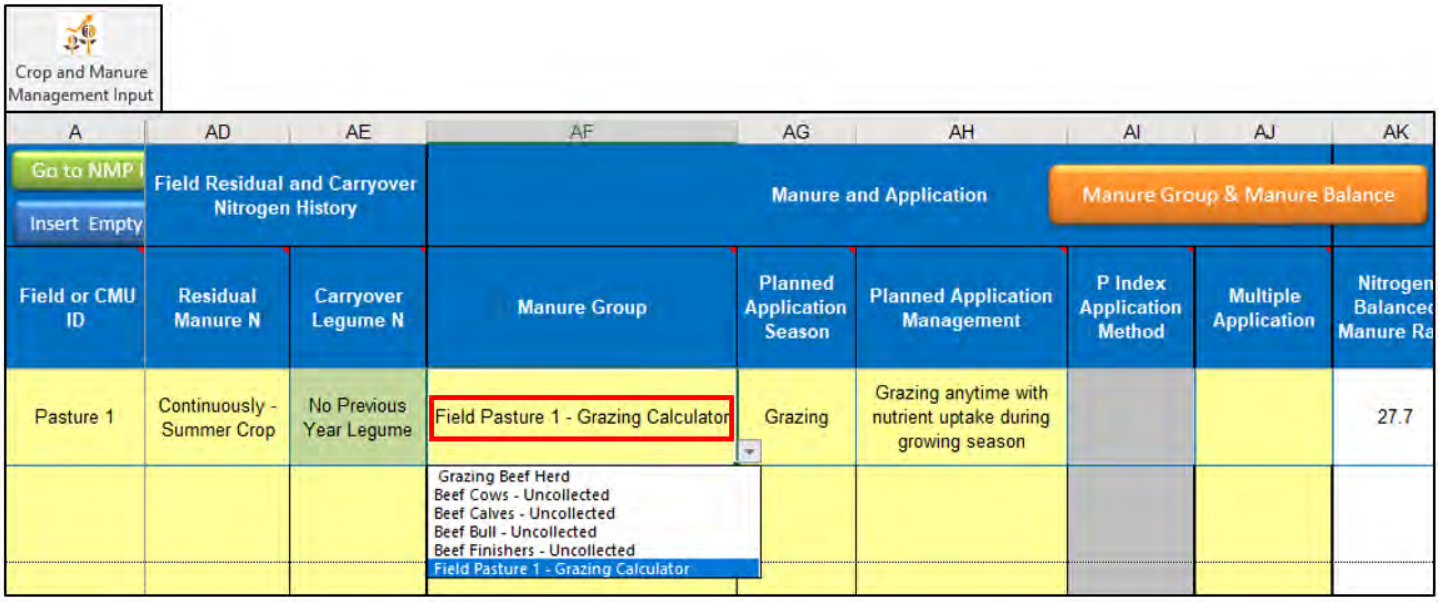
Manure Group Identification	Year	Manure Analysis Report Date (Most recent in bold)	Laboratory Name (Most recent in bold)	Manure Type	Manure Unit (lbs/ton or 1000 gal)	Total Nitrogen (N) (lbs/ton or	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	Total Phosphate (P_2O_5) (lbs/ton or	Total Potash (K_2O) (lbs/ton or 1000 gal)	Percent Solids	PSC Value (Enter analytical or book value)
Grazing Beef Herd	**Average**	**Book Values**	**PSU Agronomy Guide**	**Other**	**lb/ton**	**11.00**	**0.00**	**7.00**	**10.00**	**12.00**	**0.80**
Add 1 Year	1 year ago	Book Values	PSU Agronomy Guide	Other	lb/ton	11.00	0.00	7.00	10.00	12.00	0.80
	2 years ago										
Clear all Years	3 years ago										
	4 years ago										
	5 years ago										
Field Pasture 1 - Grazing Calculator	**Average**	**Uncollected Book**	**PSU Agronomy Guide**	**Other**	**lb/ton**	**11.76**	**0.00**	**6.49**	**9.49**	**0.00**	**0.80**
Add 1 Year	1 year ago	Uncollected Book	PSU Agronomy Guide	Other	lb/ton	11.76	0.00	6.49	9.49	0.00	0.80
	2 years ago										
Clear all Years	3 years ago										
	4 years ago										
	5 years ago										

.

4. Complete the Manure and Application Section in App 4 Input

4.1. Enter the Grazing Manure Group.

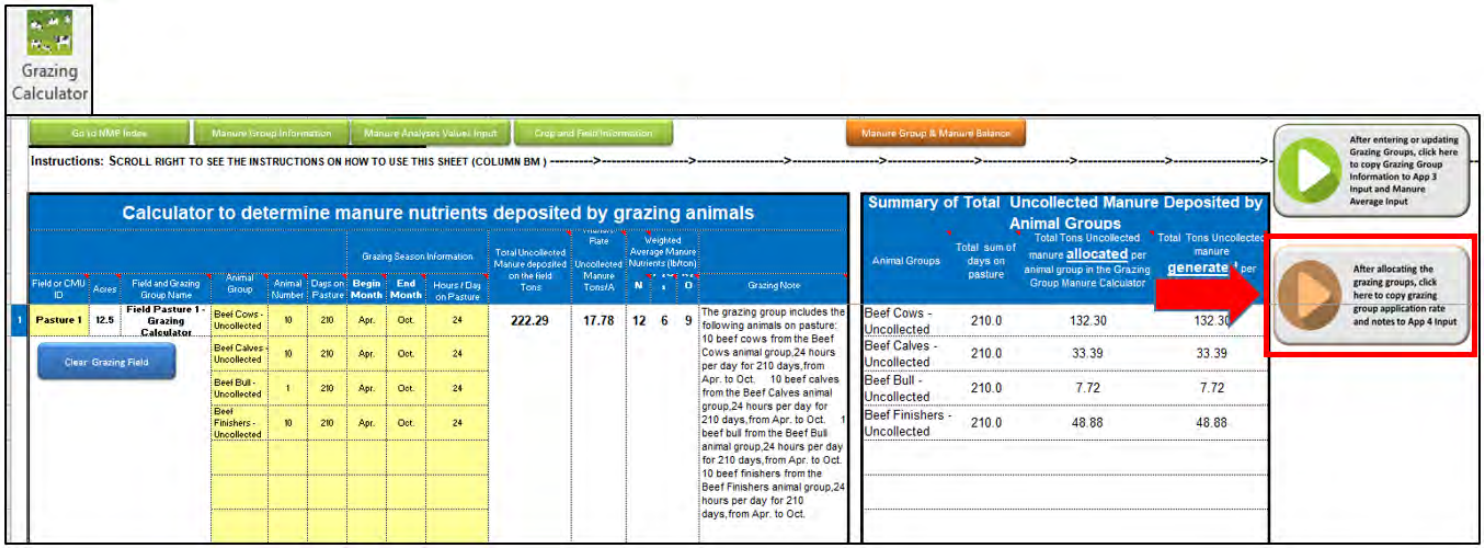
This is where you select the grazing groups created in the Grazing Calculator. In this example, four animal groups of Cows, Calves, Steers, and a bull using this pasture were combined into one grazing group to determine the manure applied to this pasture. This eliminates using multiple manure applications when more than one animal group uses a pasture.



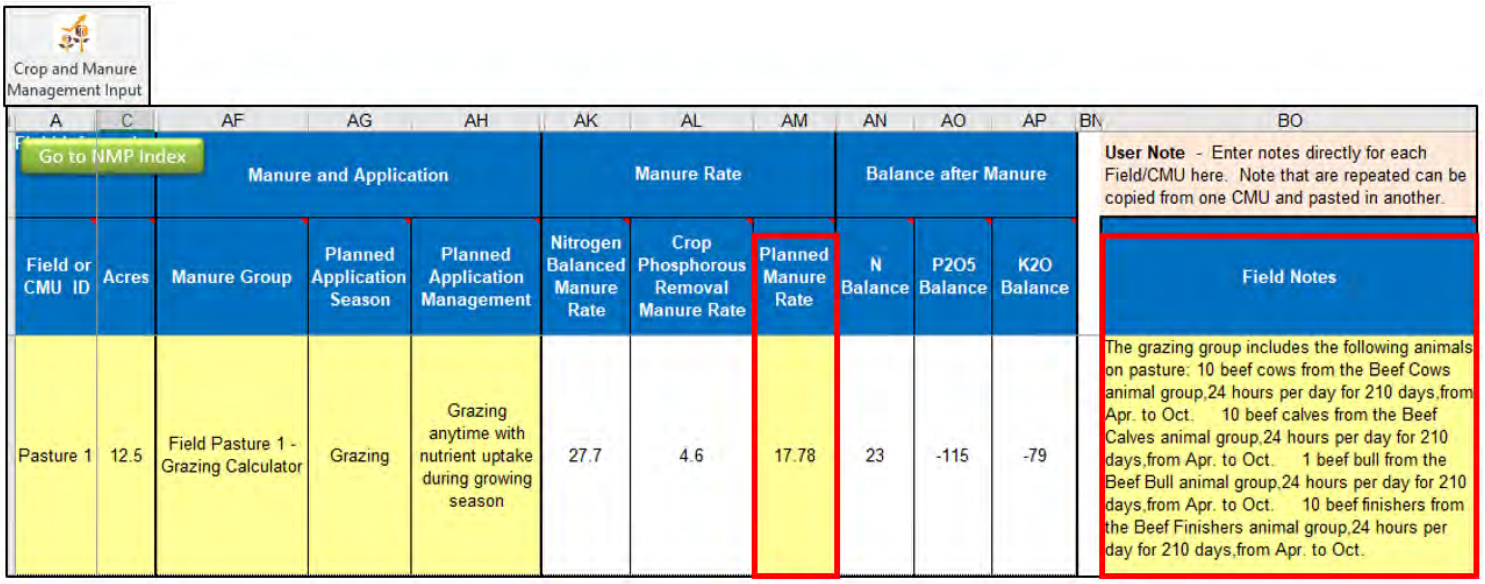
Note: You must select the grazing group name in Appendix 4 Input that is using the pasture. The planned application of season must be selected too. The next step will not work if you don't have this information completed.

5. Transfer the completed information into Appendix 4 Input Worksheet

5.1. Click on the orange/brown = button in the Grazing Calculator to transfer the calculated manure application rates and grazing notes into App 4 Input.



5.2. The planned manure rate and grazing note will be transferred to App 4 Input



A	C	AF	AG	AH	AK	AL	AM	AN	AO	AP	BN	BO
		Manure and Application			Manure Rate			Balance after Manure				User Note - Enter notes directly for each Field/CMU here. Note that are repeated can be copied from one CMU and pasted in another.
Field or CMU ID	Acres	Manure Group	Planned Application Season	Planned Application Management	Nitrogen Balanced Manure Rate	Crop Phosphorous Removal Manure Rate	Planned Manure Rate	N Balance	P2O5 Balance	K2O Balance		Field Notes
Pasture 1	12.5	Field Pasture 1 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	27.7	4.6	17.78	23	-115	-79		The grazing group includes the following animals on pasture: 10 beef cows from the Beef Cows animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef calves from the Beef Calves animal group,24 hours per day for 210 days,from Apr. to Oct. 1 beef bull from the Beef Bull animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef finishers from the Beef Finishers animal group,24 hours per day for 210 days,from Apr. to Oct.

5.3. Complete **any additional information in App 4 Input**

Complete the any needed information such as Supplemental Fertilizer, P Index information.

Additional field notes can be added. For example, where the pastured animals are fed and watered.

