Outcomes Estimation Tools Training Webinar Series

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Featuring:
Nutrient Tracking Tool (Water Quality)

July 12, 2023
Noon to 1:30 pm eastern

American Farmland Trust

Agenda

- Welcome, Poll (5 min)
- Nutrient Tracking Tool Presentation (35 min)
- Nutrient Tracking Tool Demonstration (35 min)
- Q&A (15 min)

EPA

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Michelle

Zoom Webinar Reminders

- Use Q&A Box - last 15 minutes (Vote up!)
- Use Zoom Direct Message feature to Kinzie if having technical difficulties
- Email with resources to follow each webinar
- Recordings posted on the webinar series site the following Monday
- Evaluation survey in the Chat Box

Aysha

Time for 3 polls!

Aysha

Tools in 2023 Trainings*

May 3: Webinar Launch & PCOC (recording)

June 7: Model My Watershed (recording)

July 12: Nutrient Tracking Tool (NTT) (water quality)

August 2: NRCS Cover Crop Economics Tool (economic)

September 6: FieldPrint Platform (climate & water quality)

October 4: AFT Retrospective-Soil Health Economics (R-SHEC) Tool (economic)

November 1: PTMApp Web Tool (water quality)

December 6: EPA PLET (water quality)

Tools in 2024 Trainings*

January 10: SIPES Method/SIDMA Tool (social)

February 7: Fast-GHG (climate)

March 6: Cool Farm Tool (climate)

April 3: Cropping Systems Calculator (economic)

May 1: COMET-Farm & COMET-Planner (climate)

June 5: CAST Tool (water quality)

July 3: TBD

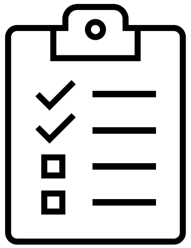
*Subject to change

Michelle

American Farmland Trust

Next steps in our outcomes estimation journey

- ❑ Remember the NRCS Cover Crops Economics Tool on August 2
- ❑ Fill out a 6-question (2-min) online evaluation survey
- ❑ Schedule a free "coaching" session with us
  - ❑ **Email atappross@farmland.org, RE: Coaching Request**
- ❑ Order a free print copy of the OET Guide
  - ❑ Keyword: "AFT outcomes tools"



Please keep in touch:
outcomestools@farmland.org

Aysha

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Nutrient Tracking Tool (NTT)
Version 8.23

Ali Saleh (project leader)
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Presentation today will:

1. Explain how to use NTT to
   a. Create field management scenarios to compare alternative management practices, crop rotations, and structural practices
   b. Compare the outcomes of each management scenario to determine which conservation practice(s) offers the best reduction opportunities
   c. Estimate yield impacts of each scenario to weigh potential tradeoffs between environmental performance and yield
2. Discuss the appropriate scale to use the tool
3. Briefly introduce NTT Research, and Education (NTT-RE)
4. Briefly introduce the new and upcoming analytical features

Agenda

- NTT description (Part 1-35 min)
  - History
  - Purpose
  - Snapshot of NTT
  - Strengths and limitations
  - Components (models, databases, conservation practices)
  - Scales
  - Latest modifications (carbon sequestration, regional tool)
  - Upcoming futures
- Demo of NTT Tool (Part 2-35 min)
- Questions and discussions (Part 3-20 min)

History of NTT

- USDA Office of Energy and Environmental Policy and Office of Environmental Market (OEEP/OEM) worked with TIAER to develop the current version of NTT as the science tool behind water quality trading

Purpose of NTT

- Conduct water quality/quantity assessment and serve as a decision-making tool for different farm conservation & watershed projects
- Conduct soil health & atmospheric gases assessment (Next version available August 23)
- Crop production optimization tool
- Planning
- Education & outreach
- Research & analysis

Snapshot of the NTT Tool

Is this the Right Tool for You?

Snap Shot of Features	Nutrient Tracking Tool (NTT)
Scale & level of specificity	**Field level:** with the potential for regional (including watershed, county, and state) scale and multiple-field project and use by adding up outcomes estimated using NTT watershed function routine. **Site-specific**: Field-specific estimates allowing for geo-specific placement of BMPs reflecting specific soils, slope, and weather data
Outcomes	**Water quantity, quality, loss reductions:** total flow, sediment, nitrogen, and phosphorus losses, soil carbon sequestration, crop yield, and economic.
Conservation practices	**Currently:** crop rotation, planting, harvesting, tillage, grazing, irrigation, nutrient management, tile management, and single or multiple structural practices **Next version(2024)**: bacteria, herbicide, pesticides, and urban BMP's
Land uses & production systems	**All land uses** (cropland, grazing, pasture, and forest) **Production systems**: all commodity row crops & grazing livestock, vegetables, fruit orchards **Next version(2024)**: urban

Snap Shot of Features	Nutrient Tracking Tool (NTT)
States & territories	**Currently:** CONUS and Puerto Rico **Next version(2024):** Hawaii and Alaska & U.S. territories
Time, data, & skills needed to generate an outcome estimate	**1)** Perform extensive "before v. after" interview with farmer to collect field specific production & conservation practice data **2)** Enter data into the web-based tool to build "before" & "after" conservation scenarios **3)** Produce and download results in tabular form or graphical bar charts displaying baseline, conservation scenario, and change metrics for water quality/quantity, and crop production estimates.
NTT versions	1. NTT Public (www.NTT.tiaer.Tarleton.edu and ; 2. Research and Educational, and APEX interface program (www.NTT-RE.tiaer.Tarleton.edu), Multiple field simulation project (individual requests) and county level conservation evaluation (to be released in 2024

Strengths, Limitations, & Trade Offs of NTT Tool

Strengths

- **National coverage** – Available in CONUS, useful if you have projects in many states
- **User friendly interface -** No software download Required
- **Provide farmers with their own site-specific analysis-** Due to use of national soils and weather datasets and the powerful APEX field production model
- Economic
- **Flexibility with scale analysis-**
  - Watershed scale is possible by creating sub-basins from field scale analysis
  - For a fee, TIAER will provide project, watershed, county, and state scale NTT analysis
- Results can be downloaded for future viewing
- **Become an official tool:** Iowa Dept of Environmental Quality (DEQ), Pennsylvania DEQ, Soil and Water Outcomes Fund (SWOF), Maryland Water Trading Program & MD Dept of Agriculture
- **Other users**: Ohio, Louisiana, Idaho, Oregon, California

Limitations, & Trade Offs

- **Initially built for field-level analysis –** Application at farm-scale, county / watershed / project scale, or larger takes additional effort
- **Validation and Calibration –** Generally validated for CONUS; addition calibration using field studies would be recommended
- **Data intensive** – It may requires significant interview time with the farmer to obtain the production and management data for creation of hypothetical before (baseline) vs after (conservation) scenarios
- **Difficulty with unstable internet** - Data entry should be conducted in locations with good internet connection & not while interfacing with the farmer.
- Is not adopted for Hawaii and Alaska, or U.S. Territories (except Puerto Rico)

NTT Components

NTT Background Models

- NTT uses two models:
  - Environmental Model: the Agriculture Policy Environmental eXtender (APEX) model (Dr. Jimmy Williams et. al.)
  - Economic model: Farm Economic Model (Dr. Osei et. al.)

Economic Model: (FEM)

- A whole-farm annual model that simulates the economic impacts of a wide range of scenarios on privately owned agricultural operations
- Model is calibrated with extensive data on farm practices, budgets and other watershed information
- Includes a number of simulation and optimization routines
- Can be modified easily for other land uses within a watershed (e.g., Forestry and Urban)

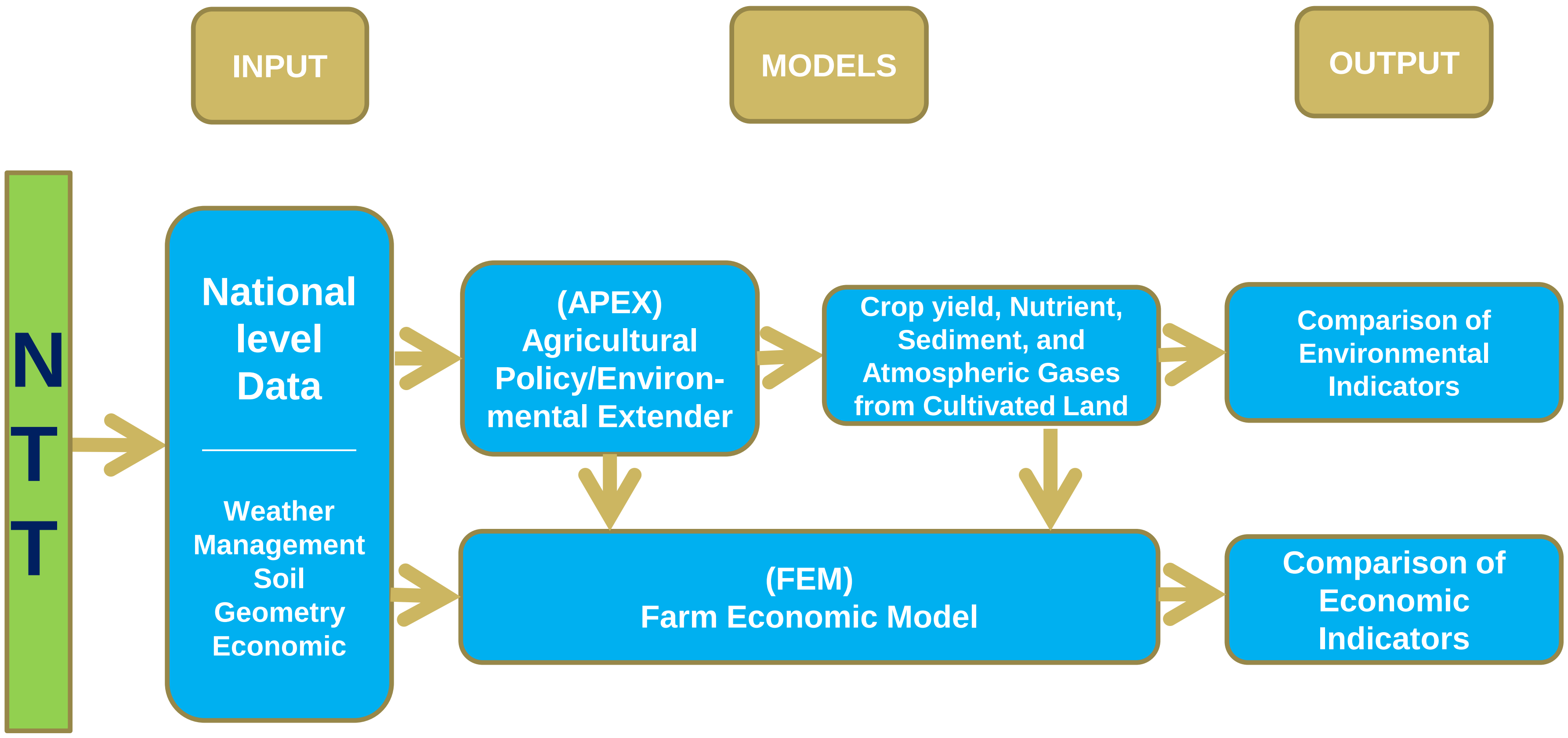
Environmental Models: (APEX)

APEX was developed by USDA scientists, led by Dr. Jimmy Williams, to predict the effects of different management scenarios on water quality, sediment yields, and pollutant loading from various land uses within fields and watersheds

Components of APEX model

- Weather
- Hydrology
- Erosion (wind and water)
- Nutrients (N, P, and K)
- Soil Carbon
- Pesticides
- Crop growth (up to 10 crops)
- Tillage
- Management
- Routing
- Reservoirs
- Groundwater
- Grazing
- Manure management
- Climate

Nutrient Tracking Tool (NTT) Framework



CPs currently available in NTT Components

Cultural Practices

- No-till/Low till
- Manure management
- Nutrient management
  - Rate
  - Timing
  - Placement
  - Source
- Cover crops
- Crop Rotation
- Soil health (Soil carbon sequestration)
- Land Conversion (to pasture/grass, to forest, to crop, etc.)
- Rotational Grazing/Prescribed Grazing
- Climate change scenarios (for next version)

Structural Practices

- Irrigation/Fertigation
- Tile drain
  - Drainage water management, bioreactors & saturated buffers
  - Pads and Pipes (Mississippi. and Missouri)
- Wetlands
- Ponds and reservoir
- Grass/Forest buffers
- Grassed Waterways
- Terraces
- Land Leveling
- Contour buffers
- Animal Fencing

Latest NTT Modifications

Science

- NTT tile-drainage modification to simulate:
  - tile bioreactors, drainage water management, and saturated buffer practice to tile drain system.
- Reservoir routine was added to the list of conservation practices
- Routing function between fields (subbasins) based on slope
- C Sequestration
- Development of NTT-RGN program

Operation

- Selection of "initial year" and "final year" for the tabular report
- Updated "tabular results" page to compare any number of scenarios
- The cropping operation database for regions of country
- Improving watershed simulation
- The inclusion of animal fencing practice

Databases and Help

- Databases
  - PRISM weather information extended to year 2021 (as always NTT is simulated using the last 35-years of updated weather). (User's weather data input available).
  - Soils data was updated using USDA-NRCS 2022 soil survey data. (User's soil data input available).
  - Economic databases were included for FEM simulations.
- Help and information
  - user manual, and page instructions were updated and made available on the site.
  - A forum page, Email system, and FEQ page was added to organize and post the most common questions asked in the forum to assist other users.

