

Nutrient Tracking Tool

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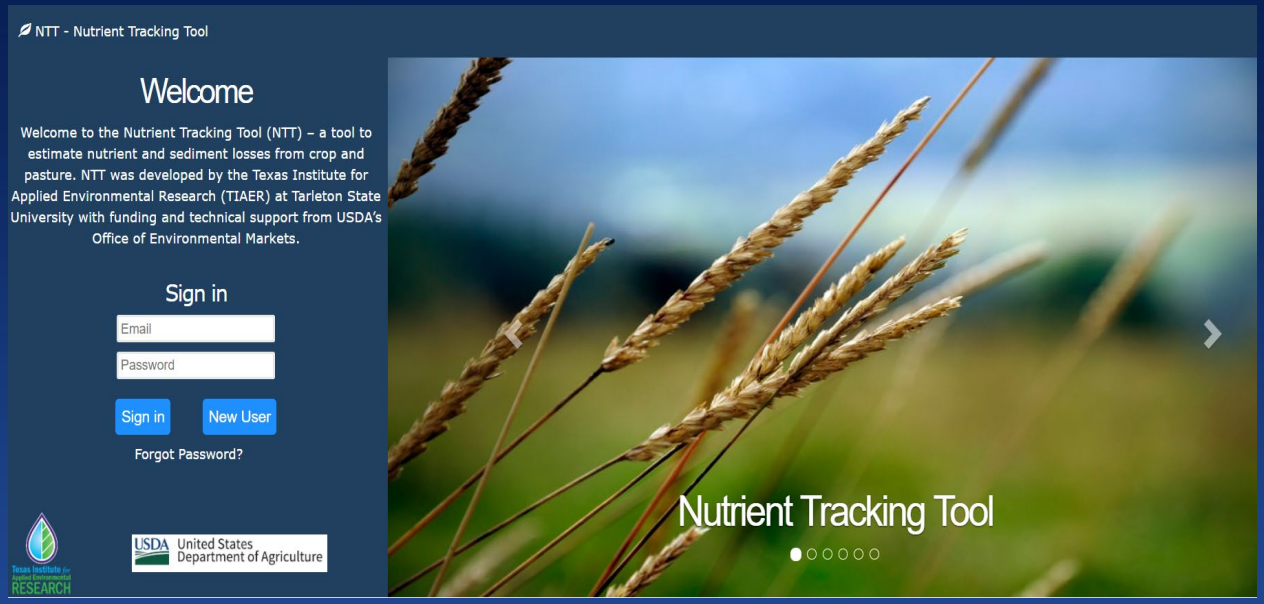
About NTT

NTT is an online, field-scale tool for estimating N, P and sediment losses from crop and pasture lands.



History of NTT

- Developed to facilitate Water Quality Trading
- Prototyped by Texas Institute for Applied Environmental Research (TIAER) and NRCS in 2008 – 2010
- OEM worked to TIAER to develop the current version of NTT which is national in scope and represents the 3rd generation of NTT

Purpose of NTT

- OEM supported development of NTT as the science tool behind water quality trading
- Other applications:
  - Corporate sustainability/Supply chain sust.
  - Education & outreach
  - Planning
  - Research & analysis

Let's get technical…

- NTT uses the Agriculture Policy Environmental eXtender (APEX) model
- Data used by APEX
  - National Soils Database (SSURGO)
  - PRISM climate database
  - 30m resolution DEM data (to estimate slope)