6. Examples of how the Information created in the Grazing Calculator appear in the Printed Sections of a NMP

6.1. Appendix 3 Manure Group Information Printout

Appendix 3 Manure Group Information Printed

	A	B	C	D	E	F	G
3	Go to NMP Index		Manure Group Information Input				Manure Analyses Values Inp
4	**Appendix 3 Manure Group Information** Crop Yrs. 2023	Grazing Beef Herd			Field Pasture 1 - Grazing Calculator		
5	Manure Report Date (note if averaging several reports)	Book Values			Uncollected Book		
6	Laboratory Name	PSU Agronomy Guide			PSU Agronomy Guide		
7	Manure Type	Other			Other		
8	Manure Unit (lbs/ton or 1000 gal)	lb/ton			lb/ton		
9	Total Nitrogen (N) (lbs/ton or 1000 gal)	11			11.76		
10	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	0			0		
11	Total Organic N (lbs/ton or 1000 gal)	11.00			11.76		
12	Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	7			6.49		
13	Total Potash (K_2O) (lbs/ton or 1000 gal)	10			9.49		
14	Percent Solids	12			0		
15	PSC Value (analytical or book value)	0.8			0.8		
16	Percent Moisture	88.00			100.00		
17	Manure Group AEU's	26.97			0.00		
18	Description: Site & Season Applied	Records		Grazing	Records		Grazing
19	Inventory Method	Calculated			Records		
20		Collected Calc.		Uncollected Calc.	Collected Calc.		Uncollected Calc.
21	Manure Group Identification	Grazing Beef Herd		Grazing Beef Herd - uncollected	Field Pasture 1 - Grazing Calculator		
22	CALCULATED: Total Manure Collected Per Manure Group	149.2		222.3			
23	Units	Tons		Tons			
24	RECORDS: Total Manure Collected Per Manure Group				222.3		
25	Unit				Tons		
26		Collected		Uncollected	Collected		Uncollected
27	Manure Used On-Farm	0.0		222.3	222.3		0.0
28	Units	Tons		Tons	Tons		
29	Manure Exported	0.0			0.0		
30	Units	tons					
31	Manure Allocation Balance	149.2		0.0	0.0		0.0
32	Units	Tons		Tons	Tons		

6.2. Manure Average Printout

Manure Analysis 5 Year Running Average

Field Pasture 1 - Grazing Calculator

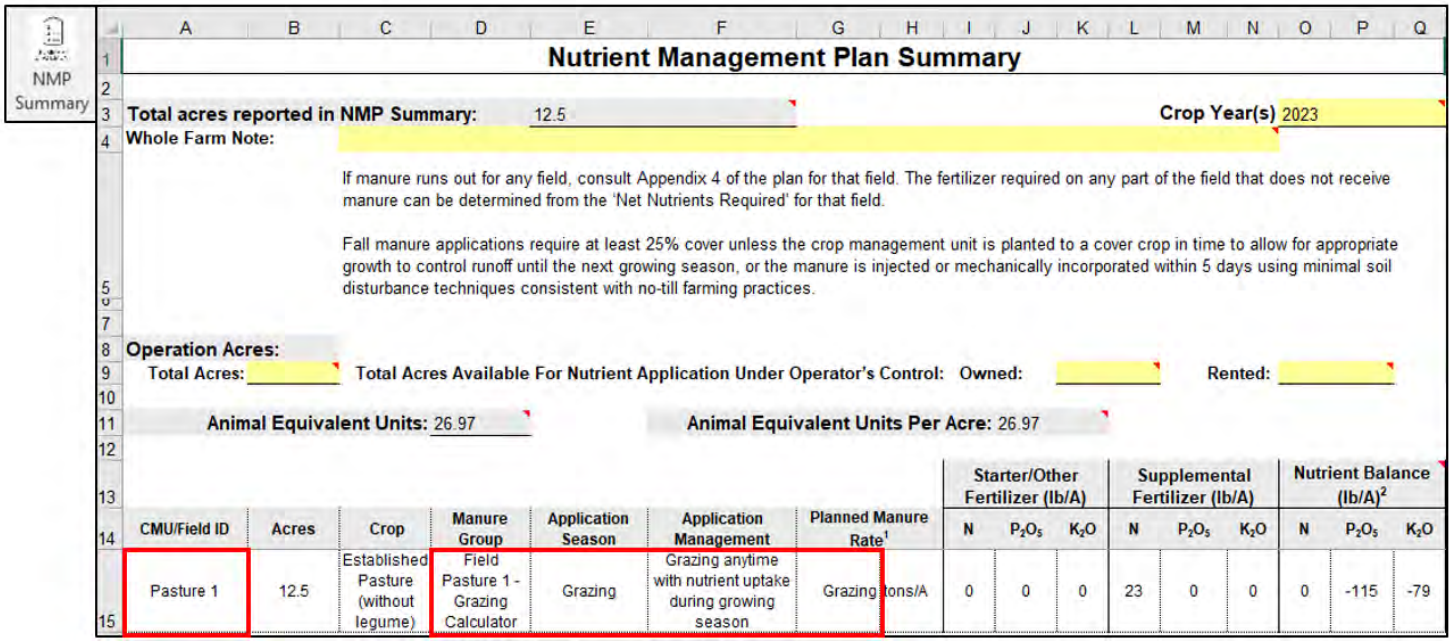
	B	C	D	E	F	G	H
17	**Manure Average for Crop Years. 2023**						
18		**Average**	1 year ago	2 years ago	3 years ago	4 years ago	5 years ago
19	Manure Report Date	**Uncollected Book**	Uncollected Book				
20	Laboratory Name	**PSU Agronomy Guide**	PSU Agronomy Guide				
21	Manure Type	**Other**	Other				
22	Manure Unit (lbs/ton or 1000 gal)	**lb/ton**	lb/ton				
23	Total Nitrogen (N) (lbs/ton or 1000 gal)	**11.76**	11.76				
24	Ammonium N (NH_4-N) (lbs/ton or 1000 gal)						
25	Total Organic N (lbs/ton or 1000 gal)	**11.76**	**11.76**				
26	Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	**6.49**	6.49				
27	Total Potash (K_2O) (lbs/ton or 1000 gal)	**9.49**	9.49				
28	Percent Solids						
29	PSC Value (Enter analytical or book value)	**0.80**	0.80				

6.3. Appendix 4 Crop & Manure Management Printout

Crop and Manure Management Input

	A	B	C	D
1	App. 4: Crop Yrs. 2023	Pasture 1		
2	CMU/Field ID			
3	Acres	12.5		
4	Soil Test Report Date	October 15, 2016		
5	Laboratory Name	AASL		
6	Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH
7	(Show conversions to ppm in Appendix 10)	56	75	6.2
8	P Index Part A Evaluation	No to All Part A		
9	Part A Result	N Based		
10	Crop	Established Pasture (without legume)		
11	Planned Yield	2 ton/A		
12	PSU Soil Test Recommendation (lb/A)	N	P2O5	K2O
13		100	0	90
14	User Soil Test Recommendation (lb/A)			
15	Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0
16	P Index Application Method			
17	Double Crop CarryOver N (lb/A)	0		
18	Manure History Description Residual Manure N (lb/A)	35	Continuously - Summer Crop	
20	Legume History Description Residual Legume N (lb/A)	0	No Previous Year Legume	
21	Net Nutrients Required (lb/A)	65	0	90
22	Manure Group	Field Pasture 1 - Grazing Calculator		
23	Application Season: Management (Incorporation, cover crops, etc.)	Grazing anytime with nutrient uptake during growing season		
24	Availability Factors	Total N	NH4-N	Org. N
25	(Total N or NH4-N & Organic N)	0.20		
26	P Index Application Method			
27	N Balanced Manure Rate (ton; gal/A)	27.7 tons/A		
28	P Removal Balance Manure Rate	4.6 tons/A		
29	(ton or gal/A; If required by P Index)	Crop P Removal (lb/A)	30.0	
30	P Index Value			
31	Planned Manure Rate (ton or gal/A)	17.78 tons/A		
32	Nutrients Applied at Planned Manure Rate (lb/A)	42	115	169
33	Nutrient Balance after Manure	23	-115	-79
34	Supplemental Fertilizer (lb/A)	23	0	0
35	P Index Application Method			
36	Final Nutrient Balance (lb/A)	0	-115	-79
37	Multiple Application			
38	Manure Utilized on CMU	222 tons		

6.4. NMP Summary Printout



NMP Summary

Nutrient Management Plan Summary

Total acres reported in NMP Summary: 12.5 **Crop Year(s)** 2023

Whole Farm Note:

If manure runs out for any field, consult Appendix 4 of the plan for that field. The fertilizer required on any part of the field that does not receive manure can be determined from the 'Net Nutrients Required' for that field.

Fall manure applications require at least 25% cover unless the crop management unit is planted to a cover crop in time to allow for appropriate growth to control runoff until the next growing season, or the manure is injected or mechanically incorporated within 5 days using minimal soil disturbance techniques consistent with no-till farming practices.

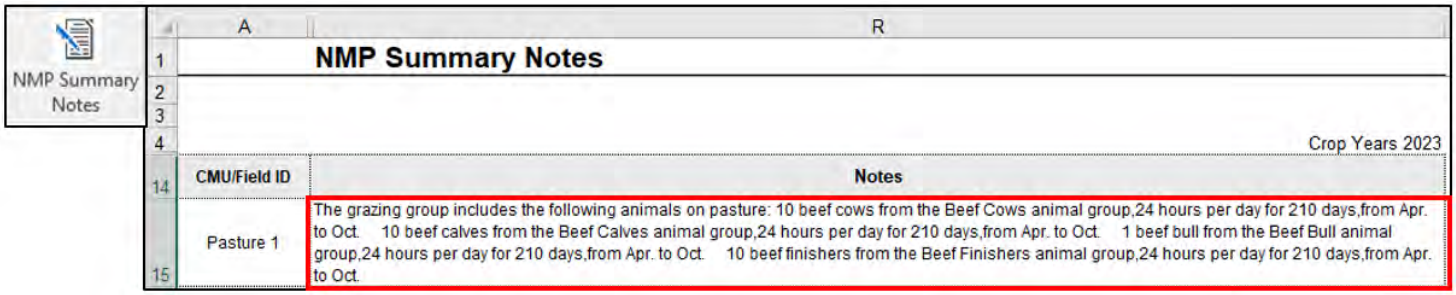
Operation Acres:

Total Acres: **Total Acres Available For Nutrient Application Under Operator's Control: Owned:** **Rented:**

Animal Equivalent Units: 26.97 **Animal Equivalent Units Per Acre:** 26.97

							Starter/Other Fertilizer (lb/A)			Supplemental Fertilizer (lb/A)			Nutrient Balance (lb/A)[2]		
CMU/Field ID	Acres	Crop	Manure Group	Application Season	Application Management	Planned Manure Rate[1]	N	P_2O_5	K_2O	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Pasture 1	12.5	Established Pasture (without legume)	Field Pasture 1 - Grazing Calculator	Grazing	Grazing anytime with nutrient uptake during growing season	Grazing tons/A	0	0	0	23	0	0	0	-115	-79

6.5. NMP Summary Notes Printout



NMP Summary Notes

NMP Summary Notes

Crop Years 2023

CMU/Field ID	Notes
Pasture 1	The grazing group includes the following animals on pasture: 10 beef cows from the Beef Cows animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef calves from the Beef Calves animal group,24 hours per day for 210 days,from Apr. to Oct. 1 beef bull from the Beef Bull animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef finishers from the Beef Finishers animal group,24 hours per day for 210 days,from Apr. to Oct.

6.6. Printout of Field Specific Grazing Group

When the grazing calculator is used then it must be printed for submission in Appendix 10.

Grazing Calculato

Calculator to determine manure nutrients deposited by grazing animals

Field or CMU ID	Acres	Field and Grazing Group Name	Animal Group	Animal Number	Days on Pasture	Grazing Season Information: Begin Month	Grazing Season Information: End Month	Grazing Season Information: Hours / Day on Pasture	Total Uncollected Manure deposited on the field Tons	Manure Rate Uncollected Manure Tons/A	Weighted Average Manure Nutrients (lb/ton): N	P_2O_5	K_2O	Grazing Note
Pasture 1	12.5	Field Pasture 1 - Grazing Calculator	Beef Cows - Uncollected	10	210	Apr.	Oct.	24	222.29	17.78	12	6	9	The grazing group includes the following animals on pasture: 10 beef cows from the Beef Cows animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef calves from the Beef Calves animal group,24 hours per day for 210 days,from Apr. to Oct. 1 beef bull from the Beef Bull animal group,24 hours per day for 210 days,from Apr. to Oct. 10 beef finishers from the Beef Finishers animal group,24 hours per day for 210 days,from Apr. to Oct.
			Beef Calves - Uncollected	10	210	Apr.	Oct.	24						
			Beef Bull - Uncollected	1	210	Apr	Oct.	24						
			Beef Finishers - Uncollected	10	210	Apr.	Oct.	24						

6.7. Summary of grazing days and Uncollected Manure in the Grazing Calculator

Summary of Total Uncollected Manure Deposited by Animal Groups

Animal Groups	Total sum of days on pasture	Total Tons Uncollected manure **allocated** per animal group in the Grazing Group Manure Calculator	Total Tons Uncollected manure **generated** per animal group
Beef Cows - Uncollected	210.0	132.30	132.30
Beef Calves - Uncollected	210.0	33.39	33.39
Beef Bull - Uncollected	210.0	7.72	7.72
Beef Finishers - Uncollected	210.0	48.88	48.88

Revision History (Delete before publishing)

Date	Description of Significant Changes
October 17, 2017	First issue of the document.
June 2018	The screenshots were updated to account for updates in NMP Version 6.2. Section 1.3 - The field and grazing group name is now populated automatically.
October 2021	Updated screenshots. Clarified guidance. Added emphasis to sections.

