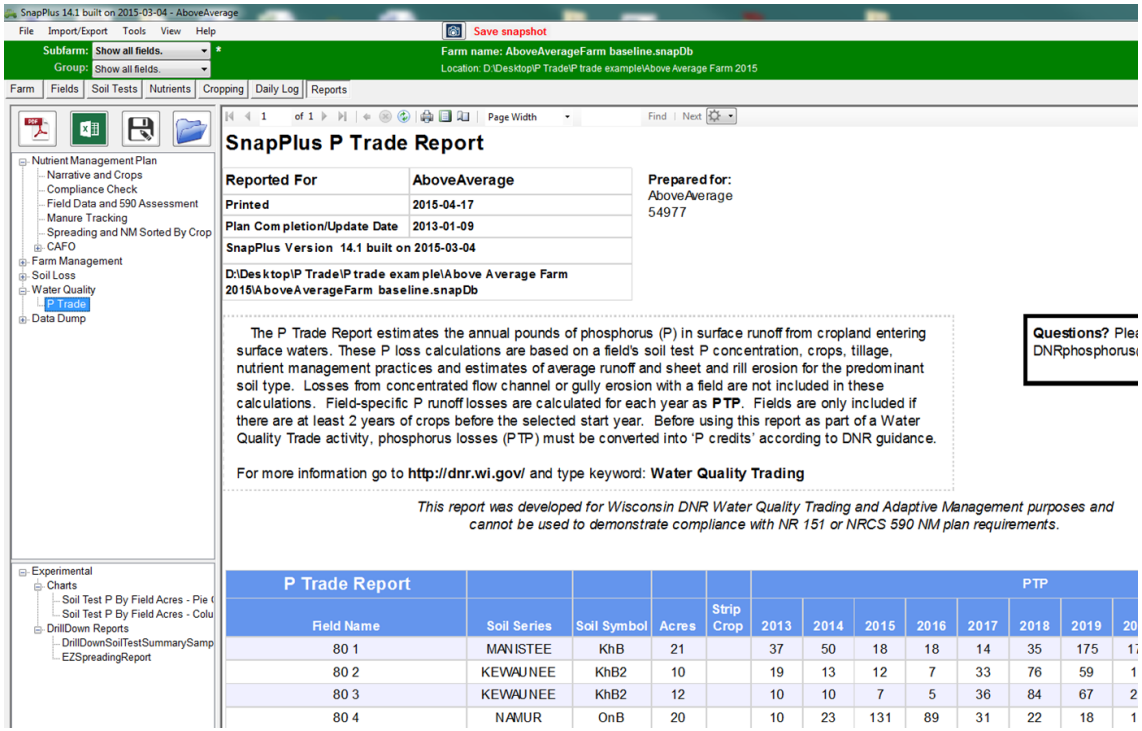
# Wisconsin P Trade Report – Webinar #4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WQ Trading and AM statewide coordinators

DNR Bureau of Runoff Management and Water Quality

April 22, 2015

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# WI P Trade Report

- What is the P Trade Report?
- How to create the report?
- How to use the report?
- DNR Guidance posted. Comment period open until May 11, 2015
  - **Appendix A - Agricultural Nonpoint Source Implementation Handbook for Adaptive Management and Water Quality Trading**
  - **http://dnr.wi.gov/news/input/guidance.html**
  - **DNRNPSProgram@Wisconsin.gov**

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# What is the P Trade Report?

- Created using SNAP+ software - www.snapplus.wisc.edu
- Created for WQ Trading or Adaptive Management compliance strategy for point source discharge permits
- Shows annual pounds of phosphorus from a field or pasture entering surface waters – current farm practices
- Calculates phosphorus reduction – from additional or new farm practices
- Use report outputs with DNR Trade Ratio(s) to determine P credits for WQ Trading

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# WI P Trade Report Calculation Basics

**Estimate phosphorus from a field delivered to stream:**

- From eroding sediment
- Released from soil, manure or fertilizer on the surface and dissolved in runoff

**Practices to reduce phosphorus delivery to stream:**

- Reduce erosion and/or runoff (transport)
- Reduce phosphorus at the soil surface that is vulnerable to erosion and/or runoff (source)

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# WI P Trade Report CAVEATS

- P Trade Report does not account for sediment-bound P lost in gully erosion on field
  - Field may not eligible for WQ Trading
- Report must include at least two prior years of farm data/ practices and must be accurate
- Report uses field 'predominant' soil to calculate P loss to surface waters
  - More accurate estimate of field P loss compared to WI P Index = planning tool; dominant critical soil used to estimate field P loss
- All fields owned or operated by the 'farm' should be included in SNAP+ database
  - Prevents 'shifting' P losses to other fields

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# Gully Erosion Examples - Sediment P

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# How to create the report

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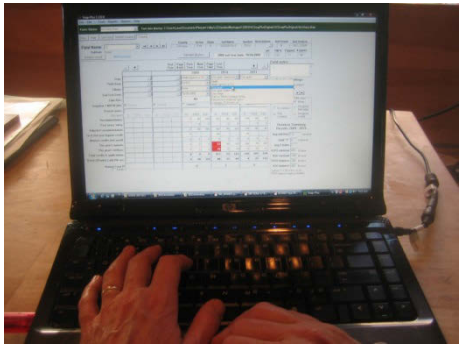
# Step 1 – Complete Baseline Inventory

Required Information for P Trade report (lb P/yr):



- **Interview farmer/agronomist to find out crops and field management**
  - **tillage, manure and fertilizer, soil erosion, filter strips, etc.**
- **Soil sample fields -** routine analysis for crop fields
- **Use soil maps to identify soil type, slope, slope length**

You can use existing SnapPlus nutrient management plans that have been updated after each crop season to reflect what happened on a field

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# Step 2 – Enter data into SnapPlus


Enter the farm's typical/ current field management for all fields and for all years up to the end of the proposed trade contract period.