Upcoming Carbon Sequestration Estimation

An example

NTT (APEX) C sequestration simulations

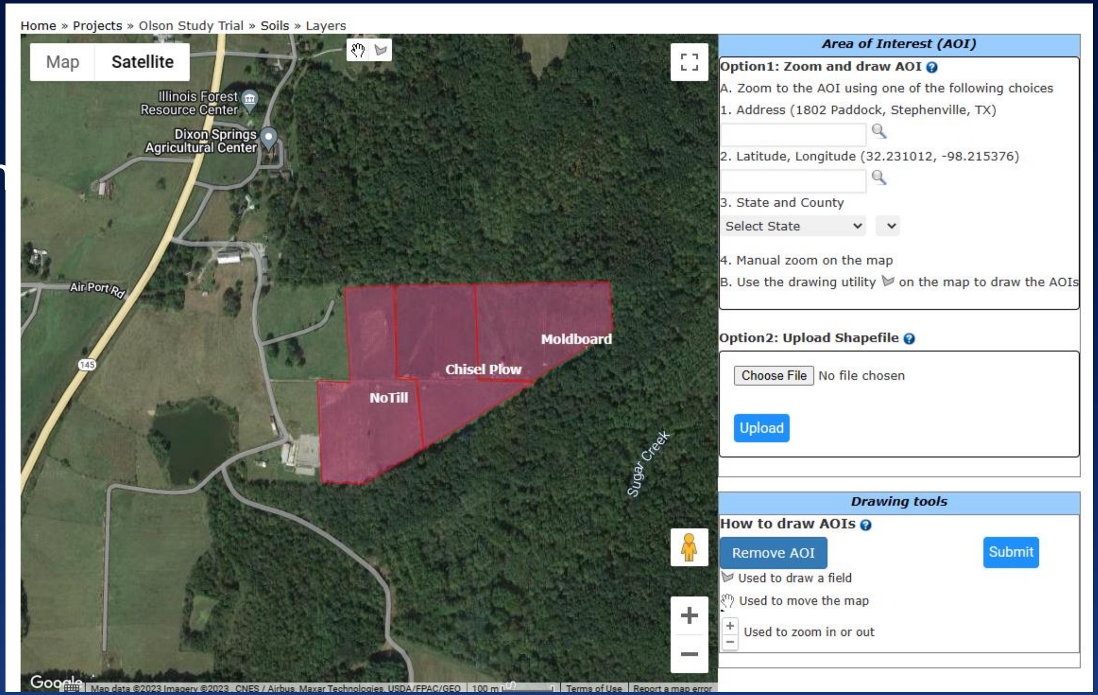
- The simulation done in daily basis
- Affected by any daily management practices
- It can be estimated at the any soil depth
- The simulation results also includes water quality/quantity and crop yield

Carbon Sequestration Validation Methods Overview

- Literature review used to find studies that report change in soil carbon under varying management practices.
- Literature review criteria
  - United States; 1985 – 2019
  - Soil carbon measurements at least 5 years apart
- Study methods, management, location, and soil conditions were put into the Nutrient Tracking Tool
- Simulated soil carbon compared to measured soil carbon

Carbon Sequestration Study: Olson et al., 2005

- Grantsburg, Illinois
  - Grantsburg Silt Loam
- Corn – Soybean rotation on previous CRP land
- Treatments:
  - No-Till
  - Chisel Plow
  - Moldboard Plow
- Initial Measurement: 1988
- Final Measurement: 2000



Full Reference: Olson, K.R., Lang, J.M., Ebelhar, S.A. 2005. Soil organic carbon changes after 12 years of no-tillage and tillage of Grantsburg soils in southern Illinois. Soil and Tillage Research, 81 (2), 217 – 225. https://doi.org/10.1016/j.still.2004.09.009

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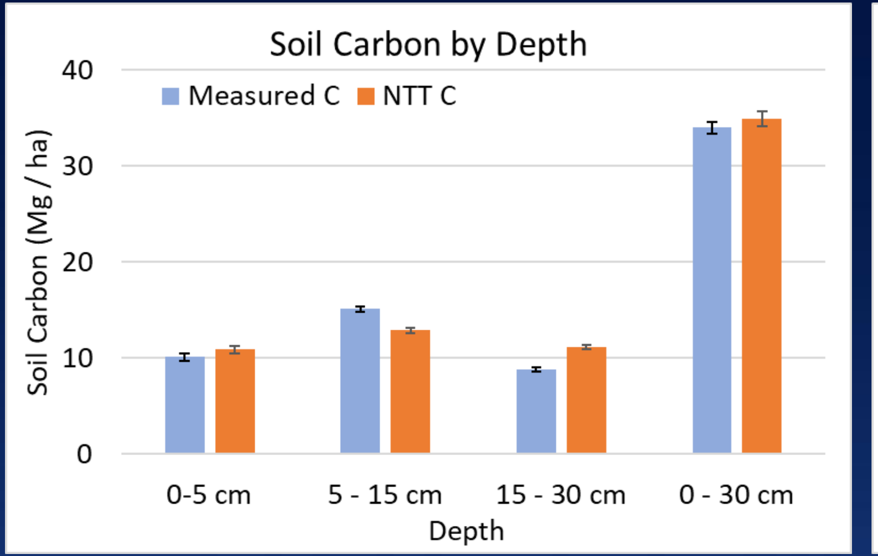
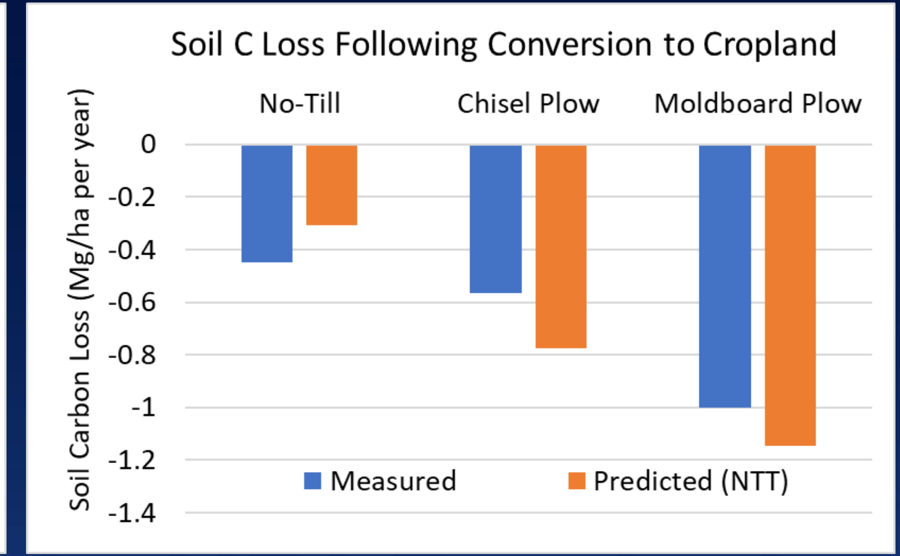
Olson Study Results



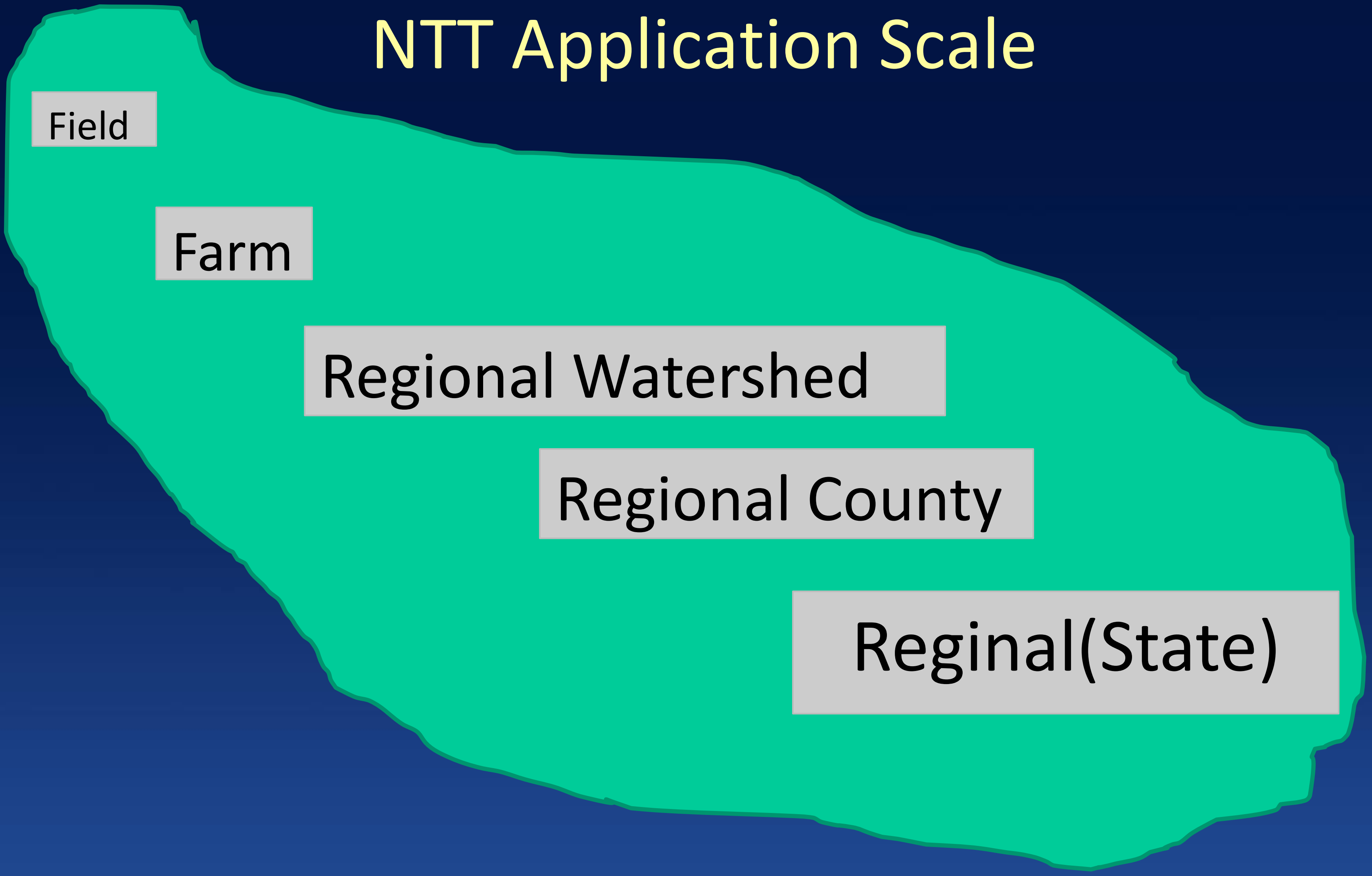
Soil C to 30 cm in 2000 (final year)



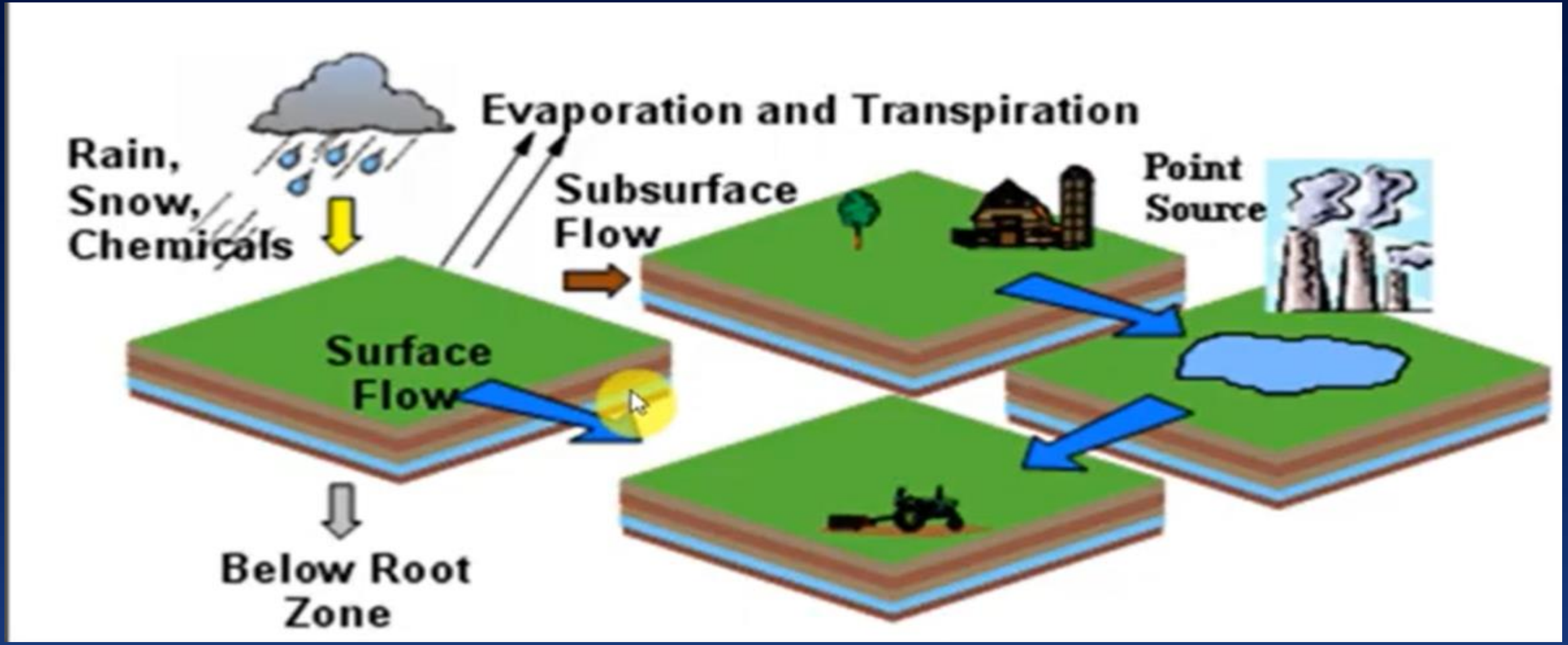
Soil Carbon Loss following conversion of perennial grassland to cropland between 1988 and 2000