How to Complete the Manure Residual N Calculator

Overview and Purpose:

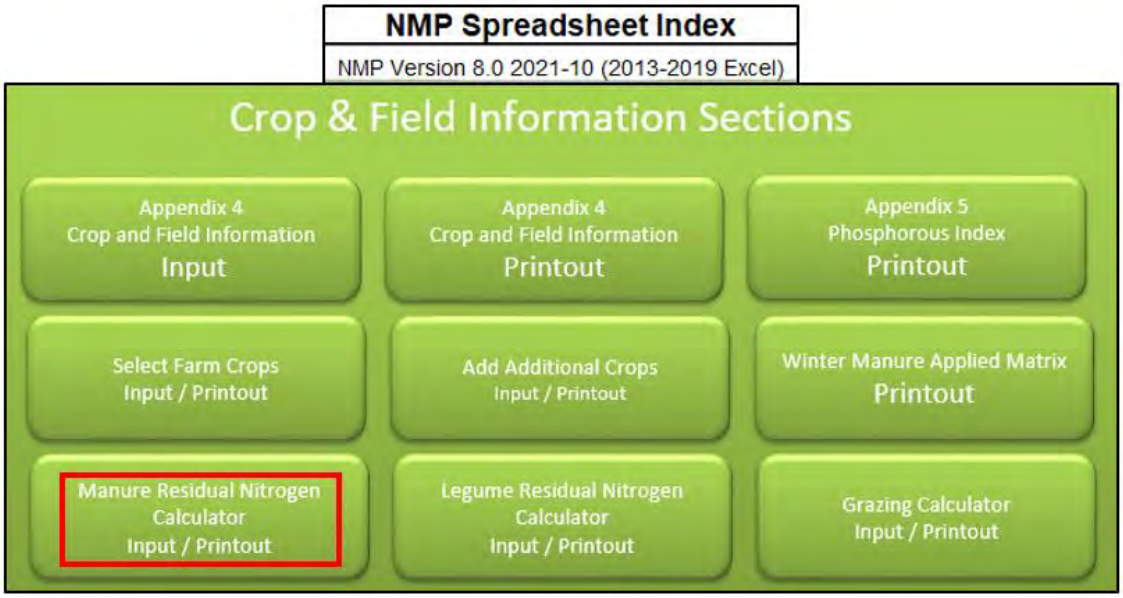
There are two ways to determine the amount of residual manure nitrogen. These options are outlined in the Penn State Agronomy Guide. Both options rely on the manure application history, particularly the frequency of manure application provided by the operator for each field. This is noted as the number of years out of the past five years that a field has received manure. In addition, option 2 requires the type of manure, the manure analysis and the application rates for each year in the past 5 that manure was applied to a field.

Option 1 uses the Penn State Agronomy Guide, Table 1.2-11B. This method is commonly called the "Total N Method". Based on the frequency of manure application over the past five years the appropriate residual nitrogen value is determined.

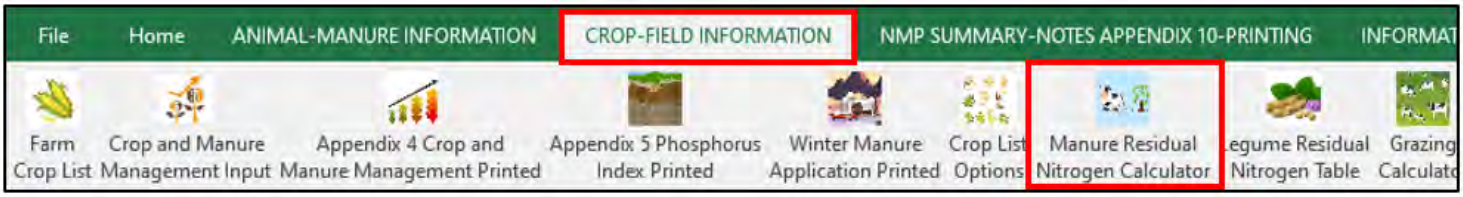
Option 2 uses the Penn State Agronomy Guide, Table 1.2-12.
This method provides a more refined estimate of residual manure nitrogen that utilizes the chemical manure analysis that provides the amount of ammonium N and organic N in the manure to calculate the amount of residual nitrogen. This method is commonly called the "N Fractions Method". The Manure N Residual Calculator that must be completed for Option 2 and must be included in Appendix 10: Supporting Information and Documentation.

This procedure describes how to complete the optional Residual N Calculator for determining the manure residual nitrogen in a Nutrient Management Plan (NMP) using the "N Fractions Method".

You can find Residual N Calculator Worksheet tabs by looking for the hyper link in the NMP Spreadsheet Index

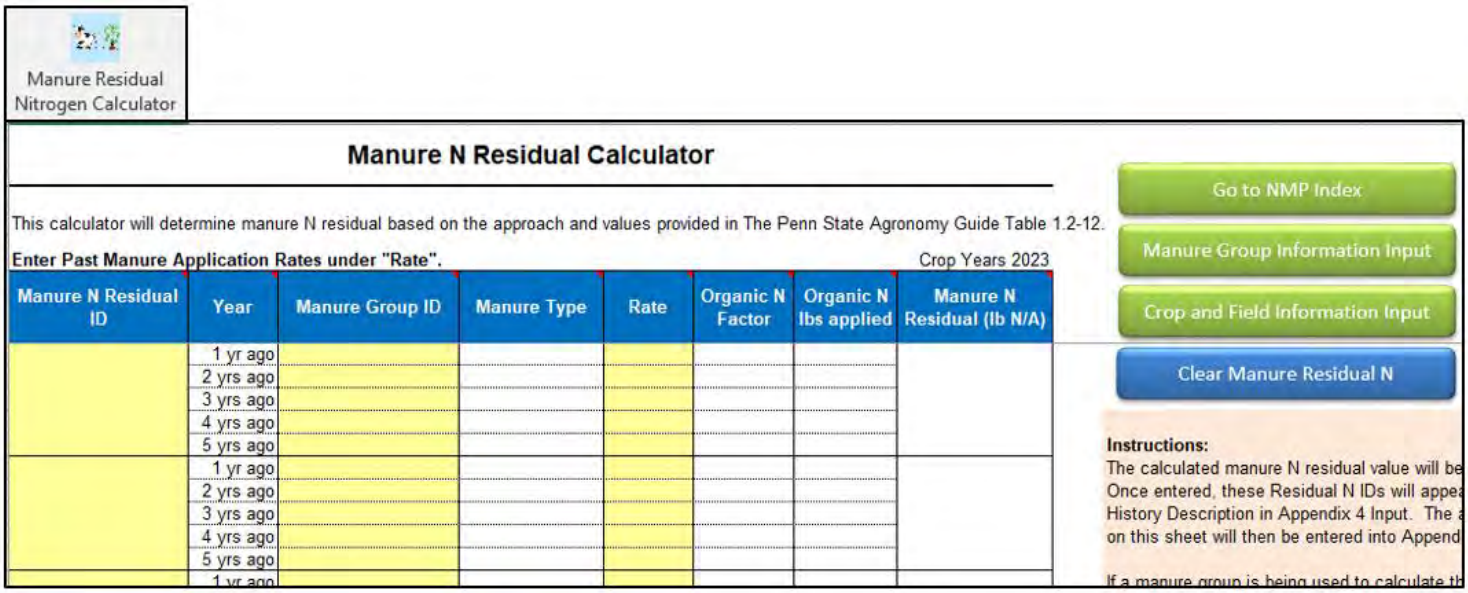


Or look for the toolbar ribbon at the top of your screen. The Manure Residual Nitrogen Calculator Icon looks like this:



How to Complete the Manure Residual N Calculator

Layout of the Manure Residual Nitrogen Calculator



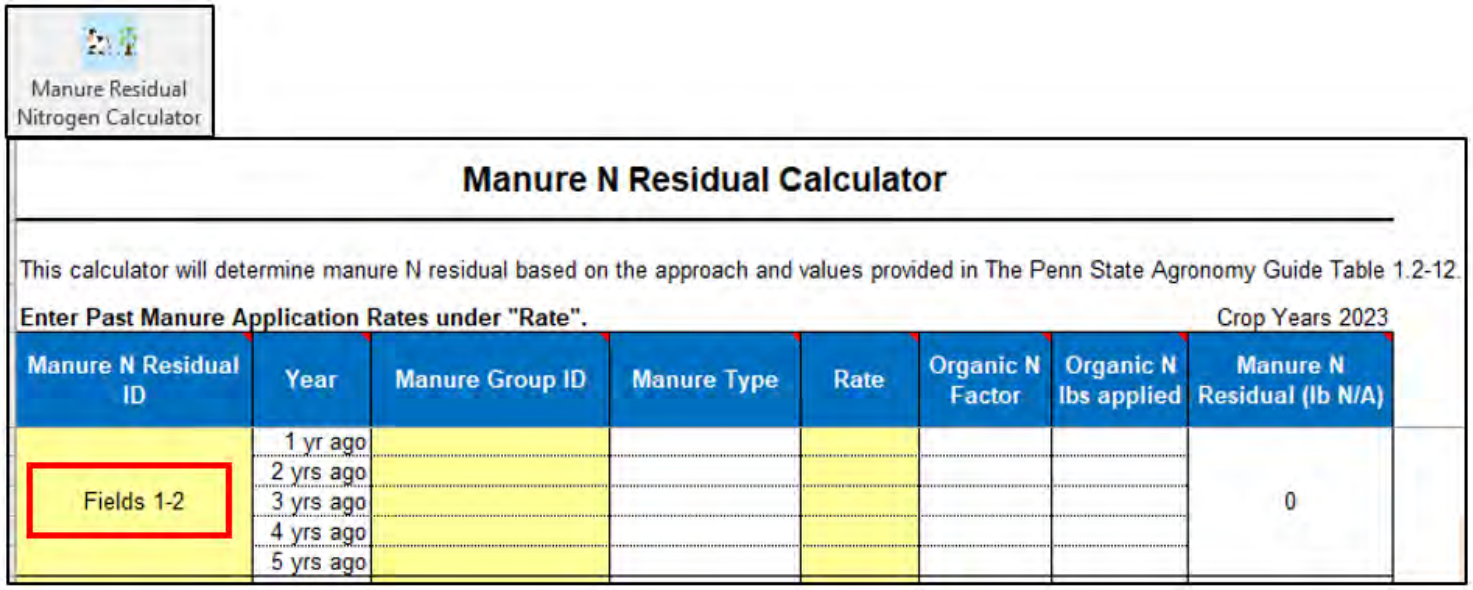
Helpful notes added in Column Headers

The blue column headers cells with red triangles have helpful notes included to help you understand what needs to be entered or what the cell data is used for. Where you see a red triangle in the cell, there is a note to help explain what should be entered in that column.

1. Procedure

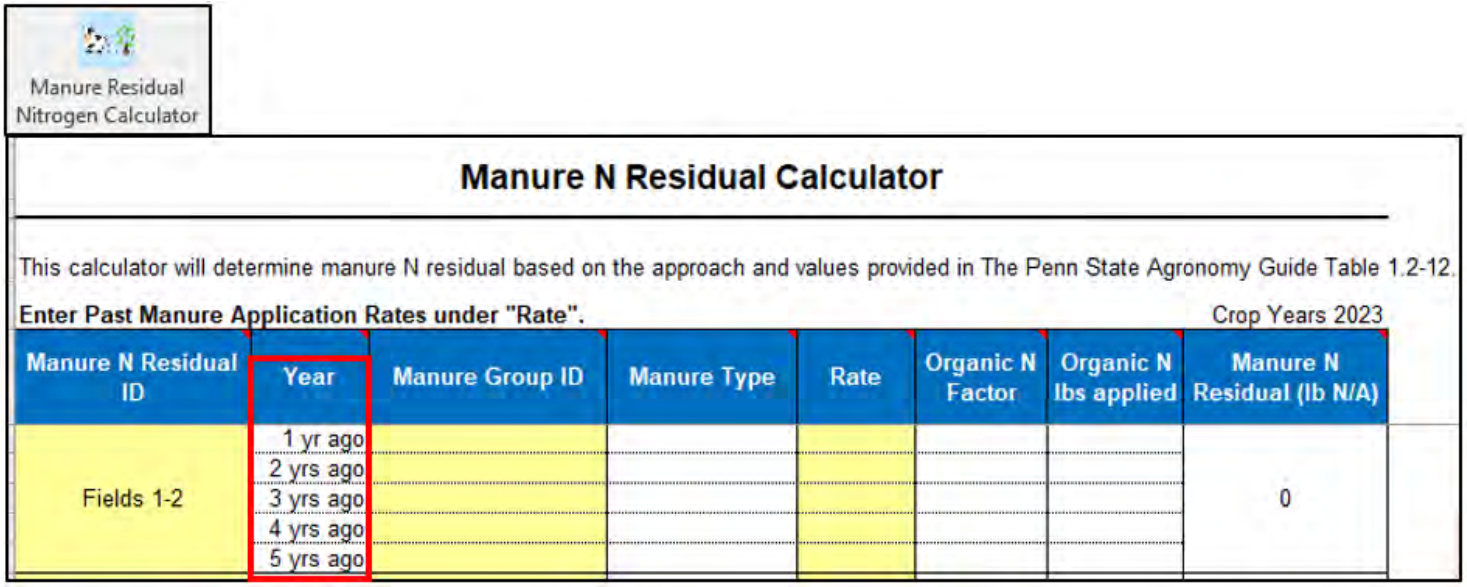
1.1. Enter the Manure N Residual ID

Enter a name that best describes the manure N history. For example, fields 1-2. The text "Manure N Residual 5 Yr History " will be added to the name that will appear in Appendix 4 Input.