Use SnapPlus screen 'tabs' to enter data

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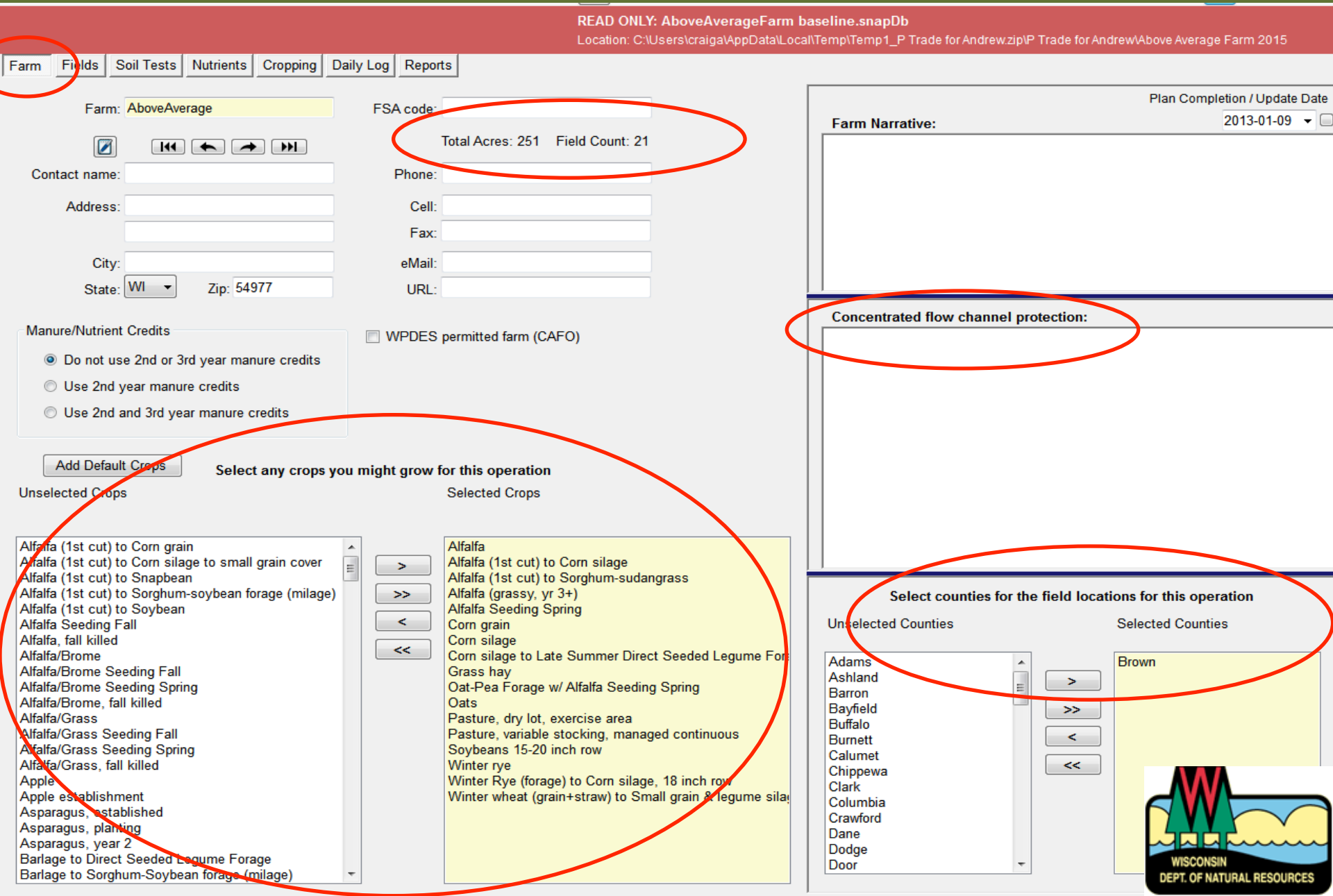
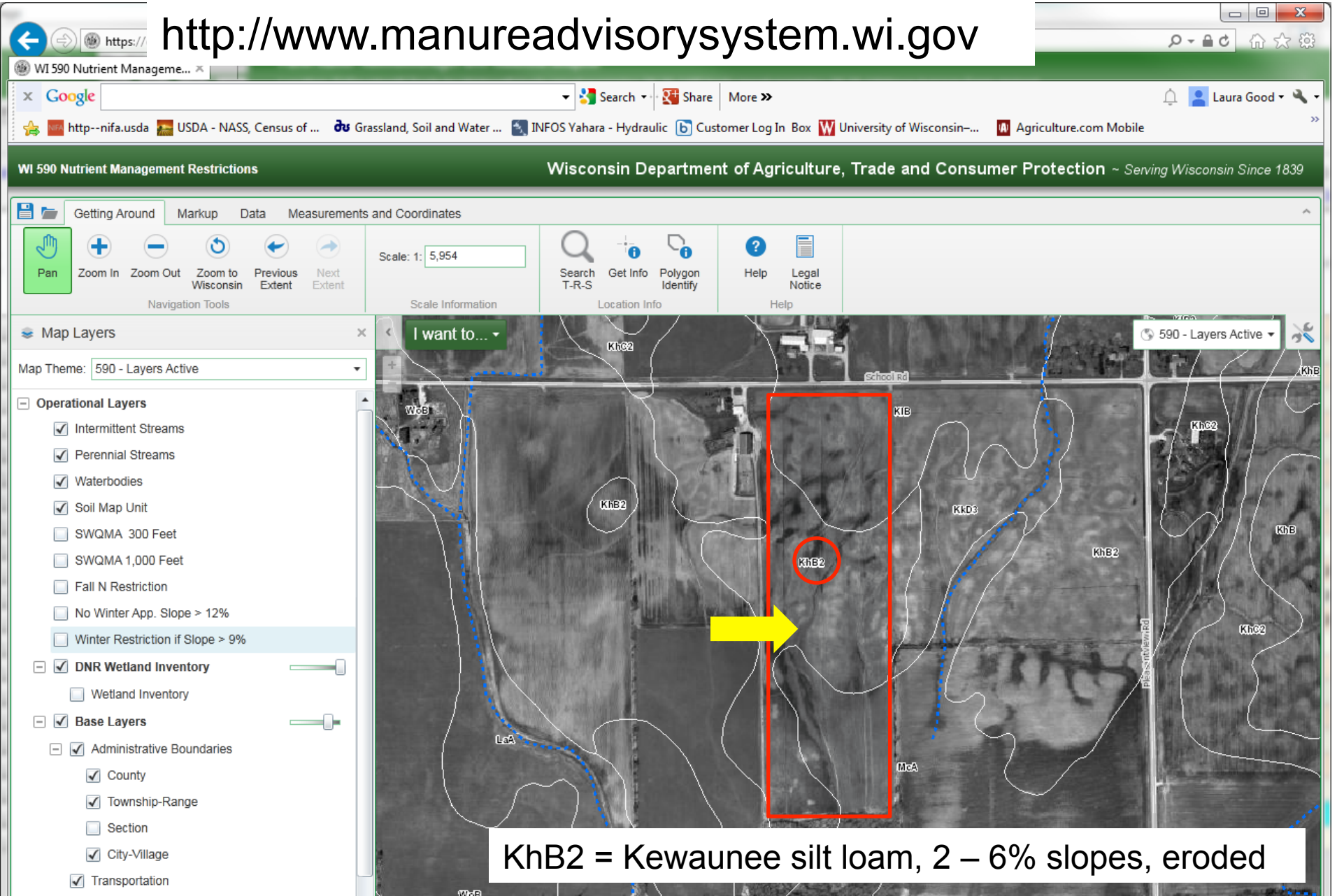
# Step 2 – Enter data into SnapPlus