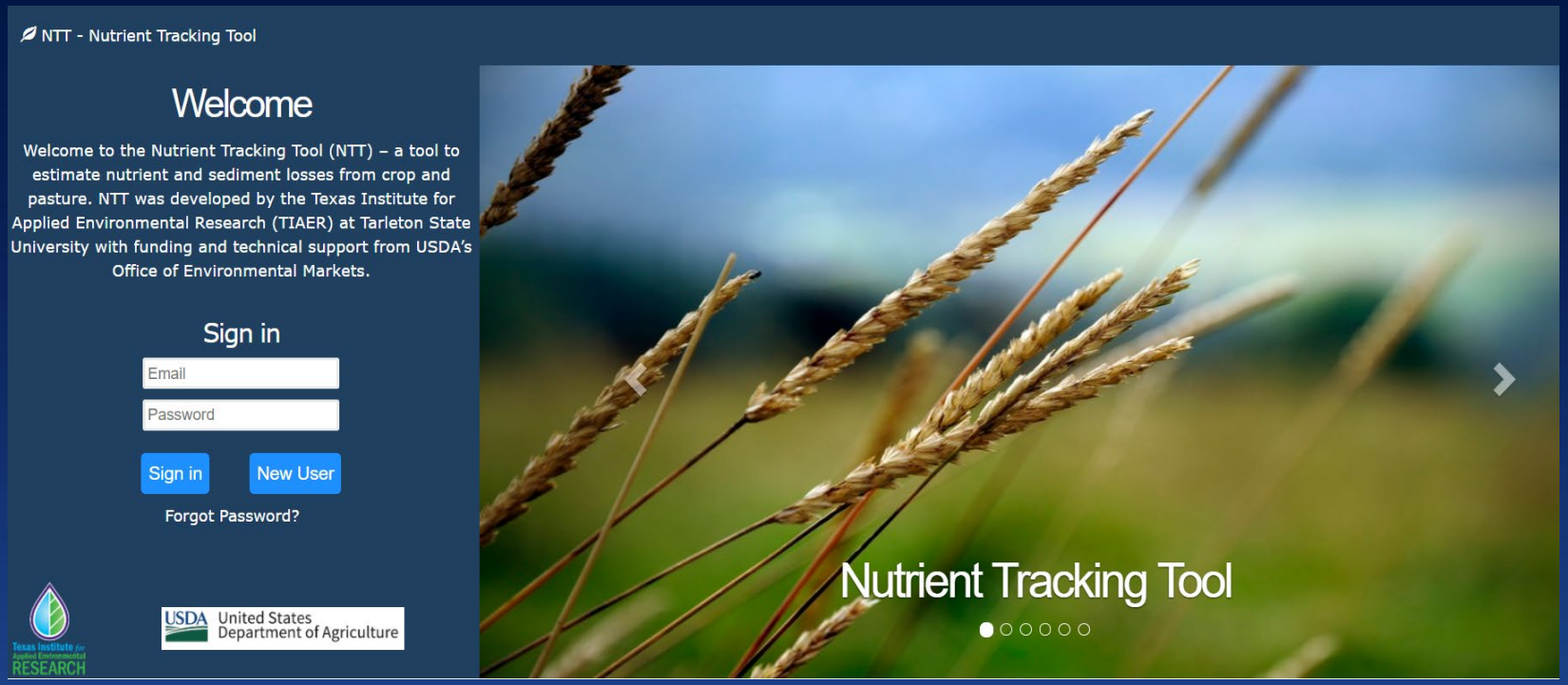
Tailoring APEX to Regional Conditions

- 2 phases of tool parameterization/validation
  - 1. State-level parameterization using publically available data (e.g. yield).
  - 2. Parameterizaiton using local field-scale data (where available)
- Goal: have phase 1 completed for U.S. by end of year
- Site-level parameterization completed for Ohio/Great Lakes area. Working of several others.
- Regions that have not yet been fine-tuned are using standard parameters for time being

NTT Example

- The following slides walk through NTT
- User will first sign in, create a project and define fields
- For each field user will enter one or more management scenarios that can be compared

ntt.tiaer.tarleton.edu



USDA

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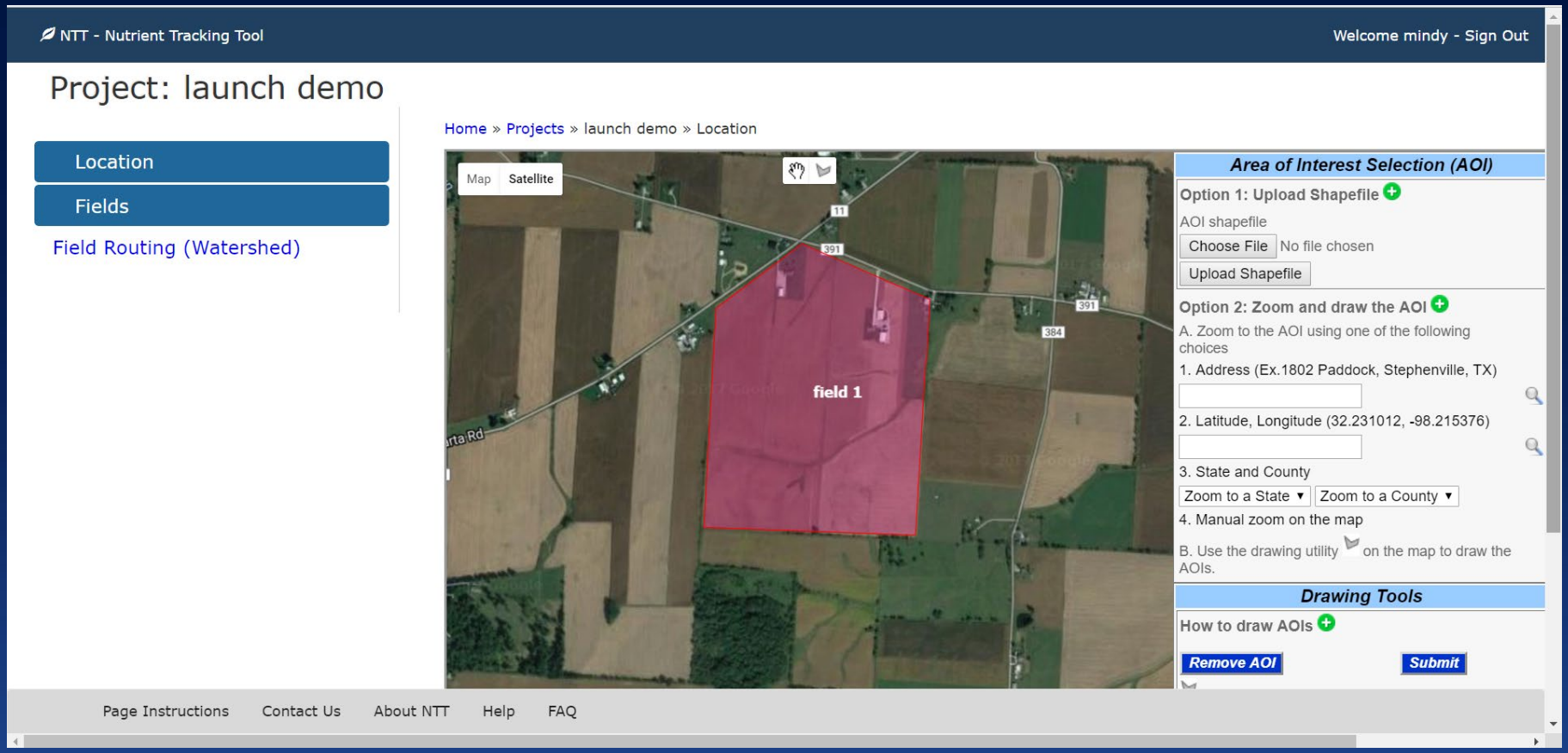