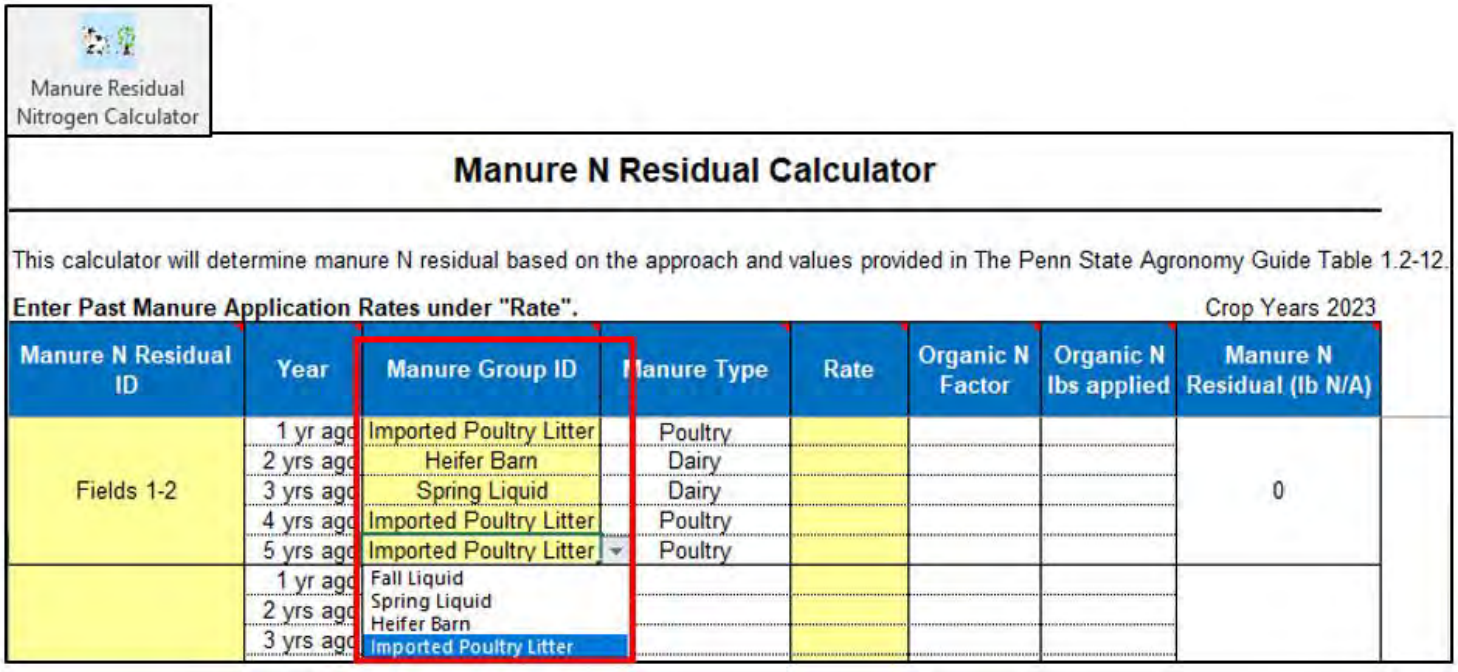
1.2. Year

Each year is the timeframe from the plan year.



1.3. Manure Group ID

The manure group names are selected drop-down list. They are the manure groups created in Appendix 3 Input sheet. For a manure group is not part of the current NMP, enter the manure group Id in Appendix 3 Input tab and the manure nutrient information in the Manure Average Input tab. The manure group selected must have the manure analysis values completed or the calculator won't work. An example might be imported Poultry Litter.

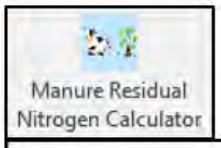


Note: An example Appendix 3 Manure Group Information sheet is attached at the end of this document listing the manure groups and analysis information used to complete the manure N residual calculator.

How to Complete the Manure Residual N Calculator

1.4. Manure Type

The manure type will be automatically transferred from Manure Average Input sheet. The manure type must be completed for the calculations to work.



Manure N Residual Calculator

This calculator will determine manure N residual based on the approach and values provided in The Penn State Agronomy Guide Table 1.2-12.

Enter Past Manure Application Rates under "Rate". Crop Years 2023

Manure N Residual ID	Year	Manure Group ID	Manure Type	Rate	Organic N Factor	Organic N lbs applied	Manure N Residual (lb N/A)
Fields 1-2	1 yr ago	Imported Poultry Litter	Poultry				0
	2 yrs ago	Heifer Barn	Dairy				
	3 yrs ago	Spring Liquid	Dairy				
	4 yrs ago	Imported Poultry Litter	Poultry				
	5 yrs ago	Imported Poultry Litter	Poultry				

1.5. Rate

Enter the manure rate applied for the year listed. Don't enter the units (tons/Acre or gallons/Acre).
For example, if poultry litter was applied one year ago at a rate of 4 tons/Acres then enter only 4. Don't enter the units of ton/A.

Manure N Residual Calculator

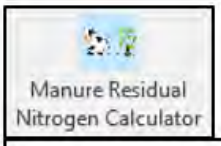
This calculator will determine manure N residual based on the approach and values provided in The Penn

Enter Past Manure Application Rates under "Rate".

Manure N Residual ID	Year	Manure Group ID	Manure Type	Rate
Fields 1-2 Manure N Residual History	1 yr ago	Imported Poultry Litter	Poultry	4
	2 yrs ago	Heifer Barn	Dairy	12
	3 yrs ago	Spring Liquid	Dairy	6000
	4 yrs ago	Fall Liquid	Dairy	6000
	5 yrs ago	Imported Poultry Litter	Poultry	4

1.6. N Factor

The Organic N Factor from past applications is transferred from Table 6in the NMP. (Agronomy Guide Table 1.2-12)



Manure N Residual Calculator

This calculator will determine manure N residual based on the approach and values provided in The Penn State Agronomy Guide Table 1.2-12

Enter Past Manure Application Rates under "Rate". Crop Years 2023

Manure N Residual ID	Year	Manure Group ID	Manure Type	Rate	Organic N Factor	Organic N lbs applied	Manure N Residual (lb N/A)
Fields 1-2	1 yr ago	Imported Poultry Litter	Poultry	4	0.12	29.14	44
	2 yrs ago	Heifer Barn	Dairy	12	0.05	5.62	
	3 yrs ago	Spring Liquid	Dairy	6000	0.02	1.98	
	4 yrs ago	Imported Poultry Litter	Poultry	4	0.02	4.86	
	5 yrs ago	Imported Poultry Litter	Poultry	4	0.01	2.43	

The Organic N factors are listed in Table 6 of the Excel NMP.

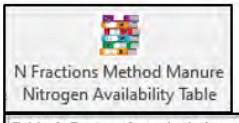


Table 6. Factors for calculating manure nitrogen availability based on time of application, incorporation, field history, and manure analysis with ammonium and organic N fractions. Recommended for all manures, but required for atypical or treated manures. Based on Penn State Agronomy Guide Table 1.2-12

Total Manure N

Application Season	Application Method / Days to incorporation[1]	Ammonium N Analysis: Poultry	Poultry <5% Solids[2]	Other	Other <5% Solids[2]	Compost
Spring: 1.2-12 For corn, other summer annuals, grass hay	Spring 1.2-12: Incorporated the same day	0.90	0.90	0.80	0.80	0.80
	Spring 1.2-12: Incorporated within 1 day	0.80	0.80	0.60	0.60	0.60
	Spring 1.2-12 Incorporated within 2 - 4 days	0.60	0.80	0.40	0.60	0.40
	Spring 1.2-12: Incorporated within 5 - 7 days	0.40	0.60	0.20	0.40	0.20
	Spring 1.2-12: Incorporated after 7 days	0.20	0.40	0.10	0.30	0.10
Summer: 1.2-12 For corn, other summer annuals, grass hay	Summer 1.2-12: Incorporated the same day	0.90	0.90	0.80	0.80	0.80
	Summer 1.2-12: Incorporated within 1 day	0.80	0.80	0.60	0.60	0.60
	Summer 1.2-12: Incorporated within 2 - 4 days	0.60	0.80	0.40	0.60	0.40
	Summer 1.2-12: Incorporated within 5 - 7 days	0.40	0.60	0.20	0.40	0.20
	Summer 1.2-12: Incorporated after 7 days	0.20	0.40	0.10	0.30	0.10
Early Fall: 1.2-12[3] For fall and spring use by grass hay, small grains and small grain silage	Early Fall 1.2-12: fall and spring use by grass hay, small grains and small grain silage. Incorp 0-2 days	0.80	0.80	0.60	0.60	0.40
	Early Fall 1.2-12: Fall and spring use by grass hay,small grains and small grain silage. Incorp 3-7 days	0.50	0.70	0.30	0.50	0.20
	Early Fall 1.2-12: fall and spring use by grass hay, small grains and small grain silage. Incorp after 7 days	0.20	0.40	0.10	0.30	0.00
Early Fall:1.2-12[3] For following summer utilization by a summer crop following a non-harvested cover crop used as a green manure	Early Fall 1.2-12: next summer use by a summer crop after a green manure cover crop. Incorp 0-2 days	0.45	0.45	0.35	0.35	0.35
	Early Fall 1.2-12: next summer use by a summer crop after a green manure cover crop. Incorp 3-7 days	0.20	0.40	0.15	0.35	0.15
	Early Fall 1.2-12: next summer use by a summer crop after a green manure cover crop. Incorp after 7 days	0.00	0.20	0.00	0.20	0.00
	Early Fall 1.2-12: next summer use by a summer crop following a harvested winter crop or no winter crop	0.00	0.00	0.00	0.00	0.00
Late Fall: 1.2-12[4] For following summer utilization by a summer crop following a harvested winter crop or no winter crop	Late Fall 1.2-12: Summer corn or annuals with no cover crop or cover crop harvested for silage	0.00	0.00	0.00	0.00	0.00
	Late Fall 1.2-12: Spring grass hay, small grains or Summer corn, annuals with green manure cover crop	0.60	0.60	0.50	0.50	0.50
Winter: 1.2-12[4,5] For following summer utilization by	Winter 1.2-12: Summer corn or annuals with no cover crop or cover crop harvested for silage	0.00	0.00	0.00	0.00	0.00

Organic N Analysis (Total N - ammonium N)

Organic N decomposed during year applied

	Poultry	Swine	Other	Dairy	Compost
Summer Crop	0.60	0.50	0.35	0.35	0.10
Winter Crop	0.40	0.30	0.25	0.25	0.10

Additional organic N available to the summer crop in a double crop system from manure applied in the fall for the winter crop (above)

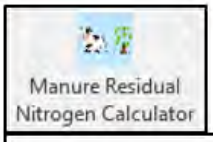
Summer Crop	0.30	0.25	0.20	0.20	0.10

Organic N decomposed from past applications

Manure applied	Manure	Compost
1 yr ago	0.12	0.05
2 yrs ago	0.05	0.02
3 yrs ago	0.02	0.01
4 yrs ago	0.02	0.01
5 yrs ago	0.01	0.01

1.7. Organic N lbs. applied

The amount of residual organic nitrogen applied during the year applied is calculated for each manure applied for up to five previous years.