Scales for NTT use

NTT Application Scale



NTT: Field and Farm (watershed) Simulation



an example will be provided in part 2

Upcoming Regional NTT-RGN (watershed)

Example

Upcoming Regional Tool
NTT-RGN
(watershed, county, & state)

Example

NTT-RGN: County and Regional (e.g., State) Scale Simulation

- 100-ac field size is selected
  - Soils are selected from soil survey
  - Local weather data selected from Prism
  - Local management (current and alternative scenarios)
  - Results are presented in NTT-REG User Interface program

NTT-RGN Program: An Example

Editing Scenario for County

Step 1: Location	
Select State:	Iowa
Select County:	Adams
Step 2: Scenario name and Crop	
Scenario Name:	Iowa CS Cover crop
Cropping Management System:	Corn/Soybean
Step 3: Nutrients	
Nutrient Type:	Commercial
Nutrient Application:	Basic Nutrients
Nutrient Incorporation:	No Incorporation
Step 4: Tillage and Irrigation	
Tillage Management:	No Till
Irrigation:	No
Step 5: Cover crop and BMPs	
Cover Crop:	Yes
Tile Drain:	Yes
BMPs:	None

Average Field Results at County Level

Enter Field Area (Acres): 100 Update

Simulated results for selected field area	Iowa CS Cover crop	Iowa CS no till		Iowa CS hi till	
Description	Losses	Losses(±)	Change(%)	Losses(±)	Change(%)
Hydrology (acre-in)					
Surface Runoff (acre-in)	257.62	478.13	220.51 (85.6)	624.87	367.25 (142.6)
Subsurface Flow (acre-in)	190.46	196.95	6.49 (3.4)	132.93	-57.53 (-30.2)
Tile Drain Flow (acre-in)	661.78	678.67	16.89 (2.6)	467.23	-194.55 (-29.4)
Irrigation Applied (acre-in)	0.00	0.00	0.00 (NaN)	0.00	0.00 (NaN)
Precipitation (acre-in)	35.20	35.20	0.00 (0.0)	35.20	0.00 (0.0)
N Losses (lbs)	831.79	2757.37	-1904.01 (-40.8)	4661.38	3829.59 (460.4)
Organic N (lbs)	452.02	1042.74	590.72 (130.7)	2123.57	1671.55 (369.8)
Runoff N (lbs)	74.71	1098.43	1023.72 (1370.3)	2100.56	2025.85 (2711.6)
Subsurface N (lbs)	48.67	76.46	27.79 (57.1)	52.03	3.36 (6.9)
Tile-Drain soluble N (lbs)	217.96	475.22	257.26 (118.0)	309.28	91.32 (41.9)
N2O (lbs)	38.42	64.53	26.11 (68.0)	75.93	37.51 (97.6)
P Losses (lbs)	93.07	238.07	-341.01 (-58.9)	579.08	486.01 (522.2)
Organic P (lbs)	46.27	137.97	91.70 (198.2)	438.81	392.54 (848.4)
Surface Soluble P (lbs)	43.60	96.86	53.26 (122.2)	138.02	94.42 (216.6)
Tile-Drain soluble P (lbs)	3.20	3.24	0.04 (1.3)	2.25	-0.95 (-29.7)
Total Sediment (t)	34.28	105.35	-308.28 (-74.5)	413.63	379.35 (1106.6)
Surface Erosion (t)	34.28	105.35	71.0700 (207.3)	413.63	379.3500 (1106.6)
Manure Erosion (t)	0.00	0.00	0.0000 (NaN)	0.00	0.0000 (NaN)
Total CO_2 and N_2O losses ()	86.94	108.66	-3.53 (-3.1)	112.19	25.25 (29.0)
C Sequestration rate at 12 in. soil depth (t)	48.51	44.13	-4.38 (-9.0)	36.26	-12.25 (-25.3)
N2O (lbs)	38.42	64.53	26.11 (68.0)	75.93	37.51 (97.6)
Total Crop Yield					
SOYB (bu	6900	6900	0.00 (0.0)	6900	0.00 (0.0)
CORN (bu	18000	18800	2200.00 (13.3)	16600	-1400.00 (-7.8)

Upcoming futures

- Releasing the version with modified APEX 1501 (August 2023)
- Updating NTT program (ongoing)
  - Science
  - Capabilities
  - Calibration and validation
  - Additional local and national level scenarios such as Climate change
- Expand NTT-RGN program to states beyond MD & IA (ongoing)
- Pesticides and herbicides (2024)
- Bacteria (2024)

Questions and Comments

An Overview of NTT
(Demonstration via slides)

A sample use Case

An IA SWCD staff is working with a farmer to evaluate 6 practice scenarios to encourage adoption on his/her farm (3 fields) using NTT tool

Farm Description
(Data Input)

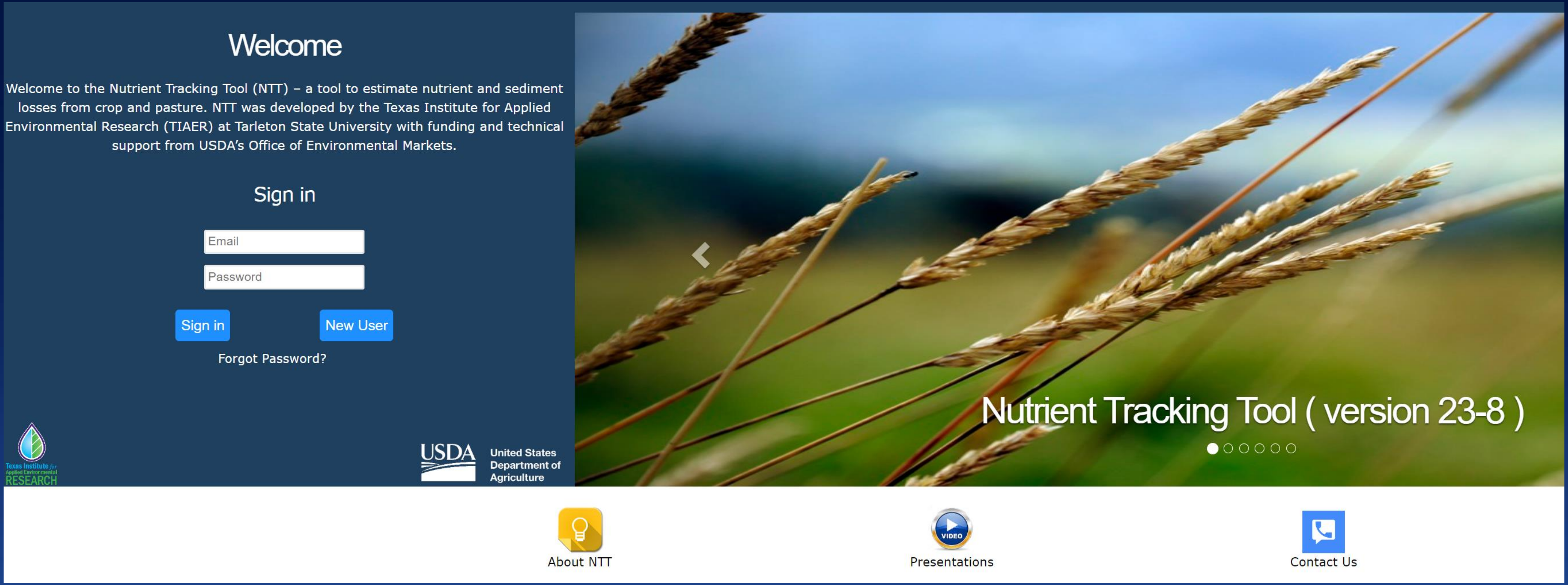
Sample Farm Management Practices (Baseline)

Date (Corn/Soybean)	*Operation*	*Application Type/Rate (lbs/ac)*
April 5/April 5	Chisel Plow	Tillage
April 15 (Corn)	Fertilizer / Element-N Fertilizer / Element-P	Surface/180 Surface/60
May 5/May 4	Field Cultivator	Tillage
May 5/May 15	Planting Corn Planting Soybeans	Regular Planter 12 Row/0.93 (seeds/ft2) Regular Planter 12 Row/7.06 (seeds/ft2)
May 14 (Soybean)	Fertilizer / Element-P	Surface/40
October 10/October 11	Harvest	-
October 18/October 18	Tandem Disk Plow	Tillage

Sample Conservation Practices

Practice	*Operation*	
No till	No Tillage operation	
No till (Nutrient Incorporation)	No Tillage operation Fertilizer N and P knifed at 3 in. depth	
Cover Crop	Rye after corn and soybean	
Tile Drainage Management		
Bioreactors	Activated Bioreactor in Tile Drain	
DWM	Closed drains in spring and opened after harvest	
Saturated Buffer Zone	60% tile was passed thru FS	

Step 1. Account set up and general information page



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Step 2. Create, upload, download, copy, or delete a project

Projects

Create New Project | Upload Project

To select an existing project, click on the project name.

Project Name ^	Description	Date Created	Actions	User
Adam parm evaluation test		2022-08-05		jenny

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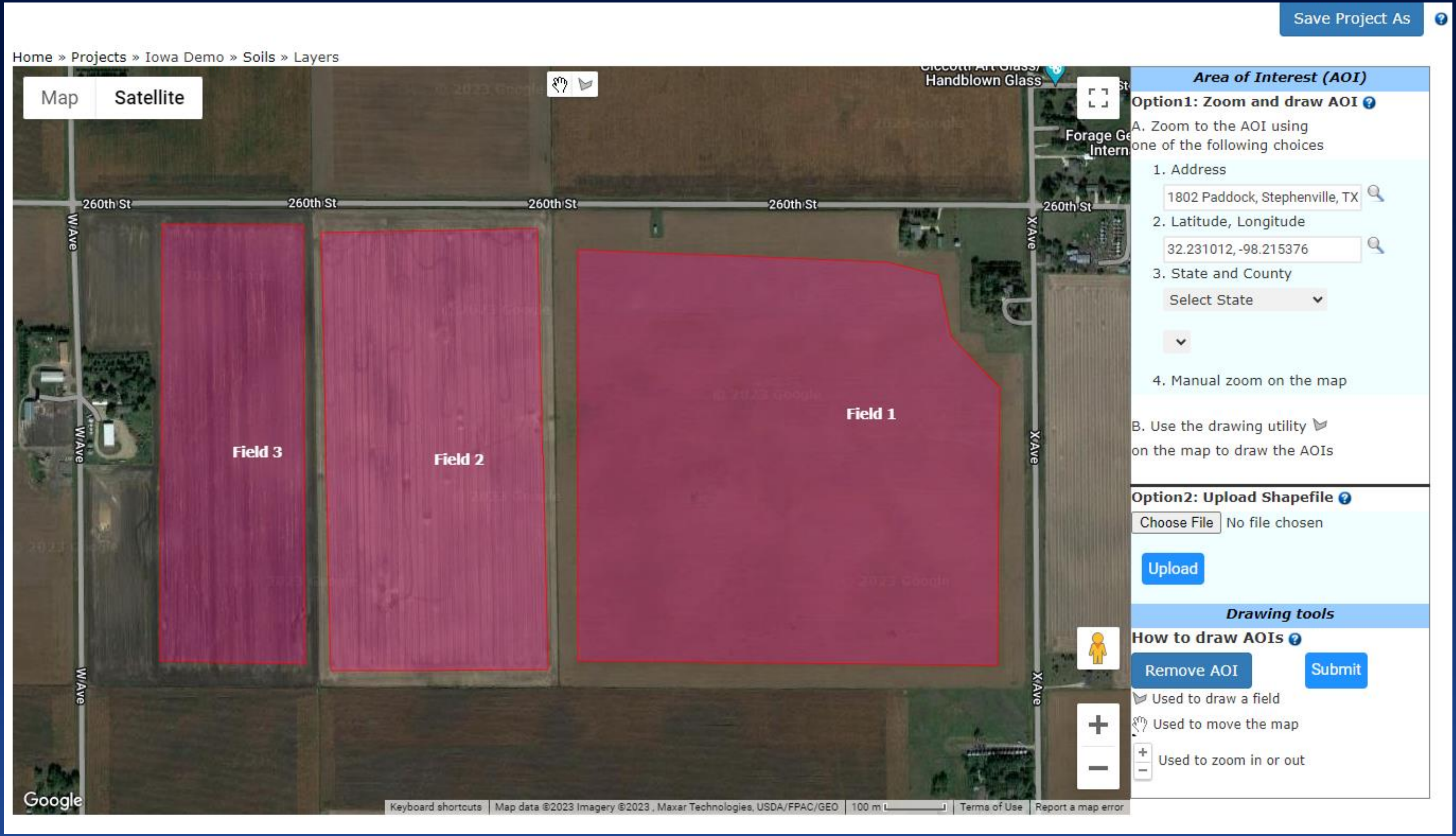
Step 3. Field/farm Selection



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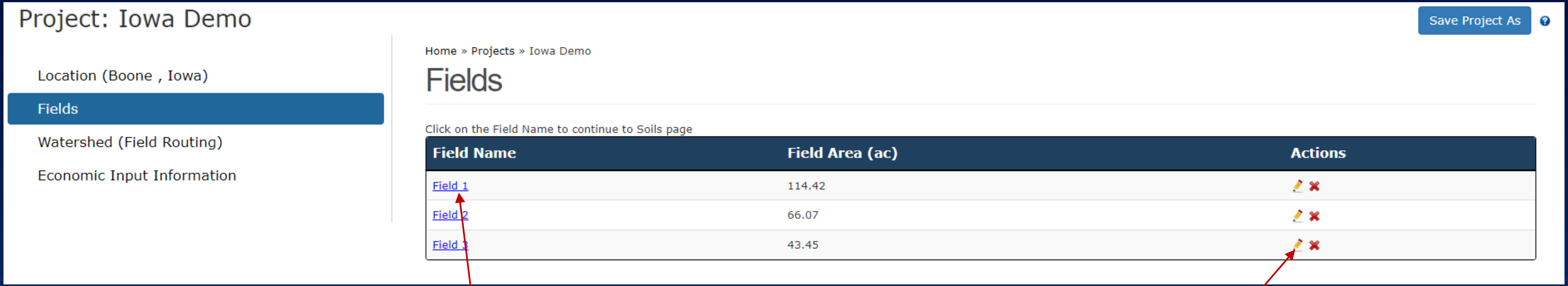
Actual Field photos

Step 4. Field information and selection



Click on a Field Name to continue.