# Step 2 – Enter field data from online Soil Maps

http://www.manureadvisorysystem.wi.gov



# Step 2 – Enter data into SnapPlus

File Import/Export Tools View Help — Save snapshot

Subfarm: Show all fields. * Field: 80 1

Group: Show all fields.

READ ONLY: AboveAverageFarm baseline.snapDb

Location: C:\Users\craiga\AppData\Local\Temp\Temp1_P Trade for Andrew.zip\P Trade for Andrew\Above Average Farm 2015

Farm | Fields | Soil Tests | Nutrients | Cropping | Daily Log | Reports

Fields | Subfarms | Groups

P Index

P Trade Rpt

Right-click on column headers for single or multi-cell editing of selected cells.

590 Restriction Maps | Restriction definitions

GDD Override | What is Tiled?

Total Acres: 251 Field Count: 21

| ALL | Field Name | Active | Sub Farm | Fsa Tract # | Fsa Field # | Size (acres) | County | Soil Map Symbol (critical) | Soil Series Name (critical) | Soil Map Symbol (pre-dominant) | Soil Series Name (pre-dominant) | Field Slope (%) | Field Slope Length (ft) | Below Field Slope to Water (%) | Distance to Perennial Water (ft) | Re striction Features | Tiled? | Field notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 80 1 | ☑ | 80 | | | 21.00 | Brown | MeC2 | MANISTEE | KhB | KEWAU... | 10 | 150 | 0 - 2 | 301 - ... | yes | ☐ | |
| | 80 2 | ☑ | 80 | | | 10.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | 80 3 | ☑ | 80 | | | 12.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | 80 4 | ☑ | 80 | | | 20.00 | Brown | NaD | NAMUR | OnB | OSHKOSH | 13 | 98 | 0 - 2 | 1001 ... | yes | ☐ | |
| | 80 6 | ☑ | 80 | | | 12.00 | Brown | KfC2 | KEWAU... | KfC2 | KEWAU... | 9 | 151 | 0 - 2 | 1001 ... | | ☐ | |
| | HOME 1 | ☑ | H... | | | 22.00 | Brown | KhB | KEWAU... | KhB | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | HOME 2 | ☑ | H... | | | 12.00 | Brown | SeD | SHAWANO | ShB | SISSON | 21 | 79 | 0 - 2 | 1001 ... | yes | ☐ | |
| | HOME 3 | ☑ | H... | | | 10.00 | Brown | KIB2 | MANA... | MaA | MANAWA | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | HOME 4 | ☑ | H... | | | 9.00 | Brown | KhC2 | KEWAU... | KhC2 | KEWAU... | 9 | 151 | 0 - 2 | 1001 ... | | ☐ | |
| | HOME 5 | ☑ | H... | | | 7.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | MART 1 | ☑ | M... | | | 2.00 | Brown | HoC2 | HOCHHEIM | KgB | KEWAU... | 9 | 151 | 0 - 2 | 0 - 300 | yes | ☐ | SWQMA |
| | MART 2 | ☑ | M... | | | 23.00 | Brown | KhB2 | KEWAU... | MaA | MANAWA | 4 | 200 | 0 - 2 | 0 - 300 | yes | ☐ | SWQMA |
| | MART 3 | ☑ | M... | | | 4.00 | Brown | KhC2 | KEWAU... | KhC2 | KEWAU... | 9 | 151 | 0 - 2 | 0 - 300 | yes | ☐ | SWQMA |
| | PASTURE East | ☑ | H... | | | 3.00 | Brown | KhC2 | KEWAU... | KhB2 | KEWAU... | 9 | 151 | 0 - 2 | 1001 ... | | ☐ | |
| | PASTURE West | ☑ | H... | | | 13.00 | Brown | KhD2 | KEWAU... | KhB2 | KEWAU... | 16 | 98 | 0 - 2 | 1001 ... | yes | ☐ | |
| | TILLIES 1 | ☑ | Til... | | | 13.00 | Brown | KhC2 | KEWAU... | KhC2 | KEWAU... | 9 | 151 | 0 - 2 | 1001 ... | | ☐ | |
| | TILLIES 2 | ☑ | Til... | | | 11.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | TILLIES 3 | ☑ | Til... | | | 10.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | TILLIES 4 | ☑ | Til... | | | 16.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | TILLIES 5 | ☑ | Til... | | | 11.00 | Brown | KhB2 | KEWAU... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |
| | TILLIES 6 | ☑ | Til... | | | 10.00 | Brown | KIB2 | KEW... | KhB2 | KEWAU... | 4 | 200 | 0 - 2 | 1001 ... | | ☐ | |

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# Step 2 – Enter data into SnapPlus

Subfarm: Show all fields. * Field: 80 1

Group: Show all fields.