Manure N Residual Calculator

This calculator will determine manure N residual based on the approach and values provided in The Penn State Agronomy Guide Table 1.2-12

Enter Past Manure Application Rates under "Rate". Crop Years 2023

Manure N Residual ID	Year	Manure Group ID	Manure Type	Rate	Organic N Factor	Organic N lbs applied	Manure N Residual (lb N/A)
Fields 1-2	1 yr ago	Imported Poultry Litter	Poultry	4	0.12	29.14	44
	2 yrs ago	Heifer Barn	Dairy	12	0.05	5.62	
	3 yrs ago	Spring Liquid	Dairy	6000	0.02	1.98	
	4 yrs ago	Imported Poultry Litter	Poultry	4	0.02	4.86	
	5 yrs ago	Imported Poultry Litter	Poultry	4	0.01	2.43	

In the example above the application rate for each previous year is multiplied by the manure group organic N then multiplied by the Organic N Factor to determine the pounds of organic nitrogen applied in that year.

(See Section 4.1 of this document for the Appendix 3 Manure Group Information)

Example Calculation for Fields 1-2 Manure N Residual History

1 year ago Imported Poultry Litter manure applied

$$\frac{4\ tons\ poultry\ litter}{1\ acre} \times \frac{60.70\ lbs\ Organic\ Nitrogen}{1\ ton\ \ poultry\ litter} \times\ 0.12\ Organic\ N\ Factor = \ 29.14\ lbs\ Organic\ N$$ lbs. applied

2 years ago Heifer Barn manure applied

$$\frac{12\ tons\ Heifer\ Barn}{1\ acre} \times \frac{9.36\ lbs\ Organic\ Nitrogen}{1\ ton\ \ Heifer\ Barn} \times\ 0.05\ Organic\ N\ Factor = \ 5.62\ lbs\ Organic\ N$$ lbs. applied

3 years ago Spring Liquid manure applied

$$\frac{6000\ gallons\ Spring\ Liquid}{1\ acre} \times \frac{16.5\ lbs\ Organic\ Nitrogen}{1000\ gallons\ Spring\ Liquid} \times 0.02\ Organic\ N\ Factor = \ 1.98\ lbs\ Organic\ N$$ lbs. applied

4 years ago Imported Poultry Litter manure applied

$$\frac{4\ tons\ Poultry\ Litter}{1\ acre} \times \frac{60.70\ lbs\ Organic\ Nitrogen}{1\ ton\ \ Poultry\ Litter} \times\ 0.02\ Organic\ N\ Factor = \ 4.86\ lbs\ Organic\ N$$ lbs. applied

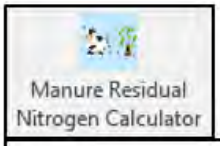
5 years ago Imported Poultry Litter manure applied

$$\frac{4\ tons\ Poultry\ Litter}{1\ acre} \times \frac{60.70\ lbs\ Organic\ Nitrogen}{1\ ton\ \ Poultry\ Litter} \times\ 0.01\ Organic\ N\ Factor = \ 2.43\ lbs\ Organic\ N$$ lbs. applied

5-year Residual Manure Organic Nitrogen Manure Applied (rounded) **44 lbs Organic N lbs. applied**

1.8. Manure N Residual (lb. Nitrogen/Acre)

The value is the sum of the residual manure nitrogen from up to five years of manure application. In the example below, a total of 41 pounds of residual organic nitrogen is available in the current crop year.



Manure N Residual Calculator

This calculator will determine manure N residual based on the approach and values provided in The Penn State Agronomy Guide Table 1.2-12

Enter Past Manure Application Rates under "Rate". Crop Years 2023

Manure N Residual ID	Year	Manure Group ID	Manure Type	Rate	Organic N Factor	Organic N lbs applied	Manure N Residual (lb N/A)
Fields 1-2	1 yr ago	Imported Poultry Litter	Poultry	4	0.12	29.14	44
	2 yrs ago	Heifer Barn	Dairy	12	0.05	5.62	
	3 yrs ago	Spring Liquid	Dairy	6000	0.02	1.98	
	4 yrs ago	Imported Poultry Litter	Poultry	4	0.02	4.86	
	5 yrs ago	Imported Poultry Litter	Poultry	4	0.01	2.43	

2. Selecting manure nitrogen history in Appendix 4 Input

2.1. Residual Manure Nitrogen

The completed Residual Manure Nitrogen group will be available as a selection at the bottom of the Residual Manure N drop-down list.

A	Z	AA	AB	AD	AE	AF	AG
Go to NMP / Insert Empty	Starter Fertilizer			Field Residual and Carryover Nitrogen History		Manure Group & Manure Balance	
Field or CMU ID	Starter N lbs/A	Starter P_2O_5 lbs/A	Starter K_2O lbs/A	Residual Manure N	Carryover Legume N	Manure Group	Planned Application Season
1	0	0	0	Fields 1-2 Manure N Residual 5 Yr History	No Previous Year Legume	Imported Poultry Litter	Spring
2	0	0	0	Fields 1-2 Manure N Residual 5 Yr History	No Previous Year Legume	Imported Poultry Litter	Spring
				Frequently - Winter Crop Frequently - Winter Double Crop Frequently - Summer Double Crop Continuously - Summer Crop Continuously - Winter Crop Continuously - Winter Double Crop Continuously - Summer Double Crop Fields 1-2 Manure N Residual 5 Yr History			

3. Appendix 4 Crop & Manure Management Printout

The newly created manure residual group and pounds of available organic nitrogen will be displayed in the manure history description.

	A	B	C	D	E	F	G
1	App. 4: Crop Yrs. 2023	1			2		
2	CMU/Field ID						
3	Acres	10.0			10.0		
4	Soil Test Report Date	October 2, 2016			October 2, 2016		
5	Laboratory Name	AASL			AASL		
6	Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH	ppm P	ppm K	pH
7	(Show conversions to ppm in Appendix 10)	121	150	6.8	121	150	6.8
8	P Index Part A Evaluation	No to All Part A			No to All Part A		
9	Part A Result	N Based			N Based		
10	Crop	Corn for Silage			Corn for Silage		
11	Planned Yield	21 ton/A			21 ton/A		
12	PSU Soil Test Recommendation (lb/A)	N	P2O5	K2O	N	P2O5	K2O
13		160	0	90	160	0	90
14	User Soil Test Recommendation (lb/A)						
15	Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0	0	0	0
16	P Index Application Method						
17	Double Crop CarryOver N (lb/A)	0			0		
18	Manure History Description Residual Manure N (lb/A)	44	Fields 1-2 Manure N Residual 5 Yr History		44	Fields 1-2 Manure N Residual 5 Yr History	
20	Legume History Description Residual Legume N (lb/A)	0	No Previous Year Legume		0	No Previous Year Legume	
21	Net Nutrients Required (lb/A)	116	0	90	116	0	90
22	Manure Group	Imported Poultry Litter			Imported Poultry Litter		
23	Application Season: Management (Incorporation, cover crops, etc.)	Spring: Spring or summer utilization-Incorporation after 7 days or none			Spring: Spring or summer utilization-Incorporation after 7 days or none		
24	Availability Factors (Total N or NH4-N & Organic N)	Total N	NH4-N	Org. N	Total N	NH4-N	Org. N
25		0.15			0.15		
26	P Index Application Method						
27	N Balanced Manure Rate (ton, gal/A)	10.5 tons/A			10.5 tons/A		
28	P Removal Balance Manure Rate	1.4 tons/A			1.4 tons/A		
29	(ton or gal/A; if required by P Index)	Crop P Removal (lb/A)	84.0		Crop P Removal (lb/A)	84.0	
30	P Index Value						
31	Planned Manure Rate (ton or gal/A)	**4 tons/A**			**4 tons/A**		
32	Nutrients Applied at Planned Manure Rate (lb/A)	44	238	193	44	238	193
33	Nutrient Balance after Manure	72	-238	-103	72	-238	-103
34	Supplemental Fertilizer (lb/A)	75	0	0	81	0	0
35	P Index Application Method						
36	Final Nutrient Balance (lb/A)	-3	**-238**	**-103**	-3	**-238**	**-103**
37	Multiple Application						
38	Manure Utilized on CMU	40 tons			40 tons		

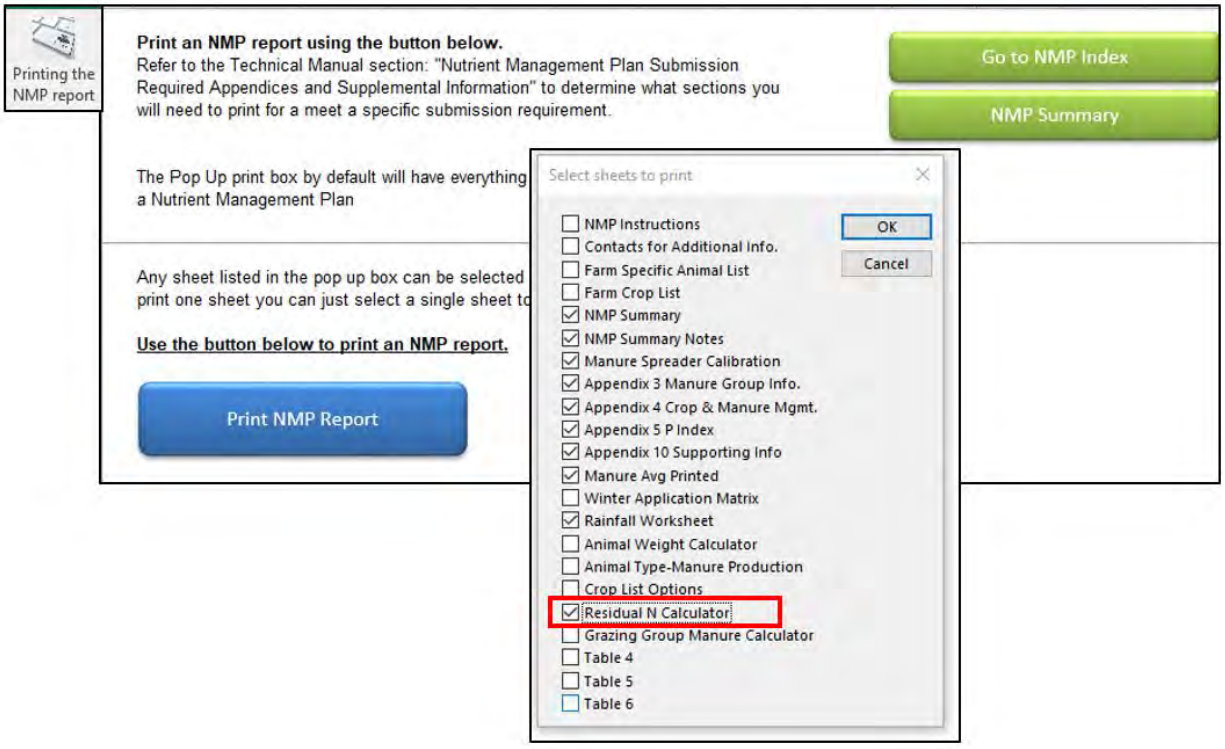
4. Supplemental Information

4.1. Appendix 3 Manure Group Information for use in section 1.7 calculation

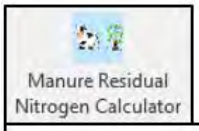
Appendix 3 Manure Group Information Printed

Appendix 3 Manure Group Information Crop Yrs. 2023	Fall Liquid	Spring Liquid	Heifer Barn	Imported Poultry Litter
Manure Report Date (note if averaging several reports)	10/1/2021	3/31/2021	3/20/2021	10/1/2021
Laboratory Name	AASL	AASL	AASL	AASL
Manure Type	Dairy	Dairy	Dairy	Poultry
Manure Unit (lbs/ton or 1000 gal)	lb/1000 gal	lb/1000 gal	lb/ton	lb/ton
Total Nitrogen (N) (lbs/ton or 1000 gal)	27	25	11	73.42
Ammonium N (NH_4-N) (lbs/ton or 1000 gal)	9.8	8.5	1.64	12.72
Total Organic N (lbs/ton or 1000 gal)	17.20	16.50	9.36	60.70
Total Phosphate (P_2O_5) (lbs/ton or 1000 gal)	12	10	6	59.41
Total Potash (K_2O) (lbs/ton or 1000 gal)	23	22	7	48.31
Percent Solids	6.4	5.7	34.7	54
PSC Value (analytical or book value)	0.8	0.8	0.8	0.54

4.2. Print the Residual N Calculator for submission and include in Appendix 10: Supporting Information and Documentation



4.3. Printed Residual N Calculator



Manure N Residual Calculator

This calculator will determine manure N residual based on the approach and values provided in The Penn State Agronomy Guide Table 1.2-12.