USDA

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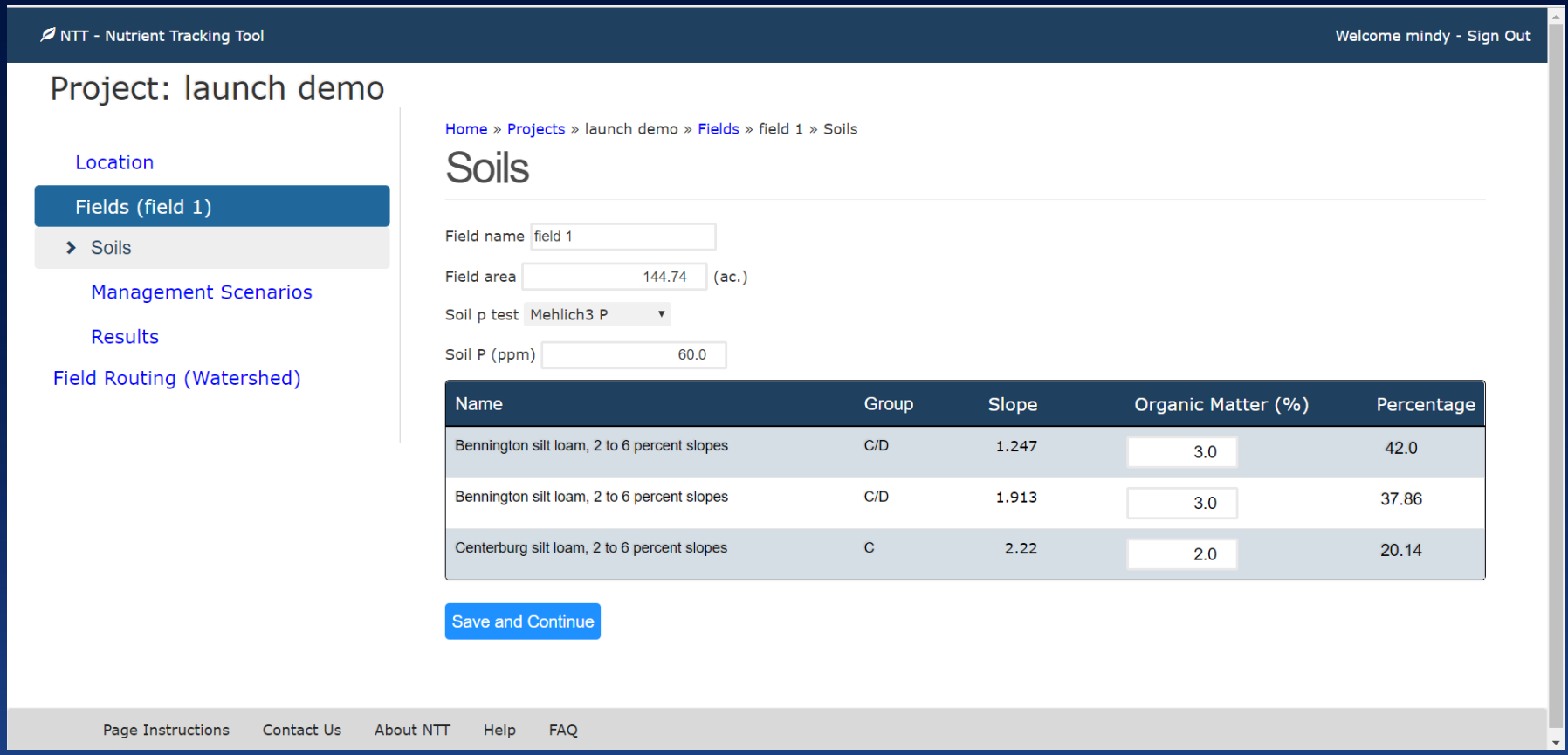