READ ONLY: AboveAverageFarm baseline.snapDb

Location: C:\Users\craiga\AppData\Local\Temp\Temp1_P Trade for Andrew.zip\P Trade for Andrew\Above Average Farm 2015

Farm | Fields | Soil Tests | Nutrients | Cropping | Daily Log | Reports

**Soil test history for field: 80 1**

| County | Acres | Slope | Field Soils: | Soil Name | Soil Symbol | Subsoil Fertility | Soil Texture |
|---|---|---|---|---|---|---|---|
| Brown | 21 | 10.0 % | Critical: | Manistee | MeC2 | E | Loamy Sand |
| | | | Predominant: | Kewaunee | KhB | C | Silt Loam |

Import Soil Test

| Test Date | Soil Test Lab | Lab Number | Plow Depth (inches) | Avg pH | Avg OM (%) | Avg P (ppm) | Avg K (ppm) | Avg Ca (ppm) | Avg Mg (ppm) | Avg B (ppm) | Avg Mn (ppm) | Avg Zn (ppm) | Avg S (ppm) | Avg CEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2013-11-12 | State approved lab | 130000 | 7 | 6.4 | 2.0 | 53 | 70 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 2009-06-16 | ROCK RIVER LAB | 118674 | 7 | 6.4 | 2.0 | 49 | 70 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

**Individual soil test samples for test date: 2013-11-12**

Sample Count: 5

| Sample ID | pH | OM (%) | P (ppm) | K (ppm) | BpH | Ca (ppm) | Mg (ppm) | B (ppm) | Mn (ppm) | Zn (ppm) | S (ppm) | CEC | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | 6.4 | 2.2 | 65 | 70 | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 45 | 6.5 | 2.1 | 49 | 50 | 7.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 46 | 6.6 | 1.8 | 55 | 76 | 7.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 47 | 6.3 | 2.0 | 52 | 70 | 6.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 48 | 6.2 | 1.9 | 44 | 84 | 6.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |

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# Step 2 – Enter data into SnapPlus

READ ONLY: AboveAverageFarm baseline.snapDb
Location: C:\Users\craiga\AppData\Local\Temp\Temp1_P Trade for Andrew.zip\P Trade for Andrew\Above Average Farm 2015

Farm | Fields | Soil Tests | Nutrients | Cropping | Daily Log | Reports

Crop Year: 2015

Copy Sources/Fertilizers/Herds | Edit Shared Fertilizers

Nutrient sources | Manure production estimator | Animal units calculator | Grazing herd setup | Manure Analysis

**Manure/Bio Source Data**

N, P2O5, K2O & S values are for first year available nutrients in lbs/unit solid or lbs/1000 gallons

| Source Name | Nutrient Type | N surface | N incorp | N inject | P2O5 | K2O | S | Dry matter % | Analysis Date | Known Annual Volume | Volume Units | Unit Value (Incorp) | Total Value (incorp) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dairy Dry Lots | Dairy, grazing | 3.0 | 0.0 | 0.0 | 3.0 | 6.0 | 1.0 | 13 | | 218 | Tons | $0.00 | $0 |
| Dry Cow Pasture ... | Dairy, grazing | 3.0 | 0.0 | 0.0 | 3.0 | 7.0 | 0.9 | 12 | | 392 | Tons | $0.00 | $0 |
| Pit Manure Dairy s... | Dairy, slurry | 7.0 | 10.0 | 12.0 | 6.0 | 17.0 | 1.0 | 6 | | 1,600,000 | Gallo... | $0.00 | $0 |
| Solid | Dairy, solid | 2.0 | 3.0 | 3.0 | 3.0 | 6.0 | 1.0 | 33 | | 311 | Tons | $0.00 | $0 |

The unit value is $/ton or $/1000 gals

**Total: $0**

**Value of nutrients in: 2015**
**based on commercial fertilizer costs.**

| | | |
|---|---|---|
| N | 0 | $/lb |
| P2O5 | 0 | $/lb |
| K2O | 0 | $/lb |
| Sulfur | 0 | $/lb |

**Dry fertilizer sources**

| Fertilizer name | % N | % P2O5 | % K2O | % S | % Mg | % Ca | Cost $ per ton |
|---|---|---|---|---|---|---|---|
| Anhydrous ammonia | 82 | 0 | 0 | 0.0 | 0.0 | 0.0 | 0.00 |
| Diammonium phosphate... | 18 | 46 | 0 | 0.0 | 0.0 | 0.0 | 0.00 |
| Potassium chloride | 0 | 0 | 61 | 0.0 | 0.0 | 0.0 | 0.00 |

**Liquid fertilizer sources**

| Fertilizer name | % N | % P2O5 | % K2O | % S | % Mg | % Ca | Density lbs/gal | Cost $ per ton |
|---|---|---|---|---|---|---|---|---|

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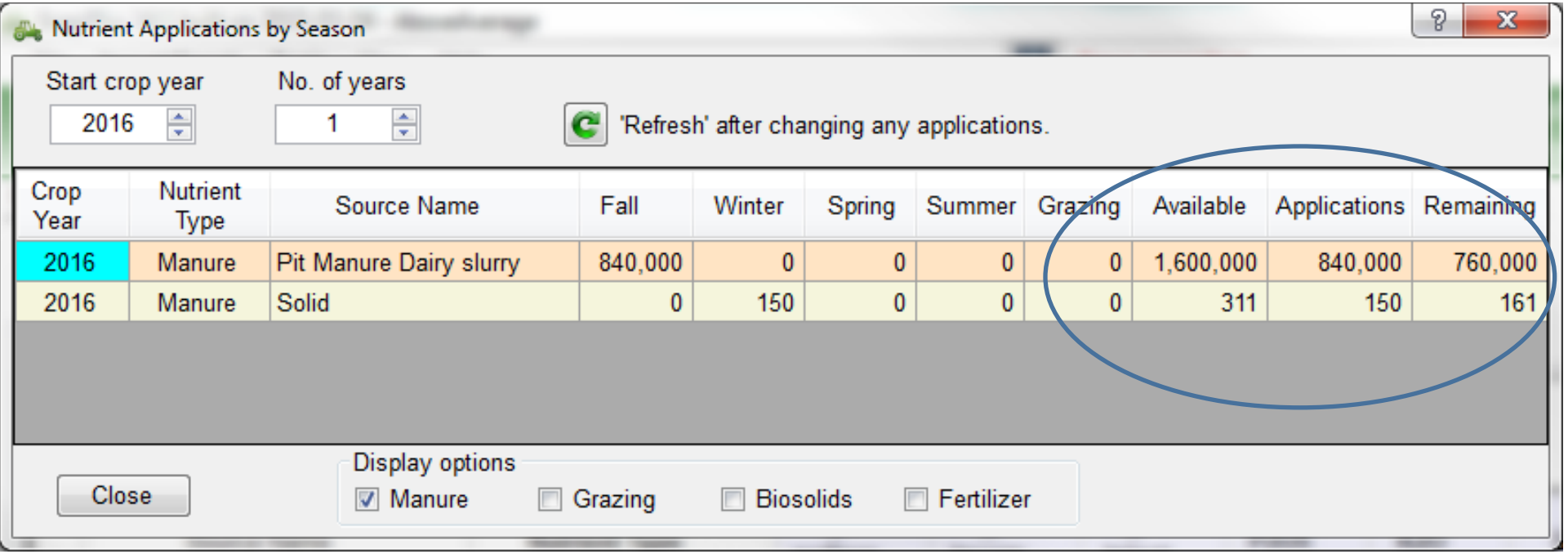
# Step 2 – Enter data into SnapPlus