Enter Past Manure Application Rates under "Rate". Crop Years 2023

Manure N Residual ID	Year	Manure Group ID	Manure Type	Rate	Organic N Factor	Organic N lbs applied	Manure N Residual (lb N/A)
Fields 1-2	1 yr ago	Imported Poultry Litter	Poultry	4	0.12	29.14	44
	2 yrs ago	Heifer Barn	Dairy	12	0.05	5.62	
	3 yrs ago	Spring Liquid	Dairy	6000	0.02	1.98	
	4 yrs ago	Imported Poultry Litter	Poultry	4	0.02	4.86	
	5 yrs ago	Imported Poultry Litter	Poultry	4	0.01	2.43	

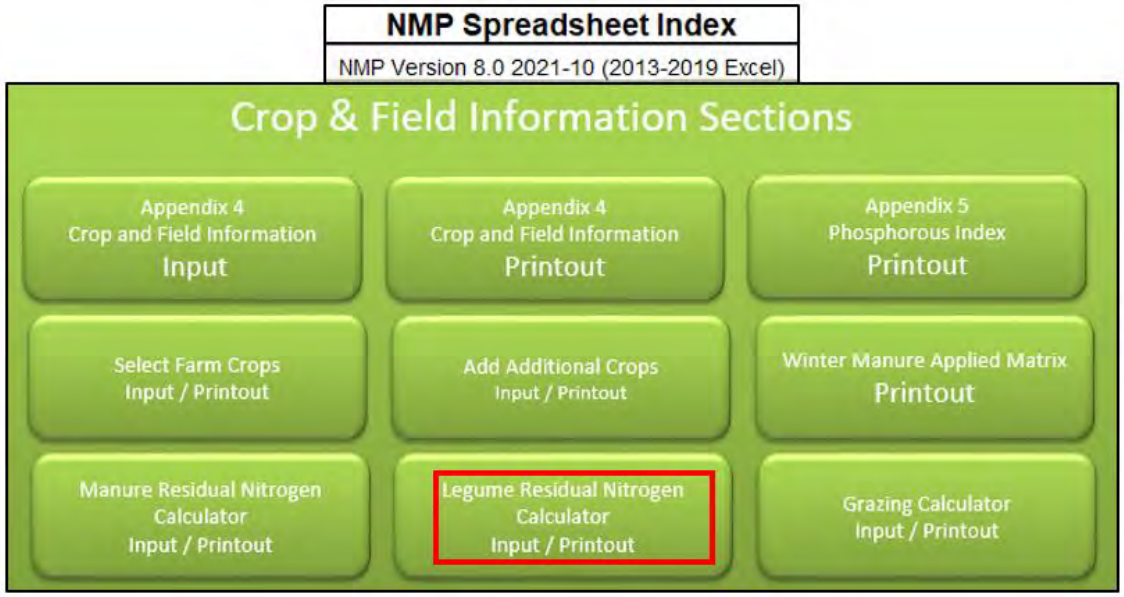
Version 8.0 - October 2021 Residual N Calculator Page - 1

How to Complete the Legume Residual N Calculator

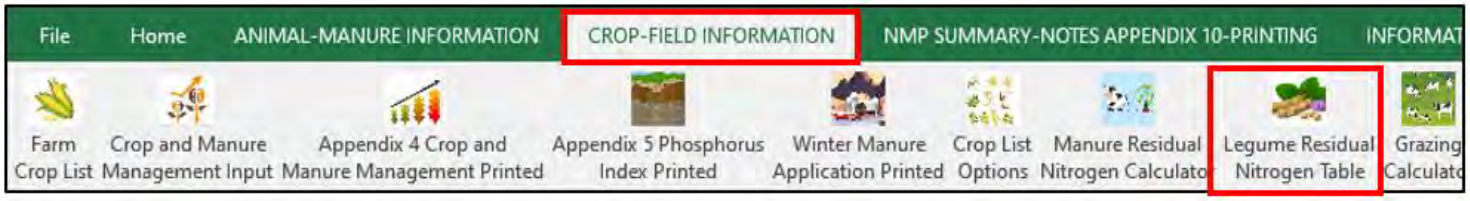
Overview and Purpose:

This procedure describes how to add a legume to the Legume Residual Nitrogen Calculator for determining the legume residual nitrogen in a Nutrient Management Plan (NMP.

You can find Residual N Calculator Worksheet tabs by looking for the hyper link in the NMP Spreadsheet Index

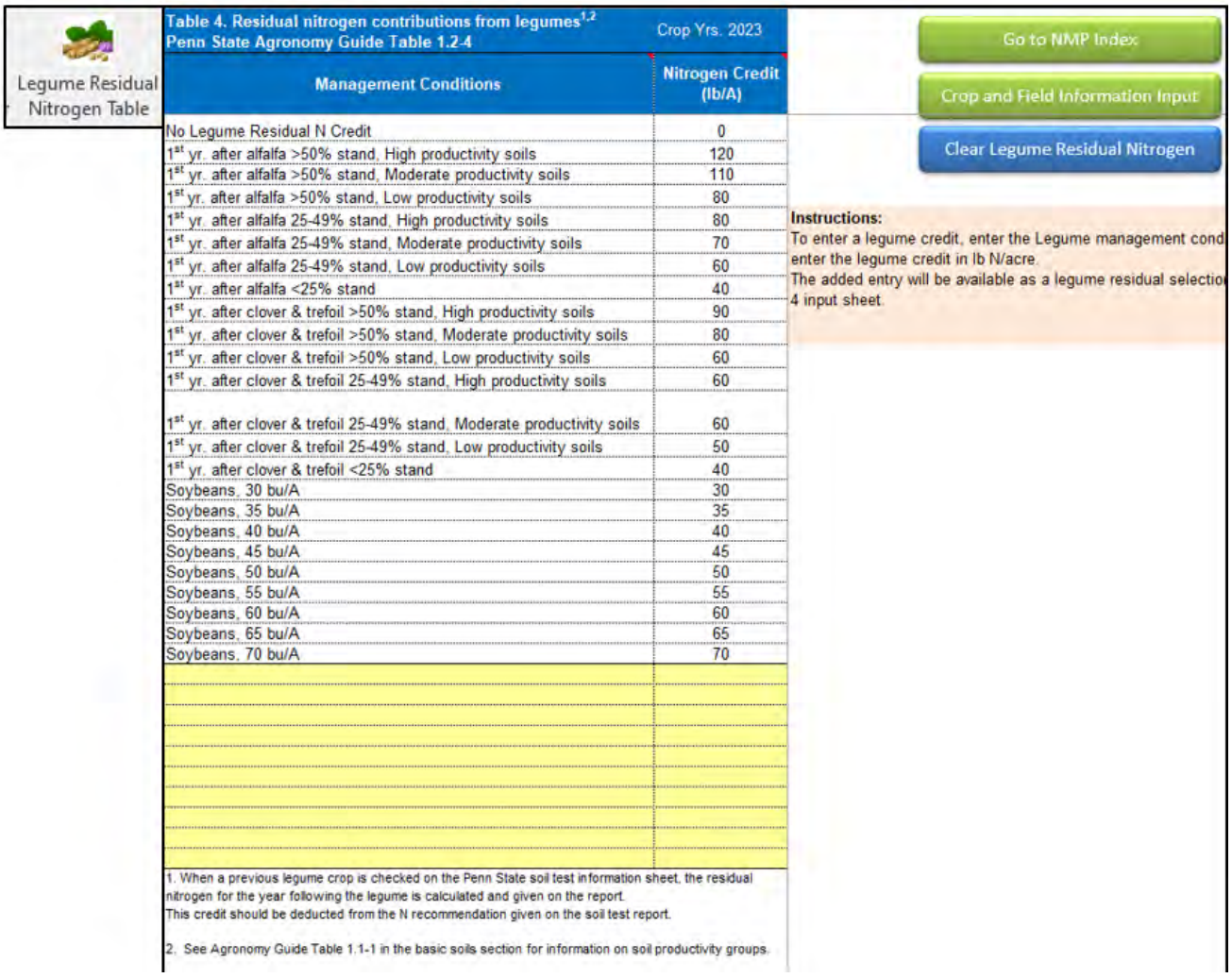


Or look for the toolbar ribbon at the top of your screen. The Legume Residual Nitrogen Table Icon looks like this:



How to Complete the Legume Residual N Calculator

Layout of the Legume Residual Nitrogen Table



Legume Residual Nitrogen Table

Table 4. Residual nitrogen contributions from legumes[1,2]
Penn State Agronomy Guide Table 1.2-4

Crop Yrs. 2023

Management Conditions	Nitrogen Credit (lb/A)
No Legume Residual N Credit	0
1st yr. after alfalfa >50% stand, High productivity soils	120
1st yr. after alfalfa >50% stand, Moderate productivity soils	110
1st yr. after alfalfa >50% stand, Low productivity soils	80
1st yr. after alfalfa 25-49% stand, High productivity soils	80
1st yr. after alfalfa 25-49% stand, Moderate productivity soils	70
1st yr. after alfalfa 25-49% stand, Low productivity soils	60
1st yr. after alfalfa <25% stand	40
1st yr. after clover & trefoil >50% stand, High productivity soils	90
1st yr. after clover & trefoil >50% stand, Moderate productivity soils	80
1st yr. after clover & trefoil >50% stand, Low productivity soils	60
1st yr. after clover & trefoil 25-49% stand, High productivity soils	60
1st yr. after clover & trefoil 25-49% stand, Moderate productivity soils	60
1st yr. after clover & trefoil 25-49% stand, Low productivity soils	50
1st yr. after clover & trefoil <25% stand	40
Soybeans, 30 bu/A	30
Soybeans, 35 bu/A	35
Soybeans, 40 bu/A	40
Soybeans, 45 bu/A	45
Soybeans, 50 bu/A	50
Soybeans, 55 bu/A	55
Soybeans, 60 bu/A	60
Soybeans, 65 bu/A	65
Soybeans, 70 bu/A	70

1. When a previous legume crop is checked on the Penn State soil test information sheet, the residual nitrogen for the year following the legume is calculated and given on the report.
This credit should be deducted from the N recommendation given on the soil test report.

2. See Agronomy Guide Table 1.1-1 in the basic soils section for information on soil productivity groups.

Go to NMP Index

Crop and Field Information Input

Clear Legume Residual Nitrogen

Instructions:
To enter a legume credit, enter the Legume management cond
enter the legume credit in lb N/acre.
The added entry will be available as a legume residual selectio
4 input sheet.

Helpful notes added in Column Headers

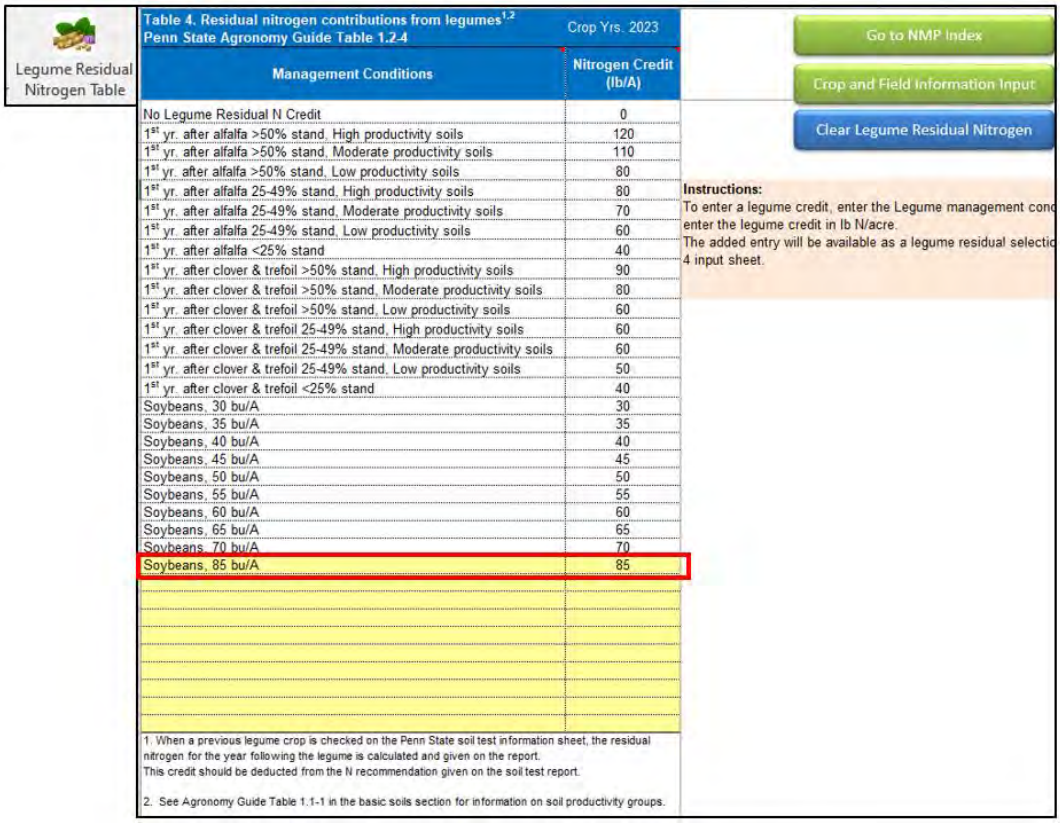
The blue column headers cells with red triangles have helpful notes included to help you understand what needs to be entered or what the cell data is used for. Where you see a red triangle in the cell, there is a note to help explain what should be entered in that column.