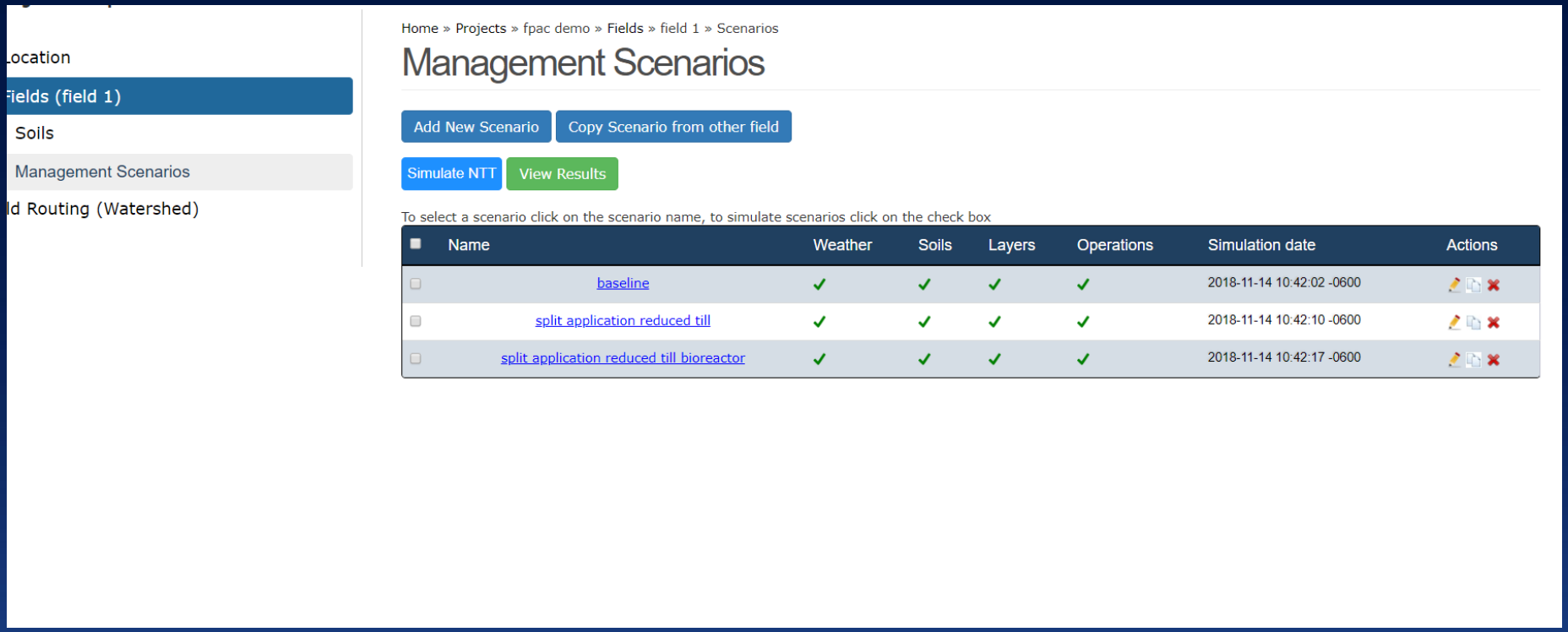
ocation
ields (field 1)
Soils
Management Scenarios
d Routing (Watershed)
Home » Projects » fpac demo » Fields » field 1 » Scenarios
Management Scenarios
Add New Scenario
Copy Scenario from other field
Simulate NTT
View Results
To select a scenario click on the scenario name, to simulate scenarios click on the check box
Name
Weather
Soils
Layers
Operations
Simulation date
Actions
baseline
2018-11-14 10:42:02 -0600
split application reduced till
2018-11-14 10:42:10 -0600
split application reduced till bioreactor
2018-11-14 10:42:17 -0600