Ensure all WQ trade project years have all manure generated on the farm distributed in planned applications

**In 2016, almost half of the manure generated on farm has not been applied**




Need to go back and distribute all of the manure

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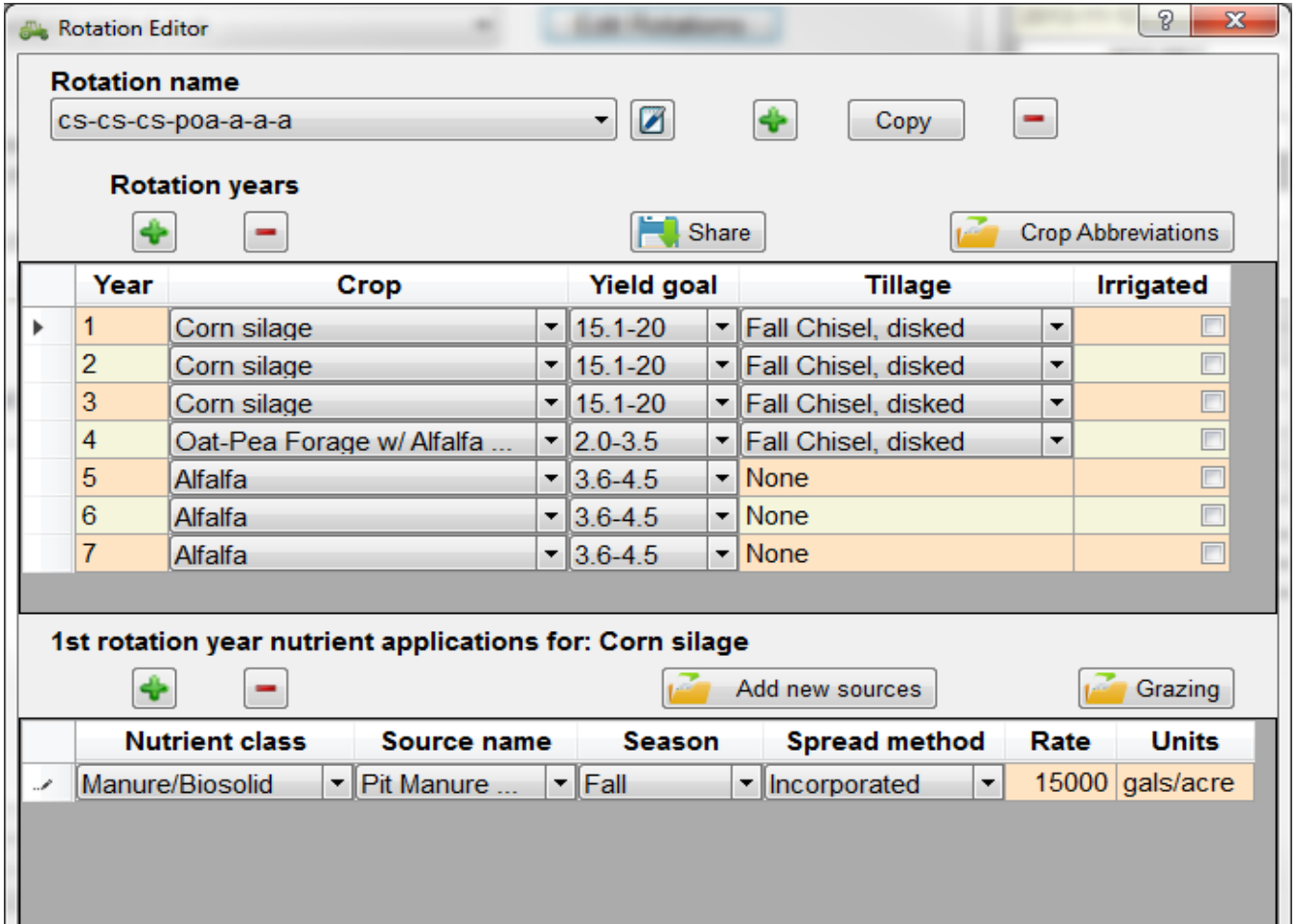
# Step 2 - All Fields Need All Management for All Project Years

Enter crop rotation with current typical tillage and manure/fertilizer applications