Soil page (optional)

Home » Projects » Iowa Demo » Fields » Field 1 » Soils

Soils

The soils information are coming from the SSURGO database from NRCS web page. For more information or see the soils information directly in NRCS Web Soil Survey page use this link: websoilsurvey.usda.gov

Field name Field 1 **Field area** 114.42 (ac.)

Create New Soil

Name	Group	Slope	Drainage Quality	Percentage	Actions
Clarion loam, Bemis moraine, 2 to 6 percent slopes	B	2.436	Well Drained	40.15	
Canisteo clay loam, Bemis moraine, 0 to 2 percent slopes	C/D	1.523	Poorly Drained	39.86	
Harps clay loam, Bemis moraine, 0 to 2 percent slopes	C/D	1.5	Poorly Drained	20.0	

Continue to Weather

Features like soil layer creation, editing, and deletion is available only to NTT-RE version.

Soil page for public version (optional)

Soils

Field name Field 5-F **Field area** 19.43 (ac.)

Soil P Test Information

Soil p test None **Soil p (ppm)**

Name	Group	Slope	Organic Matter (%)	Percentage
Blount silt loam, ground moraine, 2 to 4 percent slopes	D	2.444	2.0	50.49
Glynwood clay loam, ground moraine, 2 to 6 percent slopes, eroded	D	2.956	1.75	27.84
Pewamo silty clay loam, 0 to 1 percent slopes	C/D	1.443	4.0	21.67

Save and Continue

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Soil page for RE version (Optional)

Home » Projects » Iowa Demo » Fields » Field 1 » Soils: Clarion loam, Bemis moraine, 2 to 6 percent slopes » Layers

Layers

Create New Soil Layer | Back to Soils

Depth (in)	Soil P (ppm)	Bulk Density (Mg/m3)	Sand (%)	Silt (%)	Clay (%)	Organic Matter (%)	Ph	Actions
3.94	0.0	1.3	45.0	34.0	21.0	3.5	6.2	
9.06	0.0	1.3	45.0	34.0	21.0	3.5	6.2	
13.78	0.0	1.35	45.0	34.0	21.0	2.5	6.2	
33.07	0.0	1.4	45.0	34.0	21.0	0.75	6.6	
78.74	0.0	1.6	49.0	36.0	15.0	0.25	8.0	

New layer

Depth (in) 0.0
Soil P Test None
Soil P (ppm)
Bulk Density (Mg/m3) 0.0
Sand (%) 0.0
Silt (%) 0.0
Clay (%) 0.0
Organic Matter (%) 0.0
Ph 0.0
Save | Back

Editing Soil Layer

Depth (in) 3.94
Soil P Test None
Soil P (ppm)
Bulk Density (Mg/m3) 1.3
Sand (%) 45.0
Silt (%) 34.0
Clay (%) 21.0
Organic Matter (%) 3.5
Ph 6.2
Save | Back

Create New Soil

Selected ☐
Key
Symbol
Group
Name
Albedo
Slope
Percentage
Drainage Quality Select One
Save | Back

Editing Soils

Selected ☑
Key 2765522
Symbol L138B
Group B
Name Clarion loam, Bemis moraine
Albedo 0.16
Slope 2.436
Percentage 40.15
Drainage Quality Well Drained
Save | Back

Weather page for RE version (optional)

Home » Projects » Iowa Demo » Fields » Field 1 » Weather

Weather

41.9766, -93.7215, N41.95833W93.70833.wth

- (selected) Weather Information Using PRISM Data
- Load your Own Weather File
- Load Using Specific Coordinates (USA only)

Update Weather

Simulation period

Years of weather information: 1987 - 2021

The period to simulate is the same as the period in the weather information. The simulation years can be changed but it should be between the weather initial and final years.

Simulation period: initial year 1987 final year 2021 Update Simulation Period

Continue to Management Scenarios

Current weather period for NTT includes year 1987 to 2021.

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Step 5. Management setup

Project: Iowa Demo

Save Project As

- Location (Boone , Iowa)
- Fields (Field 1)
  - Soils
  - Weather
  - Management Scenarios
  - Water Quality Results
    - Tabular Results
      - All Years
      - Dry Years
      - Wet Years
    - Graphical Results
      - Annual
      - Monthly
  - Economic Results
  - Utility Files
- Watershed (Field Routing)
- Economic Input Information

Home » Projects » Iowa Demo » Fields » Field 1 » Scenarios

NTT Management Scenario Input and Simulation

Create New Scenario | Copy Scenario from other project/field

Water Quality Simulation | Economic & Water Quality Simulation

To see the scenario operations click the name of the scenario in the list below.
To download a simulation folder click, under actions column and in front of the scenario you want to download to,

View Results | View Economic Results

Select	Name	Weather	Soils	Layers	Operations	Simulated	Simulation date	Actions
☐	Baseline Corn & Soybean	✓	✓	✓	✓	✓	2023-07-05 14:32:02 -0500	APEX FEM
☐	Baseline No Tillage	✓	✓	✓	✓	✓	2023-07-05 14:32:20 -0500	APEX FEM
☐	Baseline Cover Crop - Oats	✓	✓	✓	✓	✓	2023-07-05 14:50:08 -0500	APEX FEM
☐	Baseline N & P at 3 inches	✓	✓	✓	✓	✓	2023-07-05 14:34:19 -0500	APEX FEM
☐	Baseline Tile Bioreactors	✓	✓	✓	✓	✓	2023-07-05 14:34:32 -0500	APEX FEM
☐	Baseline Tile Drain Management	✓	✓	✓	✓	✓	2023-07-05 14:34:45 -0500	APEX FEM
☐	Baseline Saturated Buffer	✓	✓	✓	✓	✓	2023-07-05 14:35:00 -0500	APEX FEM
☐	Baseline Cover Crop - Oats No Till	✓	✓	✓	✓	✓	2023-07-05 14:52:56 -0500	APEX FEM
☐	Baseline Cover Crop - Oats No Till with Saturated Buffer	✓	✓	✓	✓	✓	2023-07-05 14:55:18 -0500	APEX FEM

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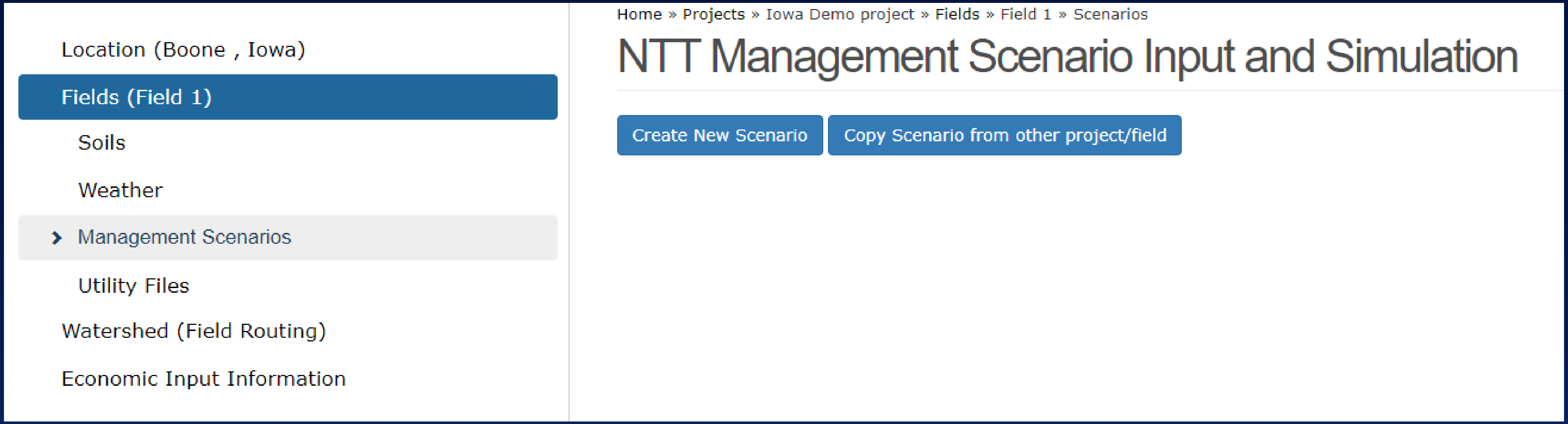
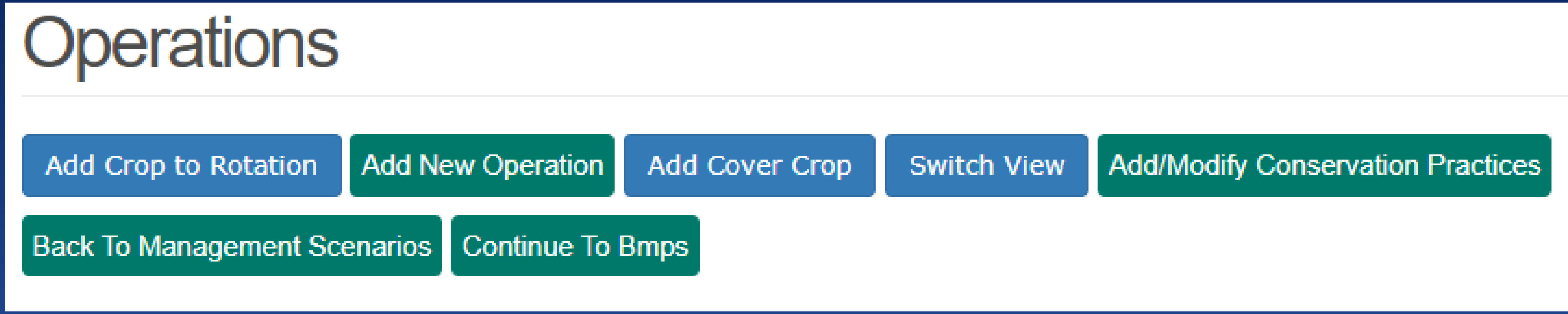
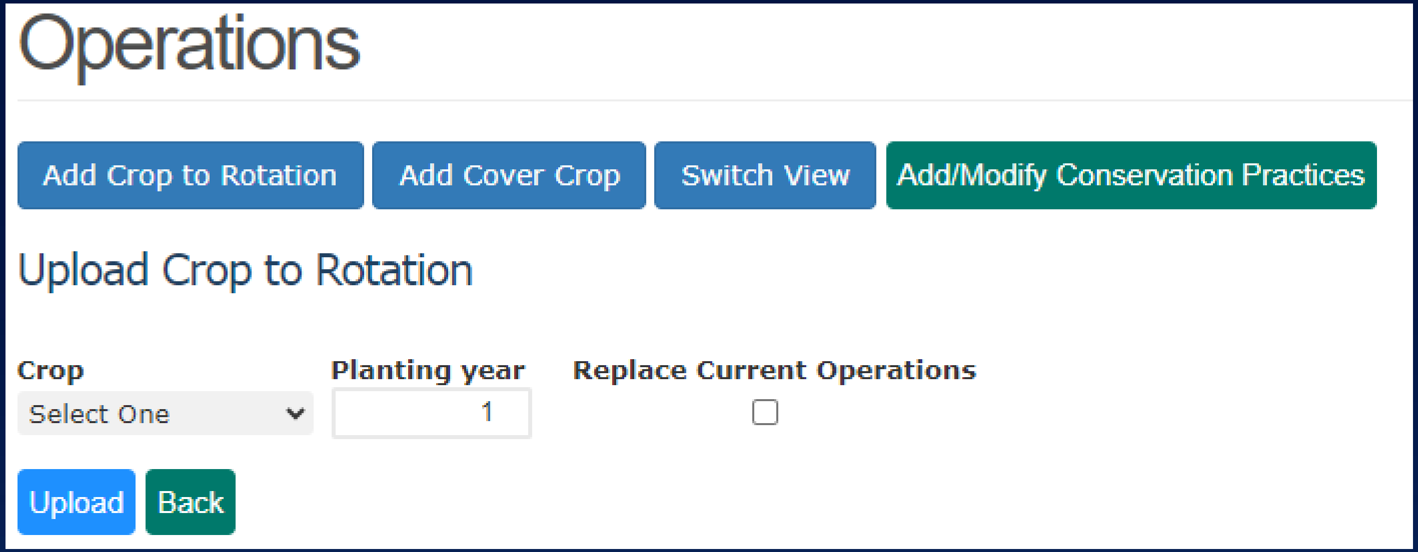
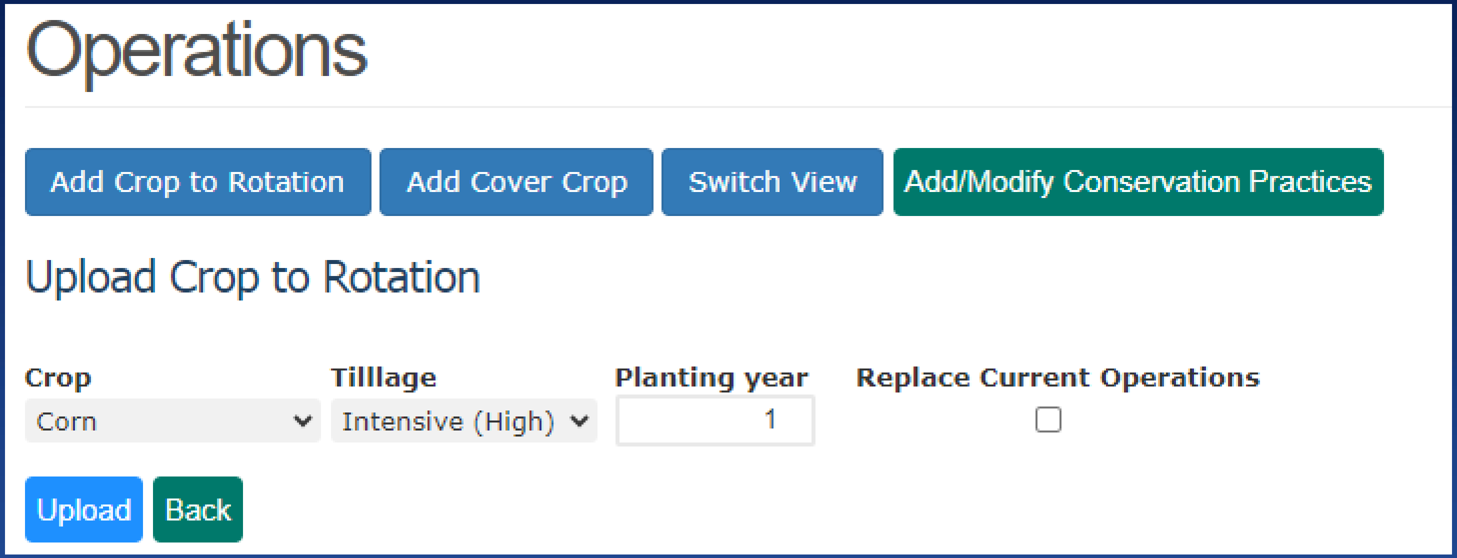