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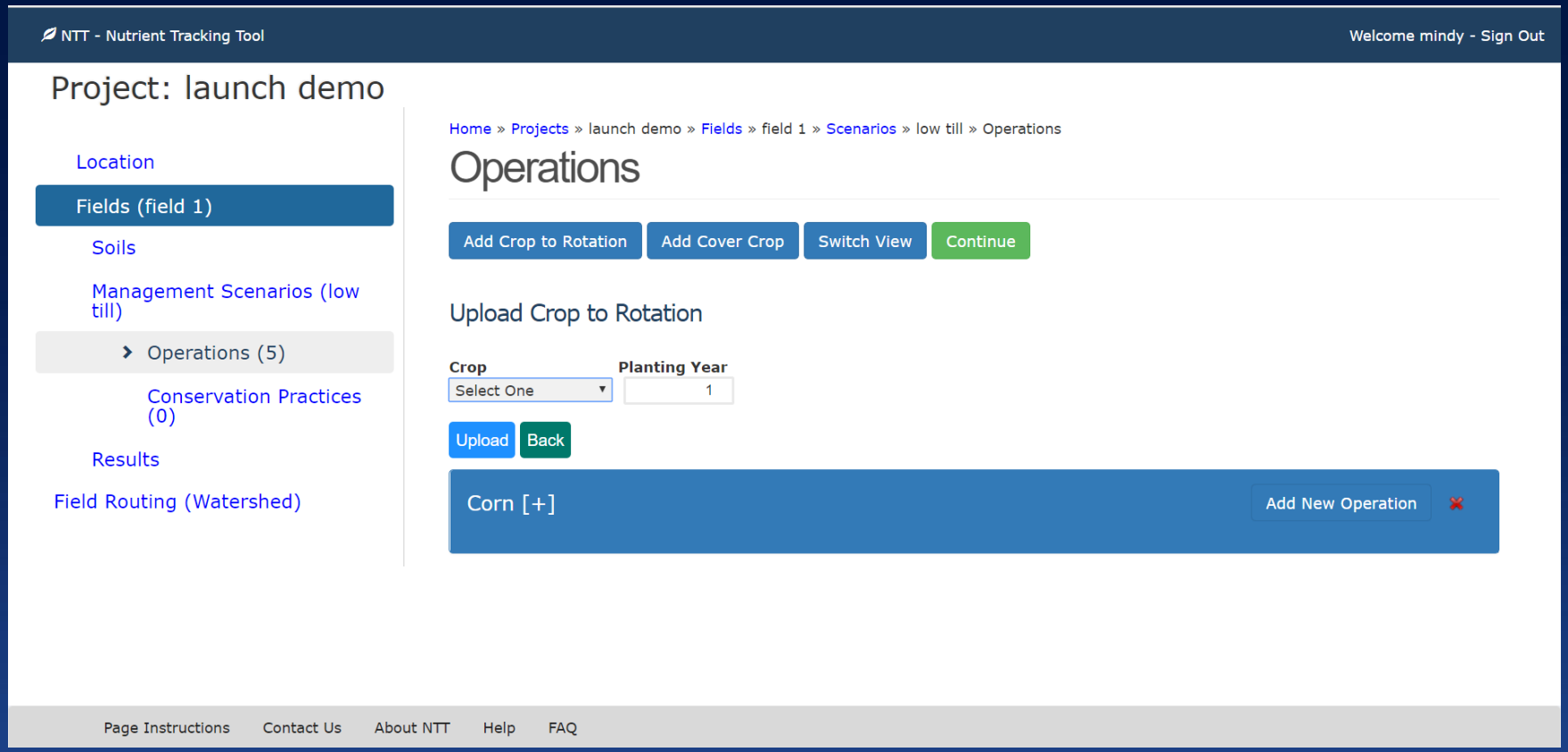