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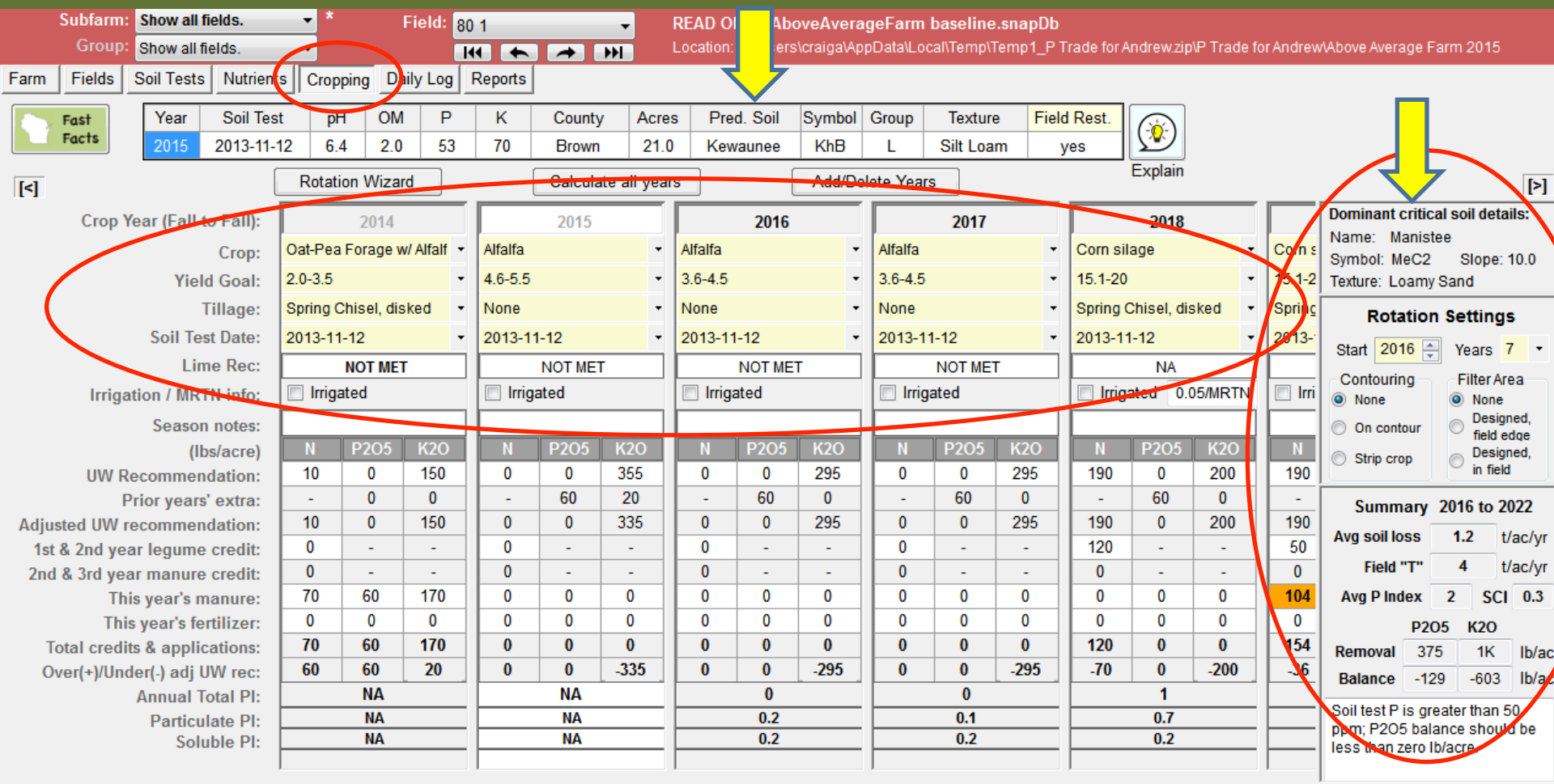
# Step 2 – Enter data into SnapPlus



# Agronomists Can Help with P Trade


**Confused? Need Help?**

**Consulting Agronomists** who are certified to do management planning have the skills to use SnapPlus and generate P Trade Report

DATCP offers classes to learn how to use SNAP+

County Land and Water staff may also help

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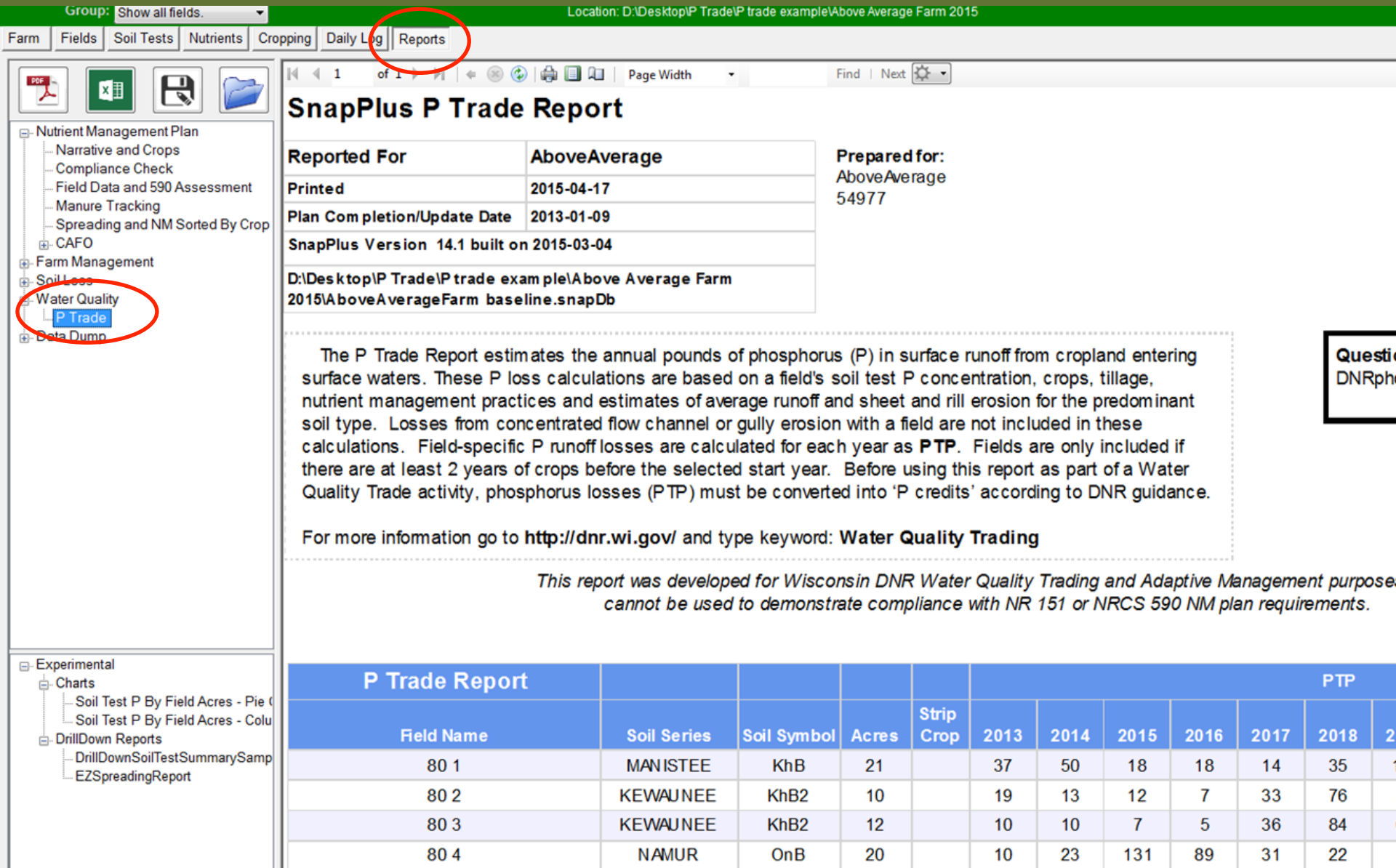
# Current Practices in all Project Years?
# Now you can run the Baseline P Trade Report