How to Complete the Legume Residual N Calculator

1. Procedure

1.1. Enter Legume Residual Management Condition

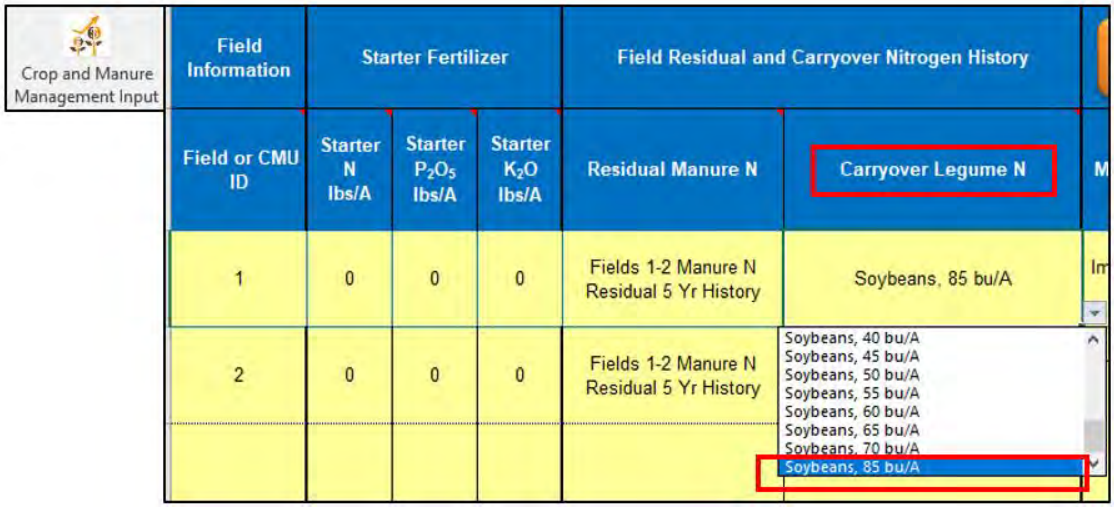
If a legume isn't listed, then enter the legume name in the first available yellow cell below and the nitrogen credit assigned.



2. Selecting legume nitrogen history in Appendix 4 Input

2.1. Residual Legume Nitrogen Selection

The completed entry will be available as a selection at the bottom of the Residual Manure N drop-down list.



3. Appendix 4 Crop & Manure Management Printout

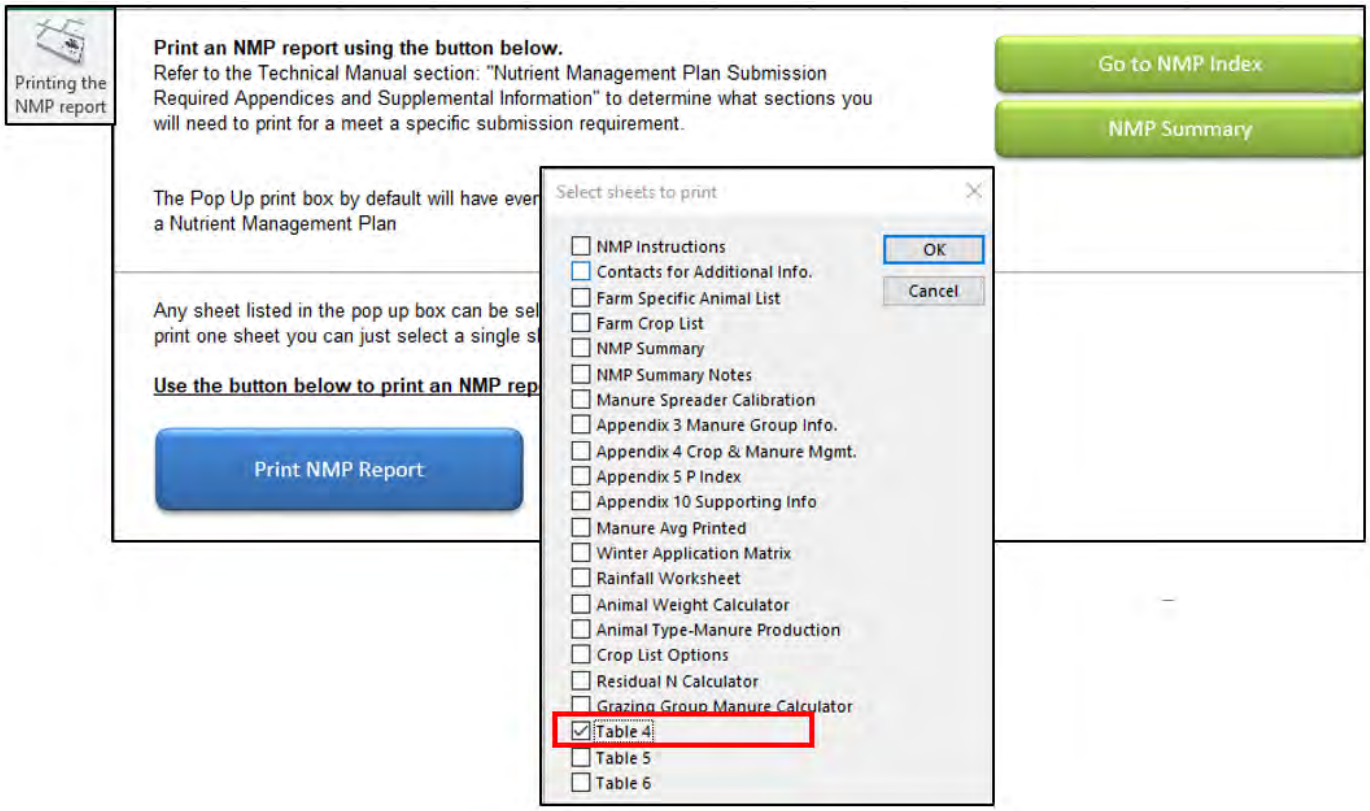
The newly created legume residual scenario and pounds of available organic nitrogen will be displayed in the manure history description.

	A	B	C	D
1	App. 4: Crop Yrs. 2023	1		
2	CMU/Field ID			
3	Acres	10.0		
4	Soil Test Report Date	October 2, 2016		
5	Laboratory Name	AASL		
6	Soil Test Levels (Mehlich-3 P & K)	ppm P	ppm K	pH
7	(Show conversions to ppm in Appendix 10)	121	150	6.8
8	P Index Part A Evaluation	No to All Part A		
9	Part A Result	N Based		
10	Crop	Corn for Silage		
11	Planned Yield	21 ton/A		
12	PSU Soil Test Recommendation (lb/A)	**N**	**P2O5**	**K2O**
13		160	0	30
14	User Soil Test Recommendation (lb/A)			
15	Other Nutrients Applied (lb/A) (Nutrients applied regardless of manure)	0	0	0
16	P Index Application Method			
17	Double Crop CarryOver N (lb/A)	0		
18	Manure History Description Residual Manure N (lb/A)	44	Fields 1-2 Manure N Residual 5 Yr History	
20	Legume History Description Residual Legume N (lb/A)	85	Soybeans, 85 bu/A	
21	Net Nutrients Required (lb/A)	31	0	90
22	Manure Group	Spring Liquid		
23	Application Season/ Management (Incorporation, cover crops, etc.)	Spring: Spring or summer utilization-Incorporation after 7 days or none		
24	Availability Factors	**Total N**	**NH4-N**	**Org. N**
25	(Total N or NH4-N & Organic N)	0.20		
26	P Index Application Method			
27	N Balanced Manure Rate (ton; gal/A)	6200 gal/A		
28	P Removal Balance Manure Rate	8400 gal/A		
29	(ton or gal/A; If required by P Index)	Crop P Removal (lb/A)	84.0	
30	P Index Value			
31	Planned Manure Rate (ton or gal/A)	**4000 gal/A**		
32	Nutrients Applied at Planned Manure Rate (lb/A)	20	40	88
33	Nutrient Balance after Manure	11	-40	2
34	Supplemental Fertilizer (lb/A)	11	0	0
35	P Index Application Method			
36	Final Nutrient Balance (lb/A)	**0**	**-40**	**2**
37	Multiple Application			
38	Manure Utilized on CMU	40,000 gallons		

4. Supplemental Information

4.1. Print the Residual Legume N Calculator for submission and include in Appendix 10: Supporting Information and Documentation

The check box for the residual legume nitrogen table is called Table 4



4.2. Printed Residual N Calculator

Table 4. Residual nitrogen contributions from legumes [1,2] Crop Yrs. 2023
Penn State Agronomy Guide Table 1.2-4

Management Conditions	Nitrogen Credit (lb/A)
No Legume Residual N Credit	0
1st yr. after alfalfa >50% stand, High productivity soils	120
1st yr. after alfalfa >50% stand, Moderate productivity soils	110
1st yr. after alfalfa >50% stand, Low productivity soils	80
1st yr. after alfalfa 25-49% stand, High productivity soils	80
1st yr. after alfalfa 25-49% stand, Moderate productivity soils	70
1st yr. after alfalfa 25-49% stand, Low productivity soils	60
1st yr. after alfalfa <25% stand	40
1st yr. after clover & trefoil >50% stand, High productivity soils	90
1st yr. after clover & trefoil >50% stand, Moderate productivity soils	80
1st yr. after clover & trefoil >50% stand, Low productivity soils	60
1st yr. after clover & trefoil 25-49% stand, High productivity soils	60
1st yr. after clover & trefoil 25-49% stand, Moderate productivity soils	60
1st yr. after clover & trefoil 25-49% stand, Low productivity soils	50
1st yr. after clover & trefoil <25% stand	40
Soybeans, 30 bu/A	30
Soybeans, 35 bu/A	35
Soybeans, 40 bu/A	40
Soybeans, 45 bu/A	45
Soybeans, 50 bu/A	50
Soybeans, 55 bu/A	55
Soybeans, 60 bu/A	60
Soybeans, 65 bu/A	65
Soybeans, 70 bu/A	70
Soybeans, 85 bu/A	85

1. When a previous legume crop is checked on the Penn State soil test information sheet, the residual nitrogen for the year following the legume is calculated and given on the report.
This credit should be deducted from the N recommendation given on the soil test report.

2. See Agronomy Guide Table 1.1-1 in the basic soils section for information on soil productivity groups.

Version 8.0 - October 2021 Table 4 Page - 1

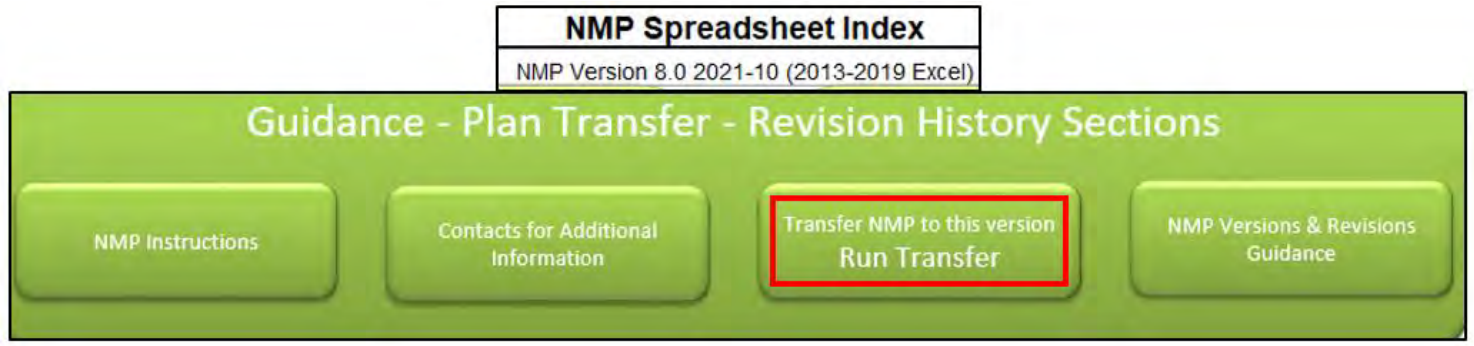
How to Transfer the Excel NMP to Version 8

Purpose and Overview:

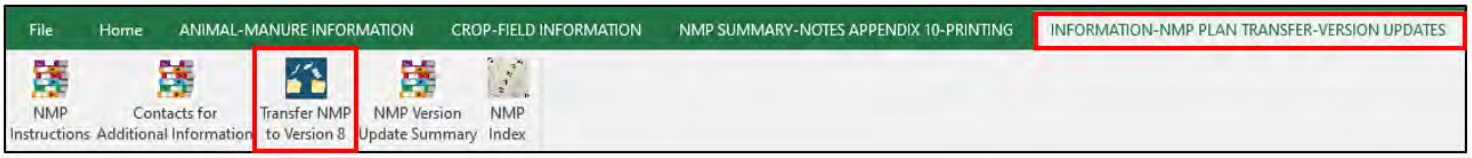
This procedure provides an overview and details how to transfer the Excel portion of a NMP to version 8 from a previous version NMP.