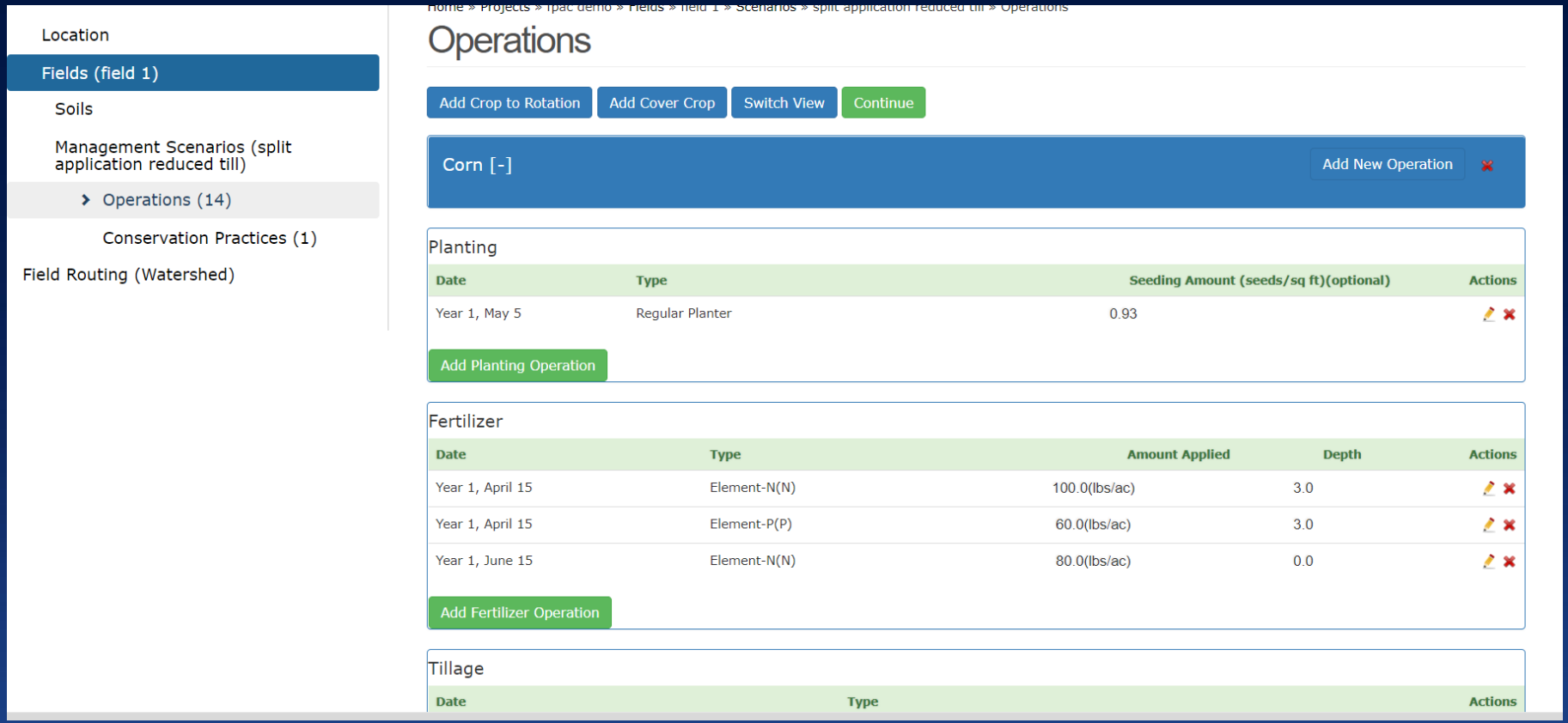
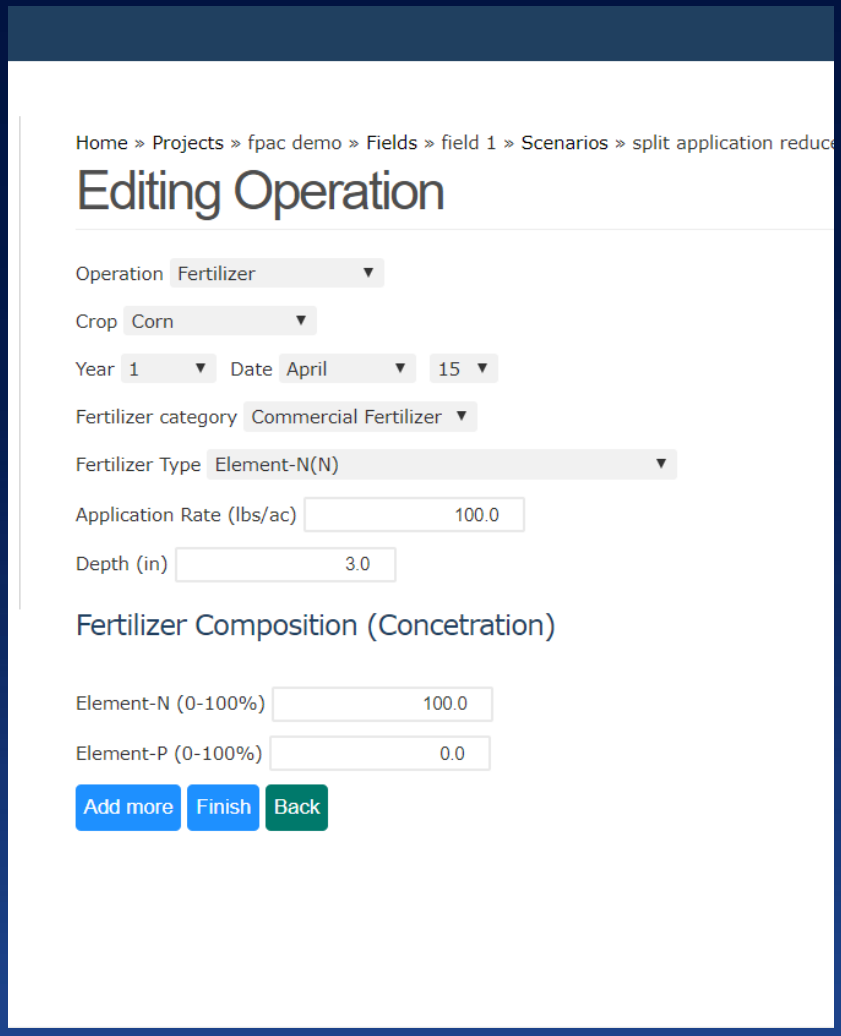
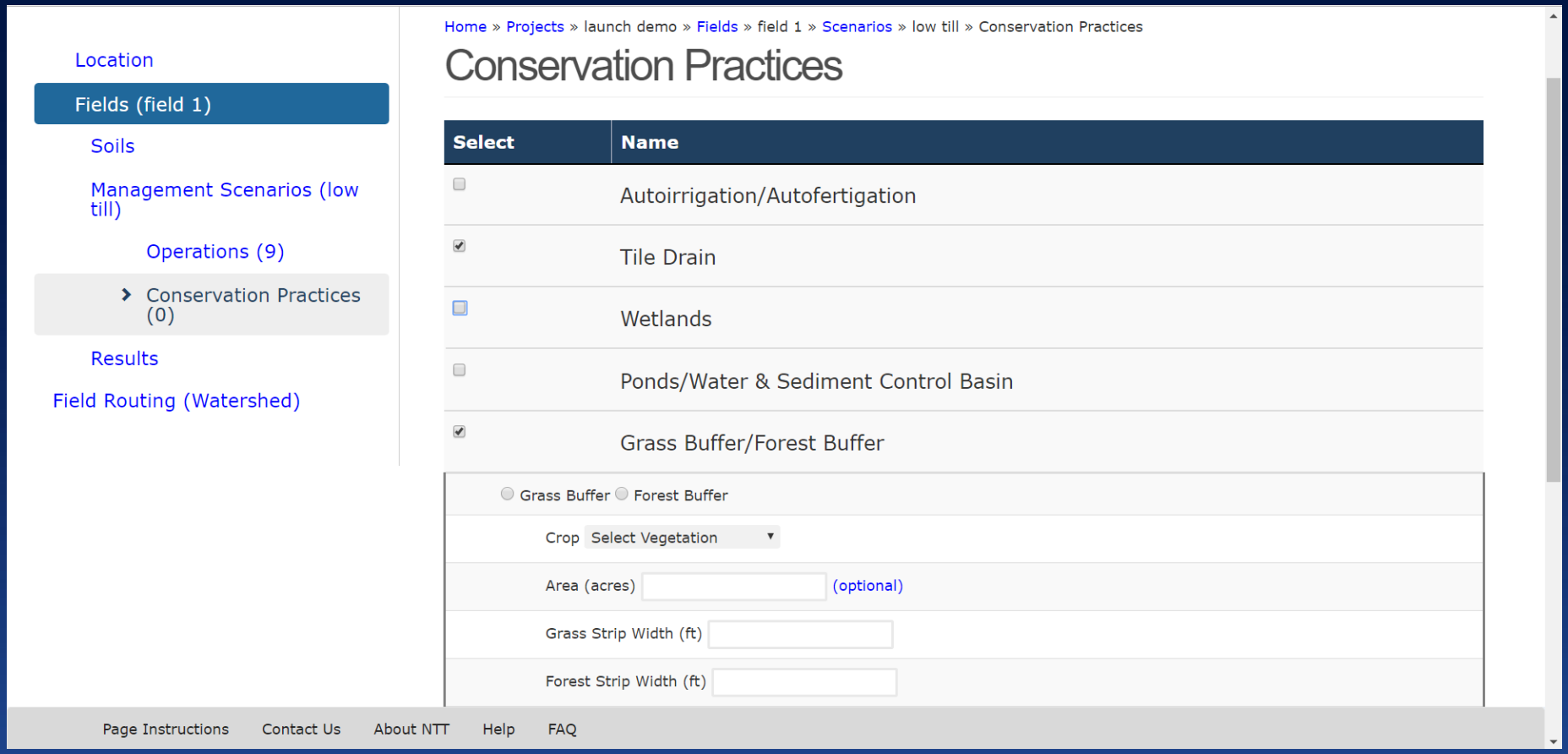