# Step 3 – Run Baseline P Trade Report

**History**

**Trade period with current farm management**

| Field | Acres | PTP 2013 | PTP 2014 | PTP 2015 | PTP 2016 | PTP 2017 | PTP 2018 | PTP 2019 | PTP 2020 |
|---|---|---|---|---|---|---|---|---|---|
| 80 1 | 21.0 | 37 | 50 | 18 | 18 | 14 | 35 | 175 | 170 |
| 80 2 | 10.0 | 19 | 13 | 12 | 7 | 33 | 58 | 59 | 19 |
| 80 3 | 12.0 | 10 | 10 | 7 | 5 | 36 | 59 | 66 | 19 |
| 80 4 | 20.0 | 10 | 23 | 131 | 89 | 31 | 22 | 18 | 14 |
| 80 6 | 12.0 | 20 | 13 | 9 | 7 | 45 | 99 | 78 | 23 |
| HOME 1 | 22.0 | 156 | 158 | 41 | 20 | 19 | 14 | 34 | 168 |
| HOME 2 | 12.0 | 7 | 19 | 68 | 67 | 25 | 16 | 13 | 10 |
| HOME 3 | 10.0 | 29 | 49 | 6 | 26 | 35 | 8 | 6 | 4 |
| HOME 4 | 9.0 | 14 | 9 | 43 | 147 | 161 | 44 | 17 | 16 |
| HOME 5 | 7.0 | 8 | 20 | 66 | 75 | 23 | 13 | 13 | 10 |
| MART 1 | 2.0 | 6 | 9 | 3 | 3 | 3 | 2 | 3 | 11 |
| MART 2 | 23.0 | 26 | 15 | 18 | 14 | 22 | 44 | 80 | 20 |
| MART 3 | 4.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| PASTURE East | 3.0 | 44 | 45 | 46 | 46 | 47 | 47 | 48 | 48 |
| PASTURE West | 13.0 | 16 | 16 | 14 | 16 | 21 | 21 | 21 | 21 |
| TILLIES 1 | 13.0 | 146 | 215 | 51 | 16 | 15 | 10 | 39 | 183 |
| TILLIES 2 | 11.0 | 7 | 5 | 18 | 66 | 94 | 21 | 10 | 9 |
| TILLIES 3 | 10.0 | 53 | 81 | 16 | 13 | 14 | 5 | 14 | 76 |
| TILLIES 4 | 16.0 | 33 | 16 | 15 | 17 | 36 | 114 | 141 | 33 |
| TILLIES 5 | 11.0 | 17 | 17 | 86 | 92 | 18 | 11 | 8 | 5 |
| TILLIES 6 | 10.0 | 7 | 5 | 3 | 13 | 48 | 82 | 16 | 7 |
| **Total** | **251** | **667** | **788** | **671** | **757** | **741** | **726** | **859** | **867** |

**Note year-to-year variations in estimated P loss**

# How to use the report

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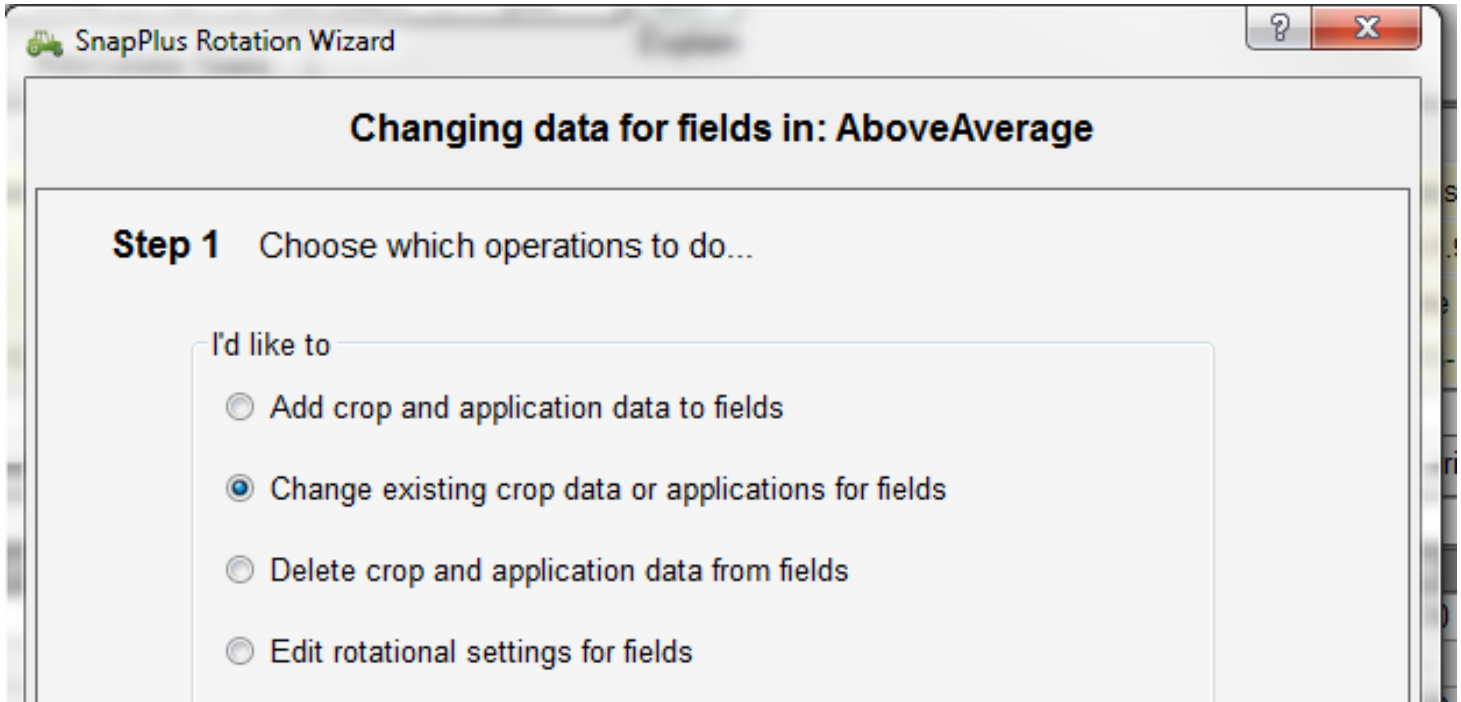
# Step 4 - Reduce P runoff from fields with new or additional practices