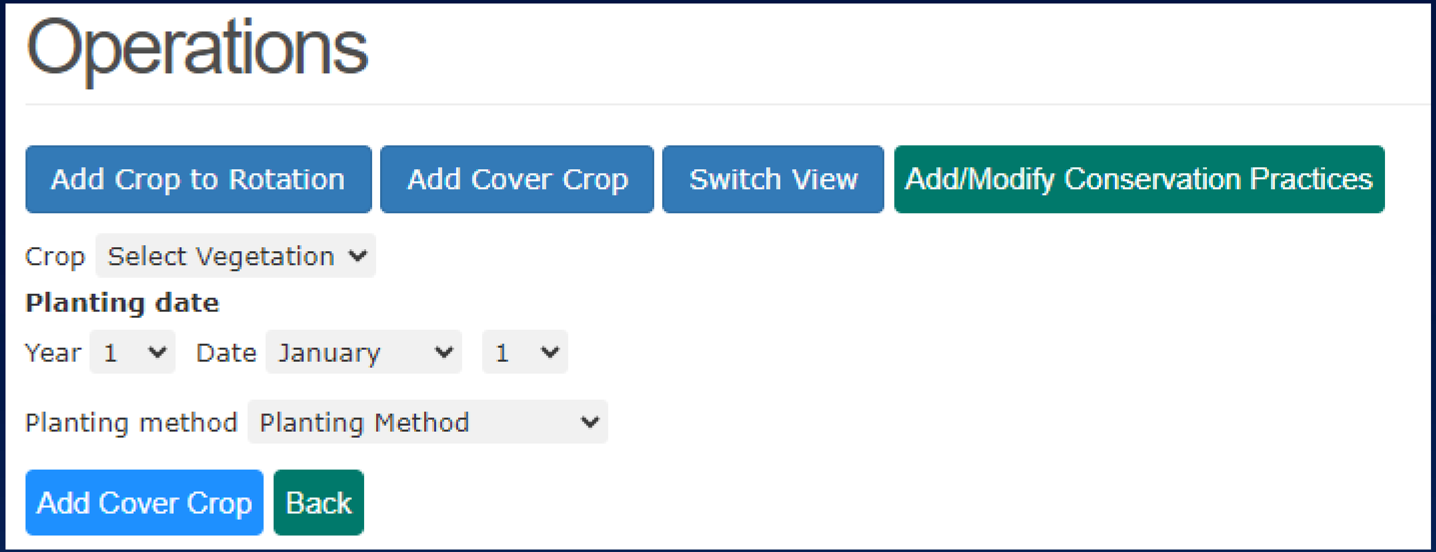
Newly created scenario will be presented with these page options.

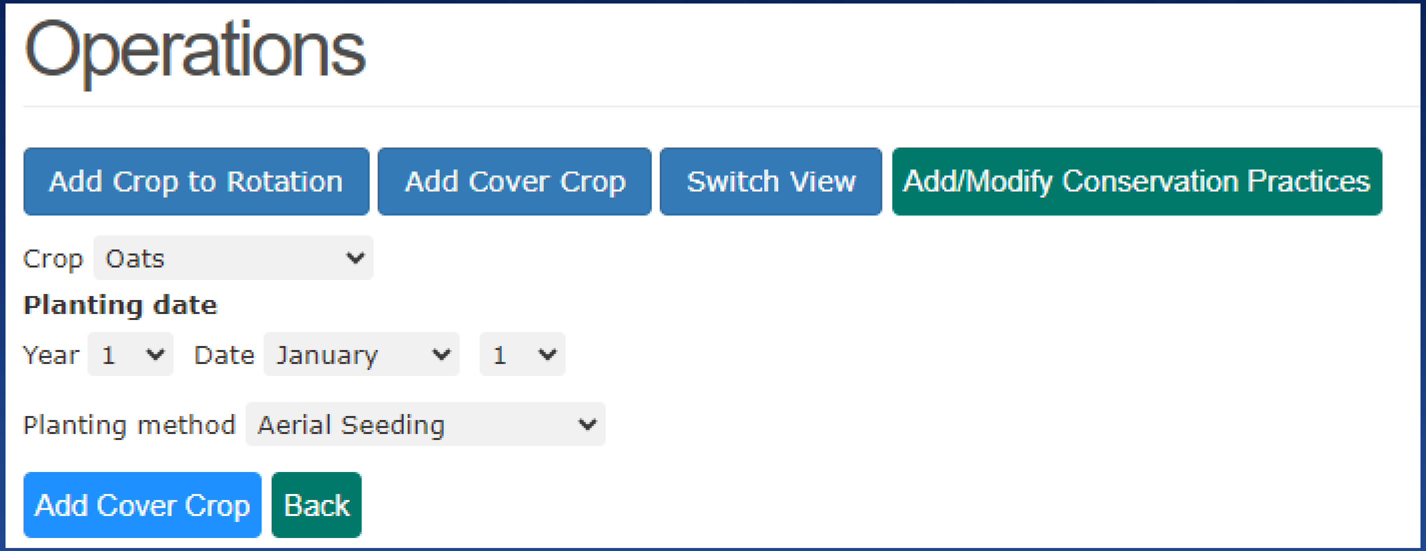




Options to add a Crop Rotation.







Options to add a Cover Crop.

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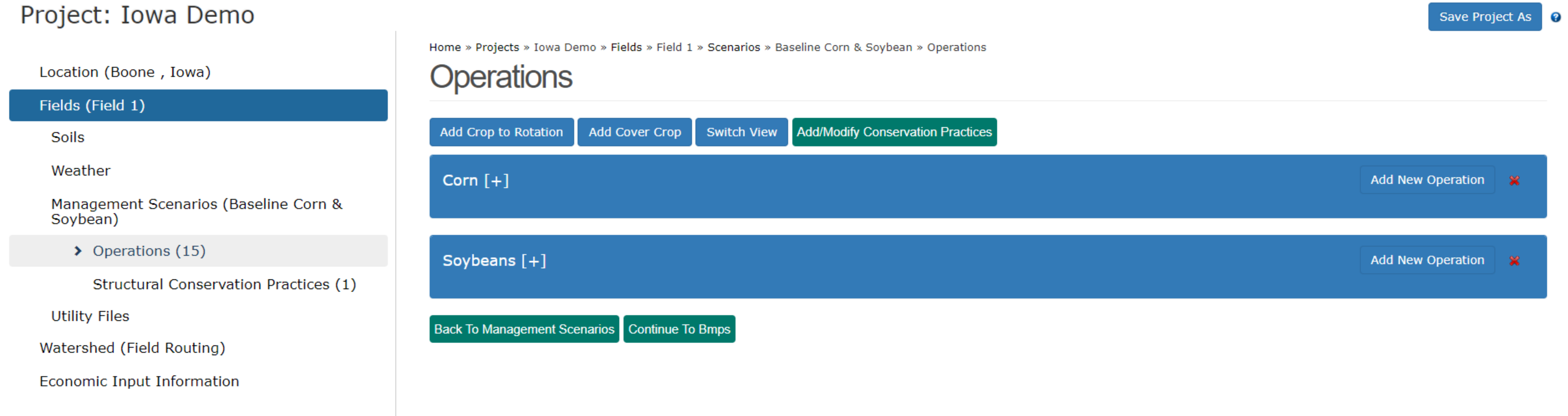

Date	Type	Seeding (seeds/ft2)(*optional)	Actions
Year 1, May 5	Regular Planter 12 Row	0.93	

Add Planting Operation

Fertilizer

Date	Type	Amount Applied	Depth	Actions
Year 1, April 15	Element-N(N)	180.0(lbs/ac)	0.0	
Year 1, April 15	Element-P(P)	60.0(lbs/ac)	0.0	

Add Fertilizer Operation

Tillage

Date	Type	Actions
Year 1, April 5	Chisel Plow	
Year 1, May 4	Field Cultivator	
Year 1, October 18	Tandem Disk	

Add Tillage Operation

Harvest

Date	Actions
Year 1, October 10	

Add Harvest Operation

End Crop Season

Date	Actions
Year 1, October 11	

Add End Crop Season

Operation: Fertilizer
Crop: Corn
Year: 1 Date: April 15
Fertilizer category: Commercial Fertilizer
Fertilizer Type: Select One
Application rate(lbs/ac): 180.0
Depth (in): 0.0
Ammonia N (0-100%): 0.0

Fertilizer Composition (Concetration)

Element-N (0-100%)
Element-P (0-100%)

Operation: Tillage
Crop: Corn
Year: 1 Date: April 5
Tillage type: Chisel Plow

Add more

- Chisel Plow
- Cotton Module Builder
- Cotton Rood Machine
- Culti-Packer Pulverizer
- Field Cultivator
- Harrow 10 Bar Tine
- Moldboard Plow
- Deep Ripper - Subsoiler
- Rotary Hoe
- Rotaty Mower
- Row Cultivator
- Strip Till
- Subsoil Chisel Plow
- Swath Roller
- Tandem Disk
- Thin
- Vertical Till
- Weed
- Destroy Puddle

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Save Project As

Home » Projects » Iowa Demo » Fields » Field 1 » Scenarios » Baseline Corn & Soybean » Operations

Operations

Add Crop to Rotation | Add Cover Crop | Crop View | Add/Modify Conservation Practices

Crop	Operation	Year	Month	Day	Type	Value1	Value2	Moisture(%)	Element-N(%)	Element-P(%)	Organic-N(%)	Organic-P(%)	Actions
Corn	Tillage	1	April	5	Chisel Plow		0.0		0.0	0.0	0.0	0.0	
Corn	Fertilizer	1	April	15	Commercial Fertilizer	180.0	0.0		100.0	0.0	0.0	0.0	
Corn	Fertilizer	1	April	15	Commercial Fertilizer	60.0	0.0		0.0	100.0	0.0	0.0	
Corn	Tillage	1	May	4	Field Cultivator		0.0		0.0	0.0	0.0	0.0	
Corn	Planting	1	May	5	Regular Planter 12 Row	0.93	0.0		0.0	0.0	0.0	0.0	
Corn	Harvest Only	1	October	10		0.0	0.0		0.0	0.0	0.0	0.0	
Corn	End crop season	1	October	11		0.0	0.0		0.0	0.0	0.0	0.0	
Corn	Tillage	1	October	18	Tandem Disk		0.0		0.0	0.0	0.0	0.0	
Soybeans	Tillage	2	April	5	Chisel Plow		0.0		0.0	0.0	0.0	0.0	
Soybeans	Tillage	2	May	4	Field Cultivator		0.0		0.0	0.0	0.0	0.0	
Soybeans	Fertilizer	2	May	14	Commercial Fertilizer	40.0	0.0		0.0	100.0	0.0	0.0	
Soybeans	Planting	2	May	15	Regular Planter 12 Row	7.06	0.0		0.0	0.0	0.0	0.0	
Soybeans	Harvest Only	2	October	15		0.0	0.0		0.0	0.0	0.0	0.0	
Soybeans	End crop season	2	October	16		0.0	0.0		0.0	0.0	0.0	0.0	
Soybeans	Tillage	2	October	18	Tandem Disk		0.0		0.0	0.0	0.0	0.0	