Location
Fields (field 1)
Soils
Management Scenarios (split application reduced till)
Operations (14)
Conservation Practices (1)
Field Routing (Watershed)
Home » Projects » tpac demo » Fields » field 1 » Scenarios » split application reduced till » Operations
Operations
Add Crop to Rotation
Add Cover Crop
Switch View
Continue
Corn [-]
Add New Operation
Planting
Date
Type
Seeding Amount (seeds/sq ft)(optional)
Actions
Year 1, May 5
Regular Planter
0.93
Add Planting Operation
Fertilizer
Date
Type
Amount Applied
Depth
Actions
Year 1, April 15
Element-N(N)
100.0(lbs/ac)
3.0
Year 1, April 15
Element-P(P)
60.0(lbs/ac)
3.0
Year 1, June 15
Element-N(N)
80.0(lbs/ac)
0.0
Add Fertilizer Operation
Tillage
Date
Type
Actions


Home » Projects » fpac demo » Fields » field 1 » Scenarios » split application reduc
Editing Operation
Operation Fertilizer
Crop Corn
Year 1
Date April 15
Fertilizer category Commercial Fertilizer
Fertilizer Type Element-N(N)
Application Rate (lbs/ac) 100.0
Depth (in) 3.0
Fertilizer Composition (Concetration)
Element-N (0-100%) 100.0
Element-P (0-100%) 0.0
Add more
Finish
Back


Location
Fields (field 1)
Soils
Management Scenarios (low till)
Operations (9)
Conservation Practices (0)
Results
Field Routing (Watershed)
Home » Projects » launch demo » Fields » field 1 » Scenarios » low till » Conservation Practices
Conservation Practices
Select
Name
Autoirrigation/Autofertigation
Tile Drain
Wetlands
Ponds/Water & Sediment Control Basin
Grass Buffer/Forest Buffer
Grass Buffer
Forest Buffer
Crop
Select Vegetation
Area (acres)
(optional)
Grass Strip Width (ft)
Forest Strip Width (ft)
Page Instructions
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About NTT
Help
FAQ

NTT Results

- After creating one or more scenarios for a field, user can view and compare results.
- NTT displays nutrient and sediment losses at the “edge of the field” as well as estimated yields.
- Results can be viewed in tabular format, or graphical formats (annual or monthly averages).

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ields (field 1)

Soils

Management Scenarios

Tabular

All Years

Dry Years

Wet Years

Annual-Chart

Monthly-Chart

d Routing (Watershed)

Select up to 3 scenarios for view

baseline | split application re | split application re | Unit Area | Total Area | View | Download PDF | Download Excel

(±) = Confidence Interval

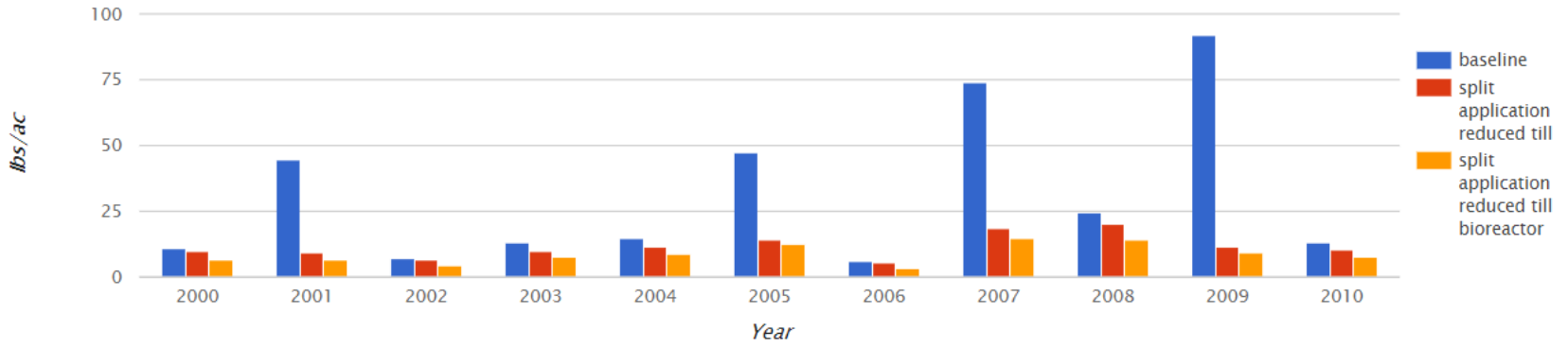
	baseline	split application reduced till		split application reduced till bioreactor	
Description	Losses(±)	Losses(±)	Change(%)	Losses(±)	Change(%)
Total N (lbs/ac)	42.9 (17.2)	17.5 (5.8)	-25.4 (-59.3)	13.1 (4.7)	-29.9 (-69.6)
Org N (lbs/ac)	4.53 (2.2)	4.35 (2.4)	-0.18 (-3.92)	4.35 (2.4)	-0.18 (-3.92)
Runoff N (lbs/ac)	28.09 (12.6)	2.73 (0.8)	-25.36 (-90.27)	2.73 (0.8)	-25.36 (-90.27)
Subsurface N (lbs/ac)	0.09 (0.0)	0.11 (0.0)	0.02 (22.45)	0.11 (0.0)	0.02 (22.45)
Tile Drain N (lbs/ac)	10.20 (2.4)	10.28 (2.5)	0.08 (0.8)	5.86 (1.4)	-4.34 (-42.5)
Total P (lbs/ac)	2.3 (0.7)	1.1 (0.4)	-1.2 (-51.8)	1.1 (0.4)	-1.2 (-51.8)
Surface/Subsurface/Tile Drain Flow (in)	13.4 (2.6)	13.7 (2.6)	0.3 (2.2)	13.7 (2.6)	0.3 (2.2)
Total Other Water Info (in)	0.7 (0.2)	0.8 (0.2)	0.1 (17.1)	0.8 (0.2)	0.1 (17.1)
Total Sediment (t/ac)	0.5 (0.3)	0.4 (0.3)	-0.1 (-13.7)	0.4 (0.3)	-0.1 (-13.7)
Crop Yield					
Corn (bu/ac)	168 (0.4)	201 (0.2)	33 (20)	201 (0.2)	33 (20)
Soybeans (bu/ac)	70 (0.1)	70 (0.1)	0 (0)	70 (0.1)	0 (0)