Copy SnapPlus database & rename the copy

Identify practices on fields or pastures to reduce P in runoff – *requires farm operator input*

Enter changes into new database

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# Step 4 – Example Practices to reduce P runoff

- ❑ Less tillage
  Reduces erosion of P-containing sediment

- ❑ Revegetated an over-used cattle lot
  Reduces erosion and runoff from a high P area

- ❑ Added an edge of field grass filter to 3 fields with high P runoff losses
  Captures P-containing sediment in runoff below field

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# Step 5 - Run P Trade Report with Changes

History

Trade period with new or additional practices

| Field | Acres | PTP 2013 | PTP 2014 | PTP 2015 | PTP 2016 | PTP 2017 | PTP 2018 | PTP 2019 | PTP 2020 |
|---|---|---|---|---|---|---|---|---|---|
| 80 1 | 21.0 | 37 | 50 | 18 | 18 | 14 | 24 | 154 | 145 |
| 80 2 | 10.0 | 19 | 13 | 12 | 7 | 31 | 71 | 57 | 19 |
| 80 3 | 12.0 | 10 | 10 | 7 | 5 | 33 | 87 | 64 | 20 |
| 80 4 | 20.0 | 10 | 23 | 131 | 89 | 31 | 22 | 18 | 14 |
| 80 6 | 12.0 | 20 | 13 | 9 | 7 | 42 | 106 | 76 | 23 |
| HOME 1 | 22.0 | 156 | 158 | 41 | 20 | 19 | 14 | 24 | 148 |
| HOME 2 | 12.0 | 7 | 19 | 68 | 61 | 24 | 12 | 12 | 10 |
| HOME 3 | 10.0 | 29 | 49 | 6 | 25 | 34 | 4 | 4 | 3 |
| HOME 4 | 9.0 | 14 | 9 | 43 | 129 | 139 | 42 | 17 | 16 |
| HOME 5 | 7.0 | 8 | 20 | 66 | 69 | 23 | 13 | 13 | 10 |
| MART 1 | 2.0 | 2 | 3 | 2 | 2 | 2 | 2 | 2 | 5 |
| MART 2 | 23.0 | 18 | 13 | 14 | 12 | 16 | 27 | 54 | 14 |
| MART 3 | 4.0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| PASTURE East | 3.0 | 44 | 45 | 46 | 26 | 23 | 23 | 23 | 23 |
| PASTURE West | 13.0 | 16 | 16 | 17 | 21 | 21 | 21 | 22 | 22 |
| TILLIES 1 | 13.0 | 146 | 215 | 51 | 16 | 15 | 10 | 24 | 151 |
| TILLIES 2 | 11.0 | 7 | 5 | 18 | 60 | 82 | 20 | 10 | 9 |
| TILLIES 3 | 10.0 | 53 | 81 | 16 | 13 | 14 | 5 | 9 | 65 |
| TILLIES 4 | 16.0 | 33 | 16 | 15 | 17 | 26 | 90 | 122 | 31 |
| TILLIES 5 | 11.0 | 17 | 17 | 86 | 84 | 18 | 11 | 8 | 5 |
| TILLIES 6 | 10.0 | 7 | 5 | 3 | 9 | 40 | 71 | 15 | 7 |
| **Total** | **251** | **655** | **780** | **669** | **691** | **649** | **679** | **729** | **741** |

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# Step 6 – Compare P Trade Reports to determine P reduction (lbs../P/year)

Project Period

| | PTP 2016 | PTP 2017 | PTP 2018 | PTP 2019 | PTP 2020 |
|---|---|---|---|---|---|
| Baseline | 757 | 741 | 726 | 859 | 867 |
| Changed | 691 | 649 | 679 | 729 | 741 |
| P Reduction | 66 | 93 | 47 | 129 | 126 |

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# Step 7 – Apply DNR Trade Ratio to determine P credits

- DNR Trade Ratios discussed in prior webinars and in DNR guidance
- Multiply farm wide lbs/P/year savings by DNR Trade Ratio to determine P CREDIT.
- Example: P Trade reports show 126 lbs/P/year farm wide savings x 2:1 Trade Ratio = 63 lbs. P/year CREDIT

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# TMDL Watersheds

- DNR WQ Trading Guidance written before the P Trade Report was created
- DNR Guidance recommends using WI P Index for:
  - Trade thresholds in TMDL approved watersheds
  - Calculating Interim and Long-term credits
- P Trade report does not follow the WI P Index when estimating annual field P losses
- **DNR is seeking public comment for using P Trade report within TMDL watersheds**

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# Summary

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# P Trade Report Summary

- Use SNAP+ to enter current P management practices over time period (2013-2020) and run P trade report
  - Report gives annual pounds/P/year lost from each field and over entire farm
  - Provides a baseline for comparison
  - Gully erosion on field = sediment bound P not accounted for; field may not be eligible for WQ Trading
- Make copy of SNAP+ database, select practices to reduce P losses in future years on same fields for same time period and run P Trade Report
  - Reduce P inputs and/or tillage
  - Establish perennial crops vs. annual crops; increase residue; cover crops
  - Buffers, contour farming
  - Stop ag practices and establish permanent vegetation over some or all of field
- Compare P trade reports to calculate P reductions (using excel or some other tool)
  - BEFORE / AFTER analysis
  - Whole farm P reductions (annual pounds/P/year) can be determined

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# P Trade Report Summary

- Apply DNR Trade Ratio to calculated P reduction mass
  - Multiply total lbs/P/year by DNR delivery factor (typically 2:1 or 3:1) to determine P savings
  - Example: 800 lbs/P/year farm wide savings x 2:1 delivery factor = 400 lbs. P/ year CREDIT
  - This is the mass of P prevented from reaching the receiving water.

- Include P Trade reports and P savings calculations within the Point Source's compliance plan
  - WQ Trading
  - Adaptive Management

- Point Source submits plan to DNR for review and approval. If approved, plan is incorporated into Point Source permit conditions. EPA review of permit also required.

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# P Trade Report Summary

- This is only a summary

- DNR guidance will provide more detail and examples for using SNAP+ P Trade reports and calculating P credits using DNR trade ratios

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# Questions or Comments?

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