Back To Management Scenarios | Continue To Bmps

Conservation practices selections

Structural Conservation Practices

Select	Name
☐	Autoirrigation/Autofertigation
☑	Tile Drain
☐	Wetlands
☐	Ponds/Water & Sediment Control Basin
☐	Stream Fencing (Livestock Access Control)
☐	Streambank Stabilization (Restoration)
☐	Grass Buffer/Forest Buffer
☐	Grass Waterway
☐	Contour Buffer
☐	Land Leveling
☐	Terrace System
☐	Auto Lime Application

Back to Scenarios | Back to Operations | Continue to Results

Select	Name
☐	Autoirrigation/Autofertigation
☑	Tile Drain

Depth (0.0 to 4.0 ft) 4.0

☐ Tile Bioreactors ☐ Drainage Water Management ☐ Saturated Buffer

Save

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Depth (0.0 to 4.0 ft) 4.0

☐ Tile Bioreactors ☐ Drainage Water Management ☑ Saturated Buffer

Please enter

Estimated fraction of annual tile flow released to saturated buffer (0-1.0) 0.6

Save

☐ Wetlands

☐ Ponds/Water & Sediment Control Basin

☐ Stream Fencing (Livestock Access Control)

☐ Streambank Stabilization (Restoration)

☑ Grass Buffer/Forest Buffer

◉ Grass Buffer ○ Forest Buffer

Crop Forest-Grass

Area (acres) 1.0 (optional)

Grass Strip Width (ft) 2.0

Fraction of field treated by buffer(0.00 - 1.00) 1.0

Is the buffer area included in your AOI? ☑

Save

☑ Tile Drain

Depth (0.0 to 4.0 ft) 4.0

☐ Tile Bioreactors ☐ Drainage Water Management ☐ Saturated Buffer

Save

Tile Drain

Depth (0.0 to 4.0 ft) 4.0

☐ Tile Bioreactors ☑ Drainage Water Management ☐ Saturated Buffer

Tile Drain Open Period

Close Drain Flow		Resume Drain Flow		
May	5	October	10	Add Dates
May	5	October	10	✖

Save

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Step 6. Simulation

NTT Management Scenario Input and Simulation

Create New Scenario | Copy Scenario from other project/field

Water Quality Simulation | Economic & Water Quality Simulation

To see the scenario operations click the name of the scenario in the list below.
To download a simulation folder click, under actions column and in front of the scenario you want to download to,

View Results | View Economic Results

Select	Name	Weather	Soils	Layers	Operations	Simulated	Simulation date	Actions
☐	Baseline Corn & Soybean	✓	✓	✓	✓	✓	2023-07-05 14:32:02 -0500	APEX FEM
☐	Baseline No Tillage	✓	✓	✓	✓	✓	2023-07-05 14:32:20 -0500	APEX FEM
☐	Baseline Cover Crop - Oats	✓	✓	✓	✓	✓	2023-07-05 14:50:08 -0500	APEX FEM
☐	Baseline N & P at 3 inches	✓	✓	✓	✓	✓	2023-07-05 14:34:19 -0500	APEX FEM

Outputs

TABULAR RESULTS

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Water Quality Results
- Tabular Results
  - All Years
  - Dry Years
  - Wet Years
- Graphical Results
  - Annual
  - Monthly

Scenarios:
1. Baseline (HT)
2. Baseline (NT)
3. NT (CC)
4. NT 3-in fertilizer Inc.

All Years

Initial year: 2005 | Final year: 2018 | Per Acre | Total Field Area | Download PDF | Download Excel

CP Results (Per Acre) Field 1, 1988-2021

(±) = Confidence Interval

	Baseline Corn & Sc	Baseline No Tillage		Baseline Cover Crc		Baseline No Tillage	
Description	Losses (±)	Losses (±)	Change (%)	Losses (±)	Change (%)	Losses (±)	Change (%)
Hydrology (in)							
Surface Runoff (in)	5.9 (1.8)	4.34 (1.4)	-1.56 (-26.4)	2.92 (1.3)	-2.98 (-50.5)	4.2 (1.4)	-1.70 (-28.8)
Subsurface Flow (in)	1.9 (0.5)	2.35 (0.6)	0.45 (23.7)	2.41 (0.6)	0.51 (26.8)	2.36 (0.6)	0.46 (24.2)
Tile Drain Flow (in)	7.75 (1.8)	9.41 (2.1)	1.66 (21.4)	9.61 (2.2)	1.86 (24.0)	9.52 (2.1)	1.77 (22.8)
Irrigation Applied (in)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Deep Percolation (in)	1.26 (0.3)	1.55 (0.4)	0.29 (23.0)	1.59 (0.4)	0.33 (26.2)	1.57 (0.4)	0.31 (24.6)
Precipitation (in)	38.29	38.29	0 (0)	38.29	0 (0)	38.29	0 (0)
N Losses (lbs)	47.11 (24.6)	30.31 (13.8)	-16.80 (-35.7)	14.58 (6.5)	-32.53 (-69.1)	17.10 (5.3)	-30.01 (-63.7)
Organic N (lbs)	6.1 (2.5)	3.95 (2.3)	-2.15 (-35.2)	2.17 (1.9)	-3.93 (-64.4)	4.02 (2.3)	-2.08 (-34.1)
Runoff N (lbs)	30.24 (19.2)	13.54 (8.3)	-16.70 (-55.2)	2.63 (1.9)	-27.61 (-91.3)	0.97 (0.2)	-29.27 (-96.8)
Subsurface N (lbs)	0.71 (0.3)	0.68 (0.2)	-0.03 (-4.2)	0.47 (0.1)	-0.24 (-33.8)	0.53 (0.1)	-0.18 (-25.4)
Tile-Drain soluble N (lbs)	10.06 (2.6)	12.14 (3)	2.08 (20.7)	9.31 (2.6)	-0.75 (-7.5)	11.58 (2.7)	1.52 (15.1)
Deep Percolation N (lbs)	4.35 (1.7)	4.04 (1.1)	-0.31 (-7.1)	2.63 (0.7)	-1.72 (-39.5)	3.47 (0.9)	-0.88 (-20.2)
P Losses (lbs)	2.60 (0.9)	1.41 (0.5)	-1.19 (-45.8)	0.83 (0.4)	-1.77 (-68.1)	0.65 (0.2)	-1.95 (-75.0)
Organic P (lbs)	1.18 (0.5)	0.48 (0.2)	-0.70 (-59.3)	0.22 (0.2)	-0.96 (-81.4)	0.37 (0.2)	-0.81 (-68.6)
Surface Soluble P (lbs)	1.34 (0.4)	0.83 (0.3)	-0.51 (-38.1)	0.5 (0.2)	-0.84 (-62.7)	0.16 (0)	-1.18 (-88.1)
Tile-Drain soluble P (lbs)	0.08 (0)	0.1 (0)	0.02 (25.0)	0.11 (0)	0.03 (37.5)	0.12 (0)	0.04 (50.0)
Total Sediment (t)	0.64 (0.3)	0.21 (0.1)	-0.43 (-67.2)	0.09 (0.1)	-0.55 (-85.9)	0.20 (0.1)	-0.44 (-68.8)

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Scenarios:

1. Baseline (HT)

2. Baseline (NT)

3. NT (CC)

4. NT 3-in fertilizer Inc.

(±) = Confidence Interval

	Baseline Corn & Sc	Baseline No Tillage		Baseline Cover Cro		Baseline No Tillage	
Description	**Losses (±)**	**Losses (±)**	**Change (%)**	**Losses (±)**	**Change (%)**	**Losses (±)**	**Change (%)**
Carbon Sequestration							
C Sequestration rate at 12 in. soil depth (t)	0.0116	0.0409	0.03 (252.6)	0.0571	0.05 (392.2)	-0.0286	-0.04 (-346.6)
CO_2 equivalent (t)	0.0426	0.1501	0.11 (252.3)	0.2096	0.17 (392.0)	-0.1050	-0.15 (-346.5)
Total Crop Yield							
Soybeans (bu)	69 (0.17)	66 (0.16)	0 (0)	69 (0.10)	0 (0)	66 (0.18)	0 (0)
Corn (bu)	214 (0.55)	211 (0.23)	0 (0)	221 (0.31)	7.00 (3.3)	219 (0.34)	8.00 (3.8)
Oats (bu)	N/A	N/A	N/A (N/A)	N/A	N/A (N/A)	N/A	N/A (N/A)
Forest-Grass (t)	N/A	N/A	N/A (N/A)	N/A	N/A (N/A)	N/A	N/A (N/A)
Switchgrass (t)	N/A	N/A	N/A (N/A)	N/A	N/A (N/A)	N/A	N/A (N/A)
N Stress							
Soybeans (days)	0 (1.83)	1 (1.78)		1 (1.07)		1 (1.80)	
Corn (days)	8 (3.51)	6 (2.96)		6 (1.63)		3 (3.02)	
Oats (days)							
Forest-Grass (days)							
Switchgrass (days)							
P Stress							
Temperature Stress							
Water Stress							

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Tile Drain Results (Per Acre)
Field 1, 1988-2021

Scenarios:

1. Baseline (Tile)
2. Tile Bioreactors
3. Tile Drain managemen
4. Saturated Buffer

(±) = Confidence Interval

	Baseline Corn & Sc	Baseline Tile Biore		Baseline Tile Drain		Baseline Saturatec	
Description	Losses (±)	Losses (±)	Change (%)	Losses (±)	Change (%)	Losses (±)	Change (%)
Hydrology (in)							
Surface Runoff (in)	4.871 (1.3)	4.871 (1.3)	0 (0)	4.761 (1.3)	-0.11 (-2.3)	4.414 (1.2)	-0.46 (-9.4)
Subsurface Flow (in)	1.51 (0.3)	1.51 (0.3)	0 (0)	3.092 (0.6)	1.58 (104.8)	1.646 (0.3)	0.14 (9.0)
Tile Drain Flow (in)	6.396 (1)	6.396 (1)	0 (0)	3.843 (0.6)	-2.55 (-39.9)	6.643 (1)	0.25 (3.9)
Irrigation Applied (in)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Deep Percolation (in)	0.995 (0.2)	0.995 (0.2)	0 (0)	2.062 (0.4)	1.07 (107.2)	1.04 (0.2)	0.05 (4.5)
Precipitation (in)	35.025	35.025	0 (0)	35.025	0 (0)	35.025	0 (0)
N Losses (lbs)	46.34 (20.0)	38.99 (17.5)	-7.35 (-15.9)	36.11 (16.2)	-10.23 (-22.1)	32.62 (14.8)	-13.72 (-29.6)
Organic N (lbs)	7.158 (4.5)	7.158 (4.5)	0 (0)	6.84 (4.1)	-0.32 (-4.4)	4.065 (1.8)	-3.09 (-43.2)
Runoff N (lbs)	20.74 (9.2)	20.74 (9.2)	0 (0)	17.203 (8)	-3.54 (-17.1)	17.248 (8.1)	-3.49 (-16.8)
Subsurface N (lbs)	1.248 (0.5)	1.248 (0.5)	0 (0)	2.321 (0.9)	1.07 (86.0)	1.227 (0.4)	-0.02 (-1.7)
Tile-Drain soluble N (lbs)	17.101 (5.8)	9.747 (3.3)	-7.35 (-43.0)	9.639 (3.2)	-7.46 (-43.6)	9.957 (4.5)	-7.14 (-41.8)
N2O (lbs)	0.098 (0)	0.098 (0)	0 (0)	0.111 (0)	0.01 (13.3)	0.12 (0)	0.02 (22.4)
Deep Percolation N (lbs)	7.78 (3)	7.78 (3)	0 (0)	15.42 (5.7)	7.64 (98.2)	8.13 (3)	0.35 (4.5)
P Losses (lbs)	2.39 (0.9)	2.39 (0.9)	0 (0)	2.27 (0.8)	-0.12 (-5.0)	1.74 (0.5)	-0.65 (-27.2)
Organic P (lbs)	1.265 (0.7)	1.265 (0.7)	0 (0)	1.19 (0.6)	-0.07 (-5.9)	0.733 (0.3)	-0.53 (-42.1)
Surface Soluble P (lbs)	1.074 (0.2)	1.074 (0.2)	0 (0)	1.045 (0.2)	-0.03 (-2.7)	0.957 (0.2)	-0.12 (-10.9)
Tile-Drain soluble P (lbs)	0.048 (0)	0.048 (0)	0 (0)	0.032 (0)	-0.02 (-33.3)	0.051 (0)	0.00 (6.2)
Total Sediment (t)	0.89 (0.7)	0.89 (0.7)	0 (0)	0.84 (0.6)	-0.05 (-5.6)	0.22 (0.1)	-0.67 (-75.3)
Total Crop Yield							
Soybeans (bu)	67 (0.18)	67 (0.18)	0 (0)	67 (0.18)	0 (0)	67 (0.18)	0 (0)
Corn (bu)	216 (0.31)	216 (0.31)	0 (0)	221 (0.30)	5.00 (2.3)	220 (0.30)	4.00 (1.9)