View Annual-Charts

Select up to 3 scenarios for view

Initial Year ▼ | Final Year ▼ | baseline ▼ | split application re ▼ | split application re ▼ | Nitrogen Losses ▼ | Select Type ▼ | View

Total N



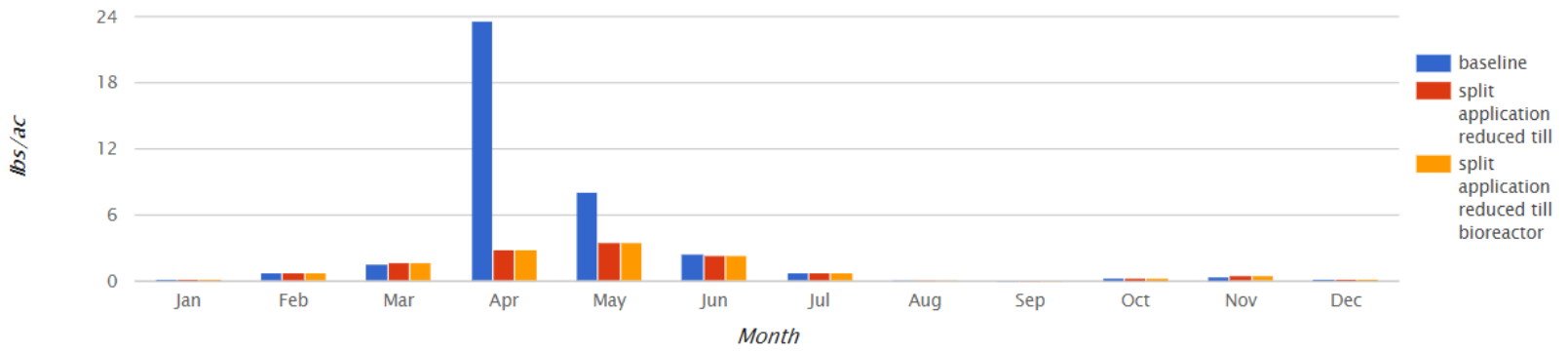
scenario	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
baseline	11.1	44.5	7.2	12.9	14.6	47.5	5.9	74.1	24.3	91.9	13.3
split application reduced till	9.8	9.3	6.7	9.9	11.3	14.0	5.4	18.5	20.0	11.3	10.1
split application reduced till bioreactor	6.4	6.8	4.3	7.5	8.6	12.7	3.5	14.5	14.1	9.3	7.6

View Monthly-Charts

Select up to 3 scenarios for view

baseline ▼ | split application re ▼ | split application re ▼ | Runoff N ▼ | View

Runoff N



scenario	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
baseline	0.1	0.8	1.6	23.6	8.1	2.5	0.8	0.1	0.0	0.3	0.4	0.2
split application reduced till	0.1	0.8	1.7	2.9	3.5	2.4	0.8	0.1	0.0	0.3	0.5	0.2
split application reduced till bioreactor	0.1	0.8	1.7	2.9	3.5	2.4	0.8	0.1	0.0	0.3	0.5	0.2

NTT Watershed Feature

- Users can define a “watershed” or field routing scenario by linking one or more fields
- NTT will simulate the “edge of watershed” load by routing runoff from one field to the next.

The Big Picture

- NTT facilitates producer decision-making (WQ benefits v. yield impacts)
- NTT provides quantitative estimates of N, P and sediment that are essential for market-based programs or TMDL tracking
- NTT can help producers maximize benefits from conservation practices

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Questions?

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