Use the procedure below to transfer any Version 6, 7, 8 NMP to Version 8. Previous NMP versions will cannot be transferred using this process.

You can find the Print Worksheet page by looking in the Guidance – Plan Transfer – Revision History sections of the NMP Spreadsheet Index



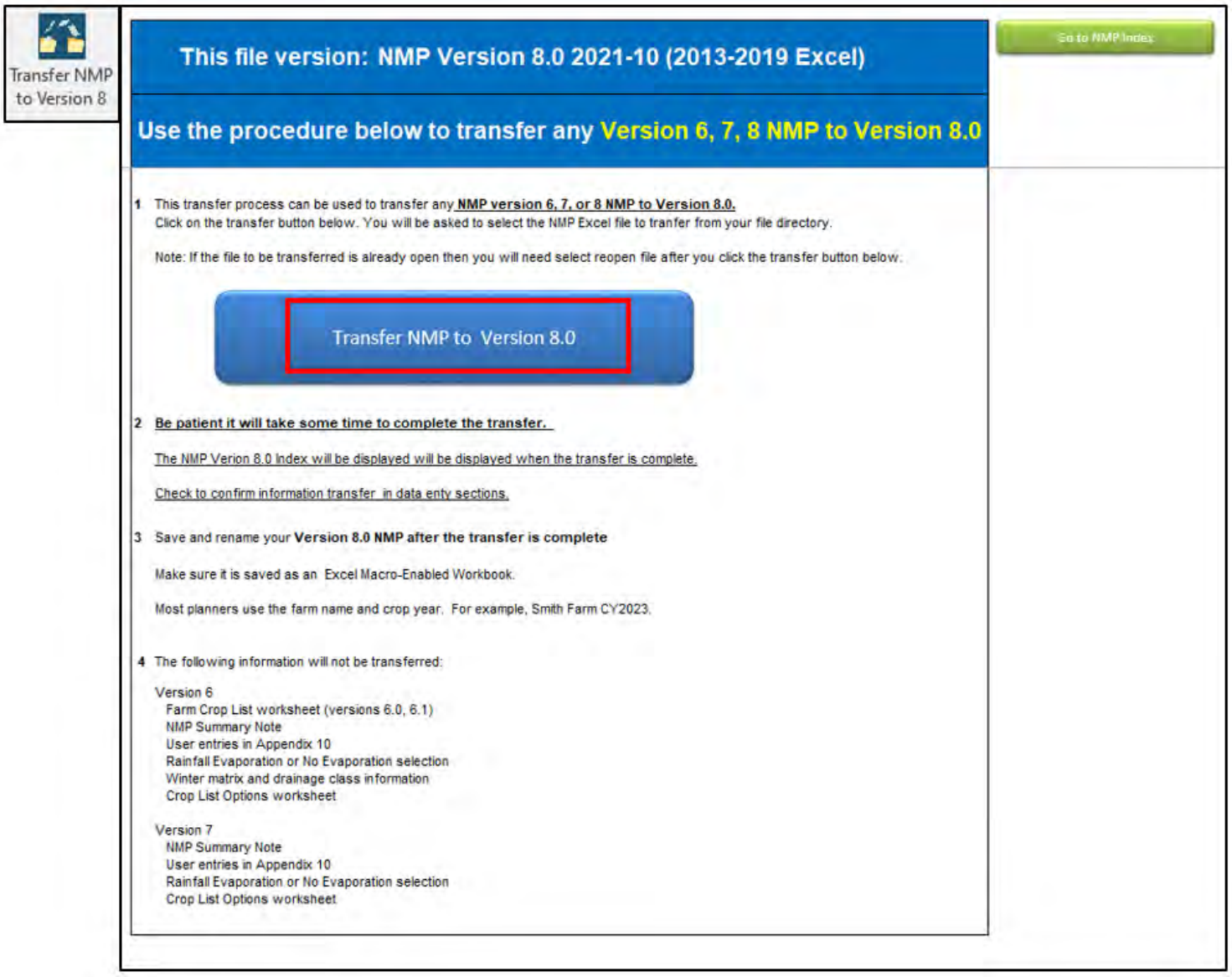
Or look for the toolbar ribbon at the top of your screen. The Transfer to Version 8 Icon looks like this:



How to Transfer the Excel NMP to Version 8

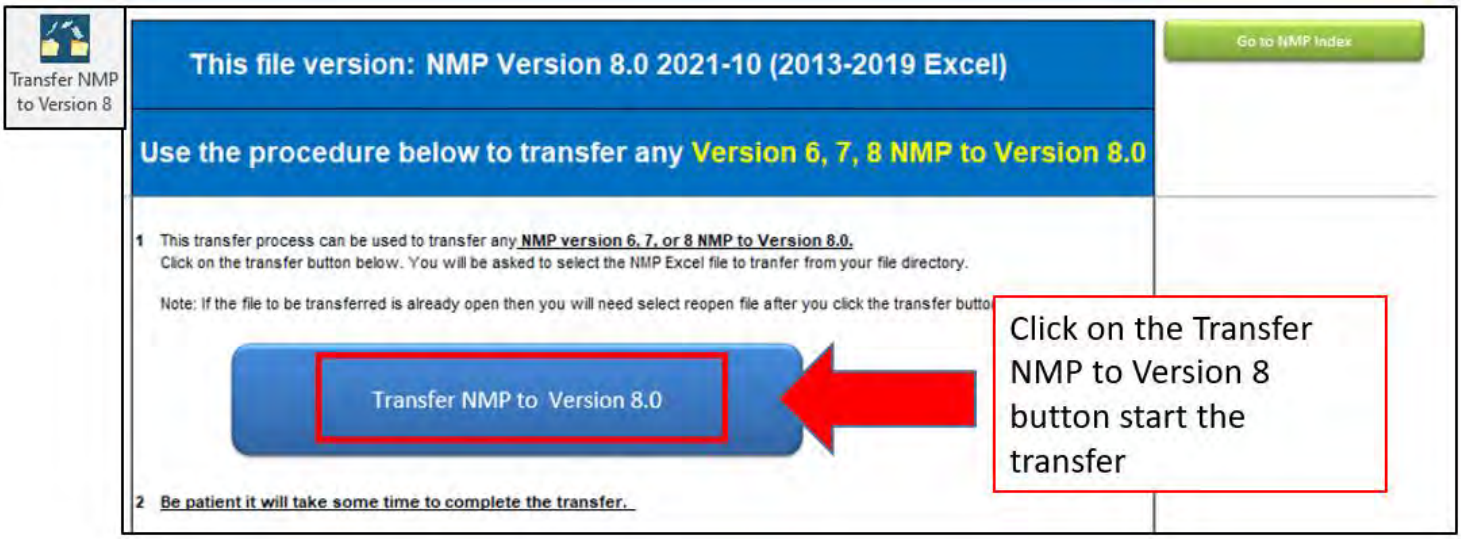
1. Layout and Completion of the Print NMP Report Page

The Transfer NMP to Version 8 page is very simple to use. There is Transfer NMP to Version 8 Button to initiate the transfer macro.



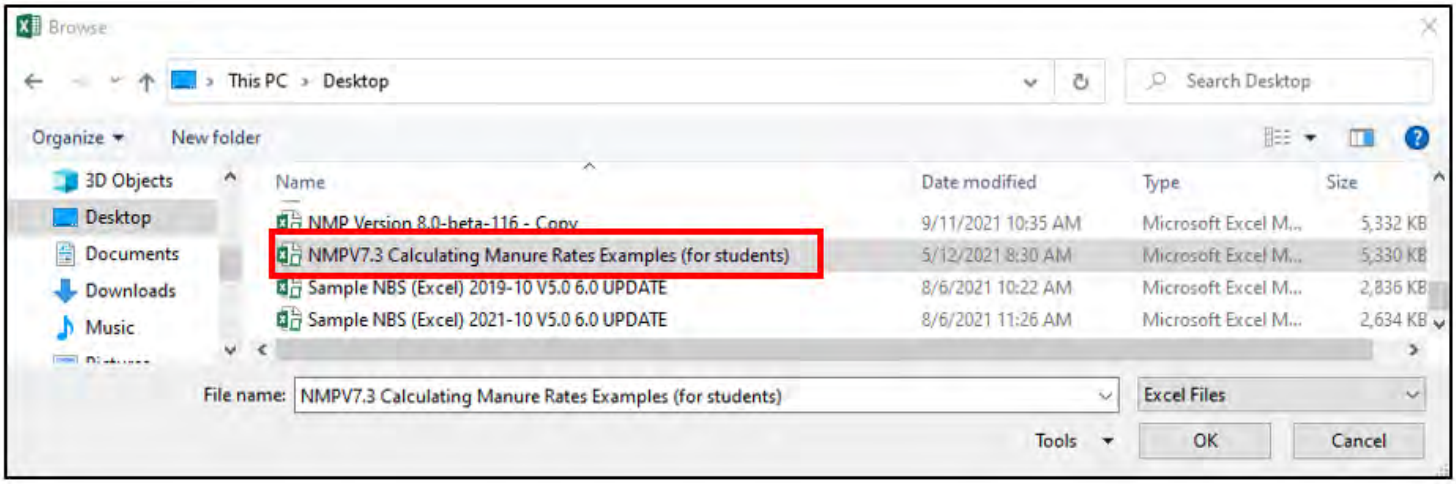
2. Procedure to print the Excel Section of a NMP

2.1. Click on the transfer button below. You will be asked to select the NMP Excel file to transfer from your file directory.



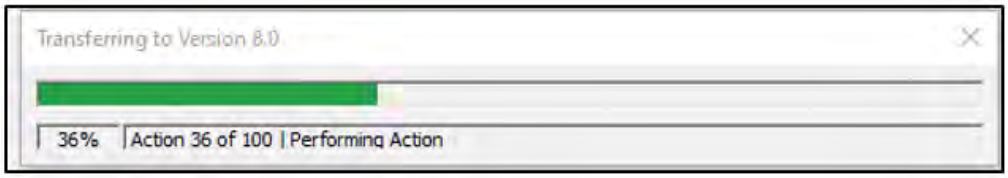
2.2. Select the file to transfer

After clicking the transfer button, a browse file box will appear and the Excel NMP file to be transferred can be selected.



2.3. A progress bar will appear during the transfer process.

Be patient it will take some time to complete the transfer.



The NMP Version 8.0 Index will be displayed will be displayed when the transfer is complete. Check to confirm information transfer in the data entry sections.

2.4. Save the newly transferred file

Save and rename your Version 8.0 NMP after the transfer is complete. Make sure it is saved as an Excel Macro-Enabled Workbook. Most planners use the farm name and crop year. For example, Smith Farm CY2023.

2.5. Information not transferred

Planners are strongly urged to review each section after transferring a plan for completeness.

Some information may be transferred but will need to be updated. For example, user enter animal types will transfer but need to be re selected in in the Farm Animal List.

The following information will not be transferred:

Version 6:

- Farm Crop List worksheet (versions 6.0, 6.1)
- NMP Summary Note
- User entries in Appendix 10
- Rainfall Evaporation or No Evaporation selection
- Winter matrix and drainage class information
- User Entered Animal Types (will need to be re-selected)
- Crop List Options worksheet

Version 7

- NMP Summary Note
- User entries in Appendix 10
- Rainfall Evaporation or No Evaporation selection
- User Entered Animal Types (will need to be re-selected)
- Crop List Options worksheet

Prepared by Don Orner | Research Technologist | Penn State Extension – Nutrient Management