Outputs

GRAPHIC RESULTS

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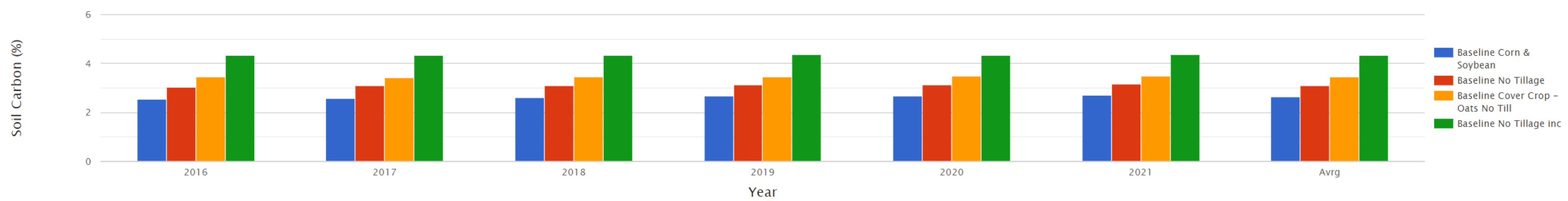
Initial year: 2016

Final year: 2021

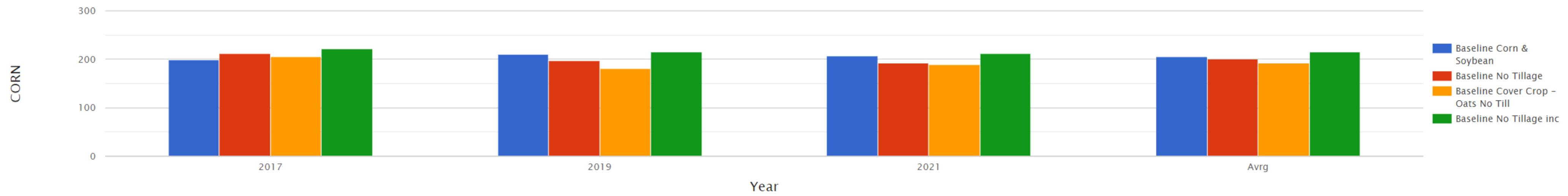
Soil Carbon

View Annual Chart

- [x] Baseline Corn & Soybean
- [x] Baseline No Tillage
- [ ] Baseline Cover Crop - Oats
- [ ] Baseline N & P at 3 inches



Scenario	2016	2017	2018	2019	2020	2021	Avrg
Baseline Corn & Soybean	2.55	2.57	2.6	2.68	2.68	2.7	2.63
Baseline No Tillage	3.04	3.08	3.11	3.14	3.13	3.16	3.11
Baseline Cover Crop - Oats No Till	3.45	3.43	3.45	3.46	3.48	3.47	3.46
Baseline No Tillage inc	4.34	4.35	4.34	4.37	4.35	4.36	4.35



Scenario	2017	2019	2021	Avrg
Baseline Corn & Soybean	199.51	211.04	206.74	205.76
Baseline No Tillage	211.42	197.58	192.71	200.57
Baseline Cover Crop - Oats No Till	206.12	181.05	189.85	192.34
Baseline No Tillage inc	221.33	214.78	211.6	215.91

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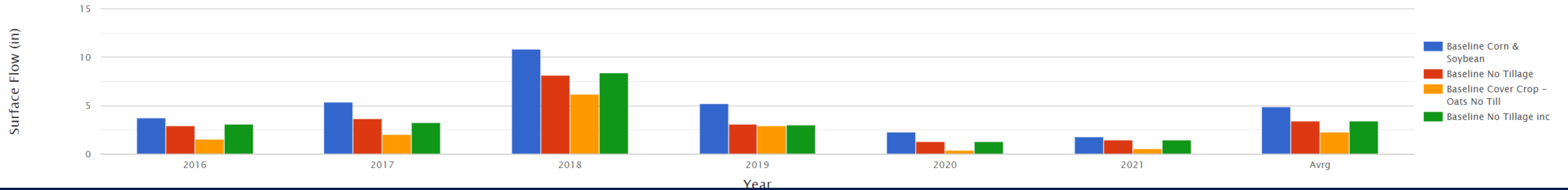

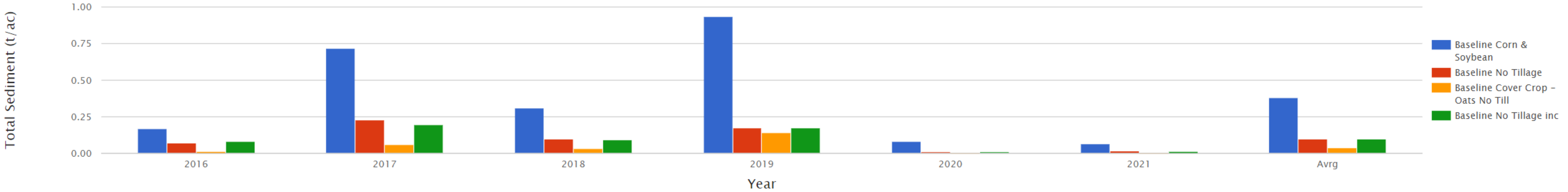

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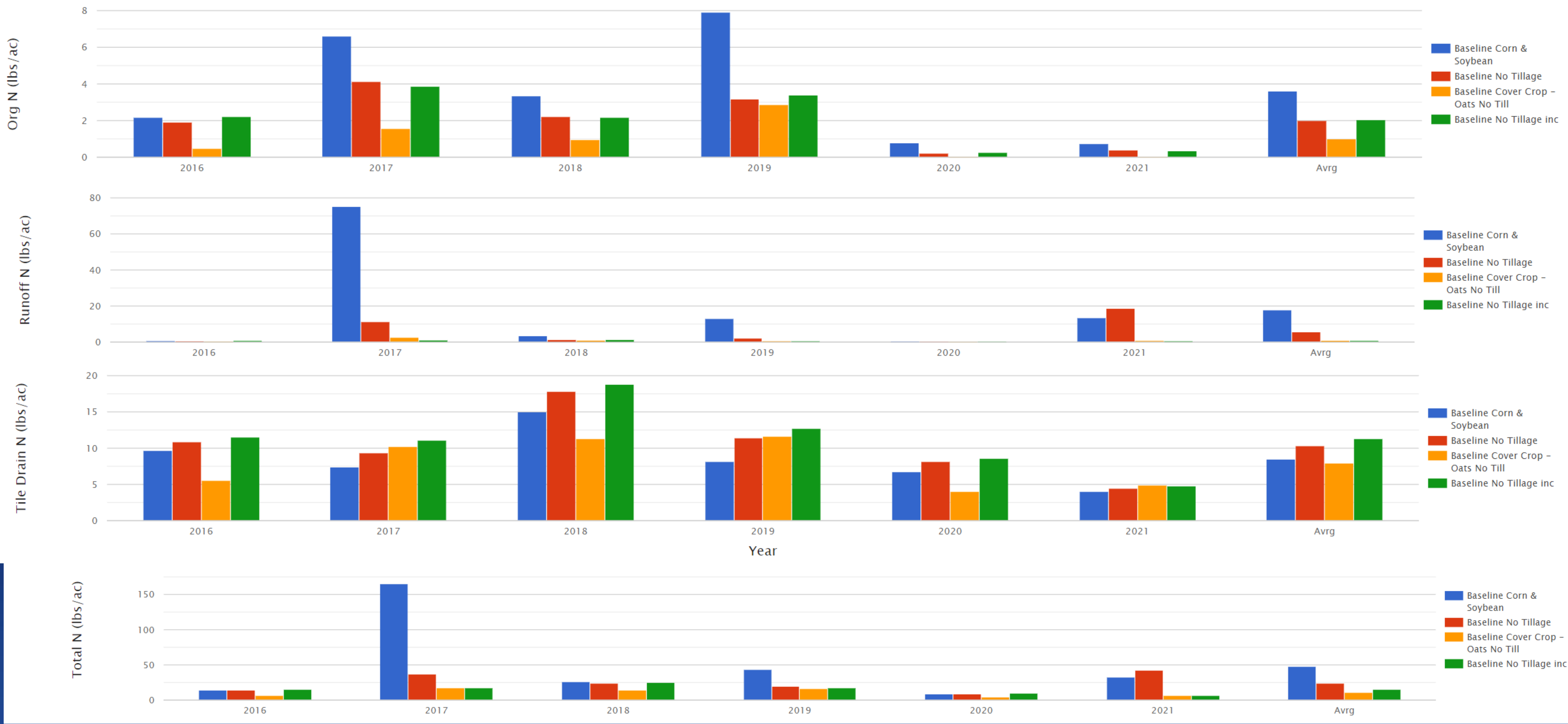

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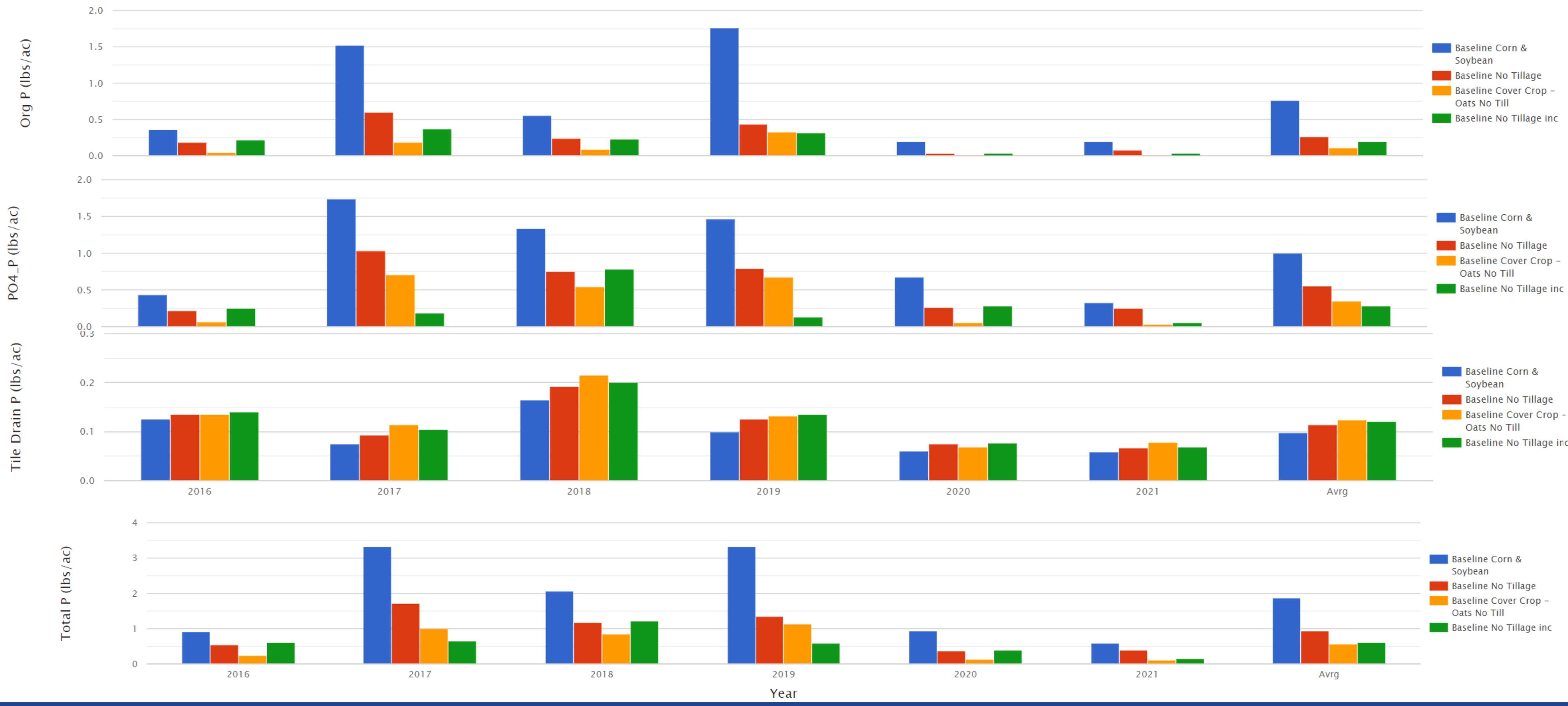
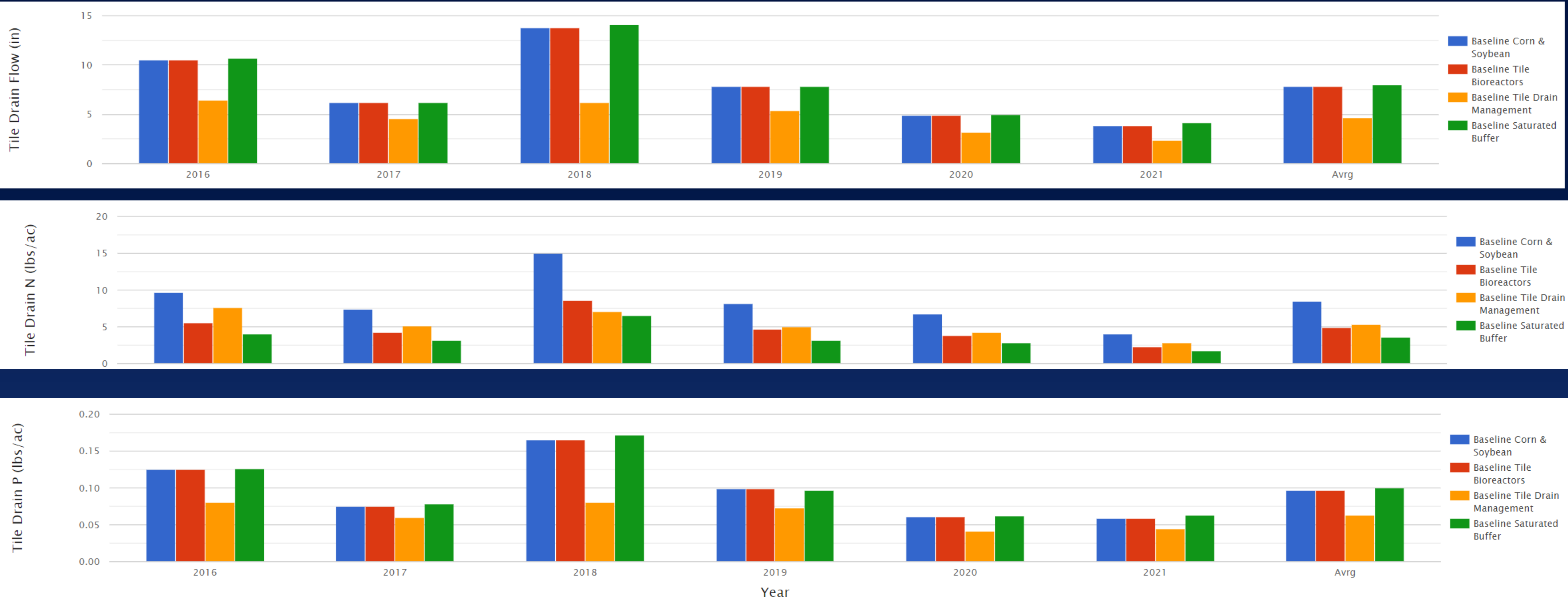
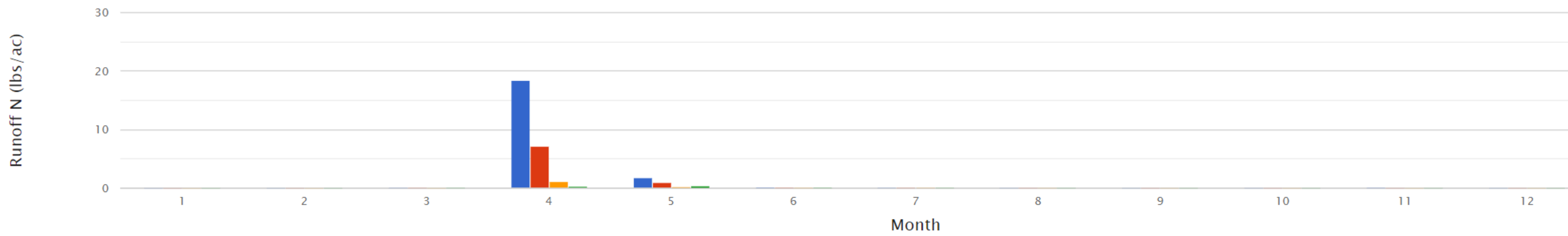



Tile Drain Flow (in)
15
10
5
0
2016
2017
2018
2019
2020
2021
Avrg
Baseline Corn & Soybean
Baseline Tile Bioreactors
Baseline Tile Drain Management
Baseline Saturated Buffer
Tile Drain N (lbs/ac)
20
15
10
5
0
Tile Drain P (lbs/ac)
0.20
0.15
0.10
0.05
0.00
Year

Monthly graphic report



Watershed (field routing) simulation

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Watershed (Field Routing)

Add New Field Routing (Watershed)

Simulate Selected Field Routing (Watershed) | View Results | Download APEX Files

To select a field routing (watershed) click on the field routing (watershed) name. To simulate a field routing (watershed) click on the check box

☐	Name	Simulation date	Actions
☐	Watershed Scenario 1	2023-07-05 15:48:04 -0500	✎ ✖

Add

Select Field ⌄ Select Scenario ⌄

Field Name	Routing to	Scenario Name	Actions
Field 1	outlet	Baseline Corn & Soybean	✖
Field 2	outlet	Baseline Tile Drain Management	✖
Field 3	outlet	Baseline No Tillage	✖

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Viewing Watershed Results:

(±) = Confidence Interval

Description	Losses (±)
	Watershed Scenari
Hydrology (in)	
Surface Runoff (in)	2.99 (1)
Subsurface Flow (in)	4.61 (0.7)
Tile Drain Flow (in)	2.25 (0.3)
Irrigation Applied (in)	0 (0)
Deep Percolation (in)	3.7 (0.6)
Precipitation (in)	35.74
N Losses (lbs)	25.79 (15.8)
Organic N (lbs)	5.58 (4.3)
Runoff N (lbs)	14.21 (9.2)
Subsurface N (lbs)	2.84 (0.9)
Tile-Drain soluble N (lbs)	3.16 (1.4)
Deep Percolation N (lbs)	17.88 (5.9)
P Losses (lbs)	1.48 (0.8)
Organic P (lbs)	0.87 (0.6)
Surface Soluble P (lbs)	0.6 (0.2)
Tile-Drain soluble P (lbs)	0.01 (0)
Total Sediment (t)	0.70 (0.7)
Surface Erosion (t)	0.7 (0.7)
Manure Erosion (t)	0 (0)

(±) = Confidence Interval

Description	Losses (±)
	Watershed Scenari
N Losses (lbs)	25.79 (15.8)
Organic N (lbs)	5.58 (4.3)
Runoff N (lbs)	14.21 (9.2)
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Organic P (lbs)	0.87 (0.6)
Surface Soluble P (lbs)	0.6 (0.2)
Tile-Drain soluble P (lbs)	0.01 (0)
Total Sediment (t)	0.70 (0.7)
Surface Erosion (t)	0.7 (0.7)
Manure Erosion (t)	0 (0)
Carbon Sequestration	
C Sequestration rate at 12 in. soil depth (t)	0.0453
CO_2 equivalent (t)	0.1663
Total Crop Yield	
Soybeans (bu)	66 (0.18)
Corn (bu)	212 (0.27)

Economic

Results and data base

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Economic Results

Home » Projects » Iowa Demo » Fields » Field 1

Download pdf

	Baseline Corn & So	Baseline N & P at 3		Baseline Cover Cro		Baseline No Tillage	
Description	Losses(±)	Losses(±)	Change(%)	Losses(±)	Change(%)	Losses(±)	Change(%)
Total Revenue	1139.71	1163.67	23.96 (2.1)	1154.64	14.93 (1.3)	1096.49	-43.22 (-3.8)
Crop/Feed Sales	1139.71	1163.67	23.96 (2.1)	1154.64	14.93 (1.3)	1096.49	-43.22 (-3.8)
Livestock Sales	0.00	0.00	0.00 (NaN)	0.00	0.00 (NaN)	0.00	0.00 (NaN)
Total Cost	258.685	258.685	0.00 (0.0)	333.076	74.39 (28.8)	239.666	-19.02 (-7.4)
Field Variable Cost	80.08	80.08	0.00 (0.0)	80.08	0.00 (0.0)	61.06	-19.02 (-23.8)
Overhead Cost	152.77	152.77	0.00 (0.0)	214.25	61.48 (40.2)	152.77	0.00 (0.0)
Other Cost	25.83	25.83	0.00 (0.0)	38.75	12.92 (50.0)	25.83	0.00 (0.0)
Net Returns	881.02	904.99	23.97 (2.7)	821.56	-59.46 (-6.7)	856.83	-24.19 (-2.7)

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Parameters

Controls | Parameters | Subareas | Soils | Operations | Site

Reset to default

Parameters	Name	Line	Value	Low Range	High Range	Actions
1	Crop canopy-PET(1-2)	1	2.0	1.0	2.0	
2	Root growth_soil strength (1_2)	1	2.0	1.0	2.0	
3	Water stress_harvest index (0_1)	1	0.5	0.0	1.0	
4	Water storage N leaching (0_1)	1	0.9	0.0	1.0	
5	Soil water lower limit (0_1)	1	0.5	0.0	1.0	
6	Winter dormancy (h) (0_1)	1	0.0	0.0	1.0	
7	N fixation (0_1)	1	0.9	0.0	1.0	
8	Soluble p runoff coefficient. (1*m^3/t)	1	20.0	10.0	20.0	
9	Pest damage moisture threshold	1	20.0	25.0	150.0	
10	Pest damage cover threshold	1	20.0	1.0	10.0	
11	Moisture required for seed germination	2	-100.0	10.0	30.0	
12	Soil evaporation coefficient	2	2.0	1.5	2.5	
13	Wind erodibility coefficient	2	2.0	0.0	3.0	
14	Nitrate leaching ratio	2	0.6	0.1	1.0	
15	Runoff CN weighting factor (0.0 1.0)	2	0.05	0.0	1.0	
16	Expands CN retention parameter (1.0 1.5)	2	1.0	1.0	1.5	
17	Soil evaporation plant cover factor (0.0 0.5)	2	0.2	0.0	0.5	

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Economic Input Information (NTT)

Home » Projects » Iowa Demo

General Inputs

Reset to default

Name	Unit	Value	Actions
Average labor wage	$/hr	12.0	
Default land rental rate	$/acre	30.0	
Default land value	$/acre	2000.0	
Diesel price	$/gallon	3.11	
Electricity price	cents/khr	0.15	
Electricity purchase price	cents/khr	0.0	
Electricity sale price	cents/khr	0.0	
Gas price	$/gallon	3.39	
Haul to compost distance	mile	20.0	
Haul to spread distance	mile	5.0	
Time horizon	yrs	2.0	

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Commodity Prices

Reset to default

Name	Unit	Selling price	Purchase price	Actions
Alf/grass < 50%	$/bale	2.96	2.96	
Alfalfa	$/bale	3.18	3.18	
Alfalfa silage	$/bale	1.46	1.46	
Alfalfa/grass hay	$/bale	3.18	3.18	
Alfalfa/grass hay < 50%	$/bale	2.96	2.96	
Alfalfa/grass silage	$/bale	1.36	1.36	
Alfalfa_haylage	$/bale	1.36	1.36	
Apples	$/lb	6.0	6.0	
Bahiagrass	$/sq. yard	5.0	5.0	
Barley	$/bu	7.39	7.39	
Barley silage	$/ton	1.41	1.41	
Barley_straw	$/bale	1.73	1.73	
Beetpulp	$/bag	7.175	7.175	
Beets	$/lb	6.0	6.0	

Equipment

Reset to default

Name	Unit	New Hours	Price	Economic Life	Actions
4w asst 100 hp diesel	per unit	12000	38492.0	12000	
4w asst 135 hp diesel	per unit	12000	54791.0	12000	
4w asst 175 hp diesel	per unit	12000	81881.0	12000	
4w asst 205 hp diesel	per unit	12000	100515.0	12000	
4w asst 225 hp diesel	per unit	12000	112969.0	12000	
4w asst 290 hp diesel	per unit	12000	143107.0	12000	
4w asst 40 hp diesel	per unit	12000	159080.0	12000	
4w asst 55 hp diesel	per unit	12000	18650.0	12000	
4w asst 85 hp diesel	per unit	12000	29862.0	12000	
Aerial app-fert	per unit	15000	17.0	15000	
Aerial app-insect 562	per unit	1	7.0	1	
Aerial chem application	per unit	2500	25027.0	2500	
Aerial fert application	per unit	2000	78942.0	2000	
Aerial seeding	per unit	1200	13557.0	1200	
Air delivery drill	per unit	8000	37300.0	8000	
Air delivery row planter	per unit	8000	118525.0	8000	
Aircraft seeded	per unit	750	4950.0	750	

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Facilities

Reset to default

Name	Unit	Price	Economic Life	Actions
A-frame huts	per unit	16000.0	20	
Beef pasture facilities	per unit	10000.0	30	
Calf and heifer facilities	per unit	2000.0	30	
Chicken houses	per unit	600000.0	20	
Commodity barn	per unit	30000.0	30	
Corrals	per unit	16000.0	20	
Crowding pen	per unit	16000.0	20	
Dikes	per unit	10761.9	5	
Ditchimprovement	per unit	15000.0	20	
Dripshed	per unit	16000.0	20	
Equipment shed	per unit	16000.0	20	
Equipment shed 1	per unit	1749.84	30	
Equipment shed 2	per unit	3982.34	30	

Supplies

Reset to default

Name	Unit	Selling Price	Purchase Price	Actions
Fertilizer: 10-34-00	$/lb	1.5	1.5	
Fertilizer: 18-46-00	$/lb	1.5	1.5	
Fertilizer: ammonium nitrate	$/lb	0.19	0.19	
Fertilizer: ammonium phosphates	$/lb	0.25	0.25	
Fertilizer: ammonium sulfate	$/lb	1.0	1.0	
Fertilizer: ammonium thiosulfate	$/lb	1.0	1.0	
Fertilizer: anhydrous ammonia	$/lb	0.26	0.26	
Fertilizer: beef-fr	$/lb	1.5	1.5	
Fertilizer: broil-fr	$/lb	1.5	1.5	
Fertilizer: dairy-fr	$/lb	1.5	1.5	
Fertilizer: duck-fr	$/lb	1.5	1.5	
Fertilizer: elem-n	$/lb	1.5	1.5	
Fertilizer: elem-p	$/lb	1.5	1.5	
Fertilizer: goat-fr	$/lb	1.5	1.5	

Utility Files (Available in RE version)

Home » Projects » Iowa Demo » Fields » Field 1 » Utility Files » Controls

Controls

Controls | Parameters | Subareas | Soils | Operations | Site

Reset to default

Controls	Code	Line	Column	Value	Low Range	High Range	Actions
1	NBYR	1	1	35.0	0.0	100.0	
2	IYR	1	2	1985.0	1.0	2040.0	
3	IMO	1	3	1.0	1.0	12.0	

Comment and Questions