



Michigan Sensitive Areas Identification System

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Outline

System Overview and Walkthrough

- Purpose
- System Background
- Demonstration

Explore SAIS with applied tutorial

Discussion and gather system feedback

Wrap-up and adjourn

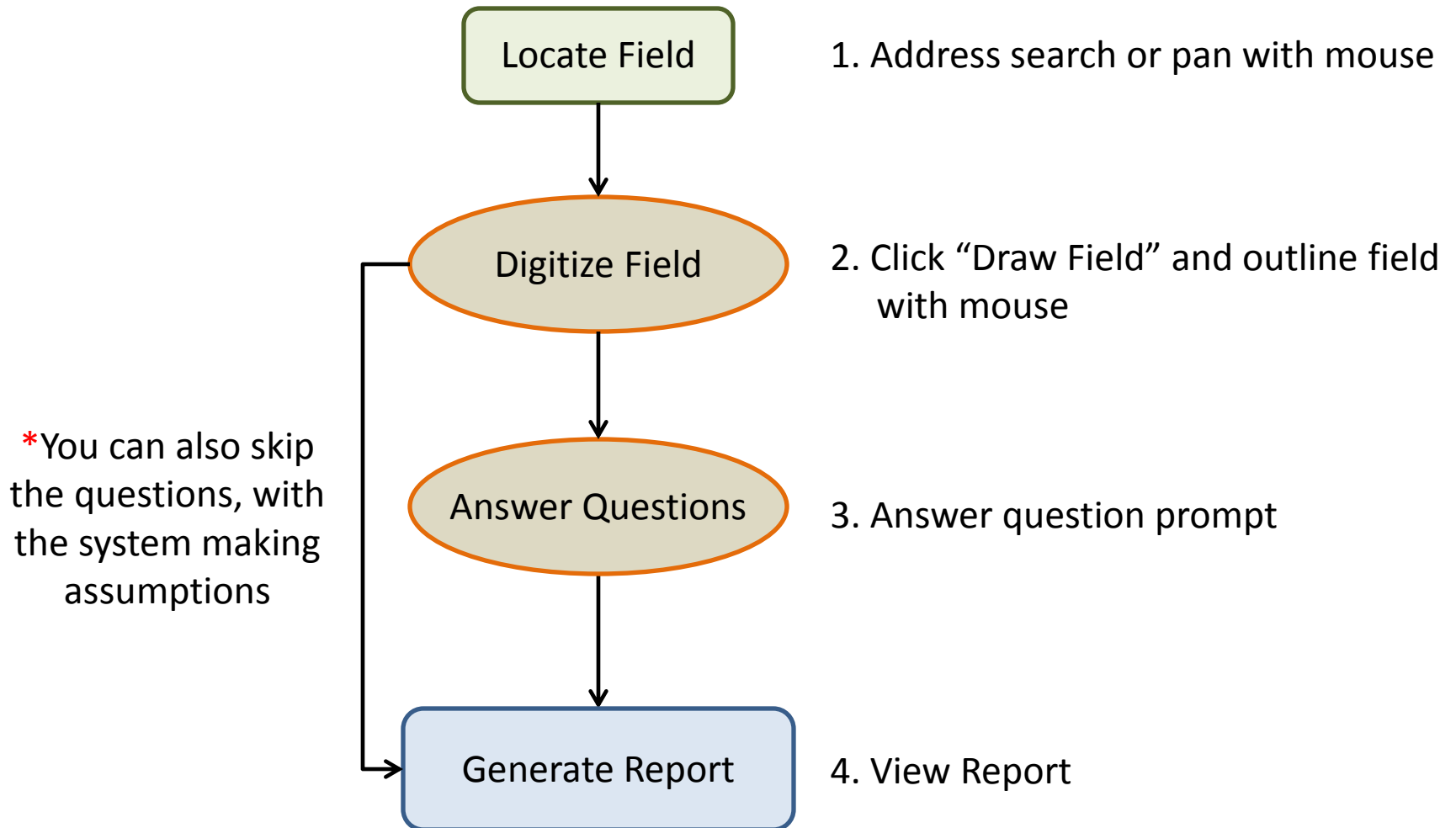
SAIS Overview - Purpose

- Connect producers with NRCS and conservation organizations to address sensitive areas through conservation treatments and available assistance programs
- Quick assessment of risks such as soil erosion by wind or water and leaching of nutrients
- Not intended to replace conservation planning work

SAIS Overview

- Developed by the MSU Institute of Water Research with input and funding by the Michigan NRCS Office
- General Uses
 - Explore an interactive map with sensitive area data
 - Answer a brief questionnaire to generate results from the Manure Application Risk Index and Phosphorus Risk Assessment
 - View nearby USDA Service Centers
 - Print and save detailed reports that include summary of results, maps, and potential conservation treatments

SAIS Overview - System Workflow



Development Background

- Met with NRCS State Office staff twice at the end of 2015 to finalize functionality.
- Met with farmers twice in the beginning of 2016.
 - Completed user needs assessment
 - Showed users an early version of the tool



Resource Concerns

- The following resource concerns were addressed in the system:
 - SOIL EROSION - Sheet, rill, & wind erosion
 - SOIL EROSION – Concentrated flow erosion
 - WATER QUALITY DEGRADATION – Pesticides transported to surface and ground waters
 - WATER QUALITY DEGRADATION – Excess pathogens and chemicals from manure, bio-solids or compost applications
 - WATER QUALITY DEGRADATION – Excessive sediment in surface waters

Recommended Practices

- All practices are commonly implemented in Michigan and have CPPE values of 4 or 5. The following are practices included in the system:
 1. Conservation Crop Rotation
 2. Cover Crop
 3. Residue and Tillage Management, No-Till
 4. Residue and Tillage Management, Reduced Till
 5. Critical Area Planting
 6. Grassed Waterway
 7. Agrichemical Handling Facility
 8. Filter Strip
 9. Nutrient Management
 10. Waste Storage Facility
 11. Vegetated Treatment Area
 12. Water and Sediment Control Basin

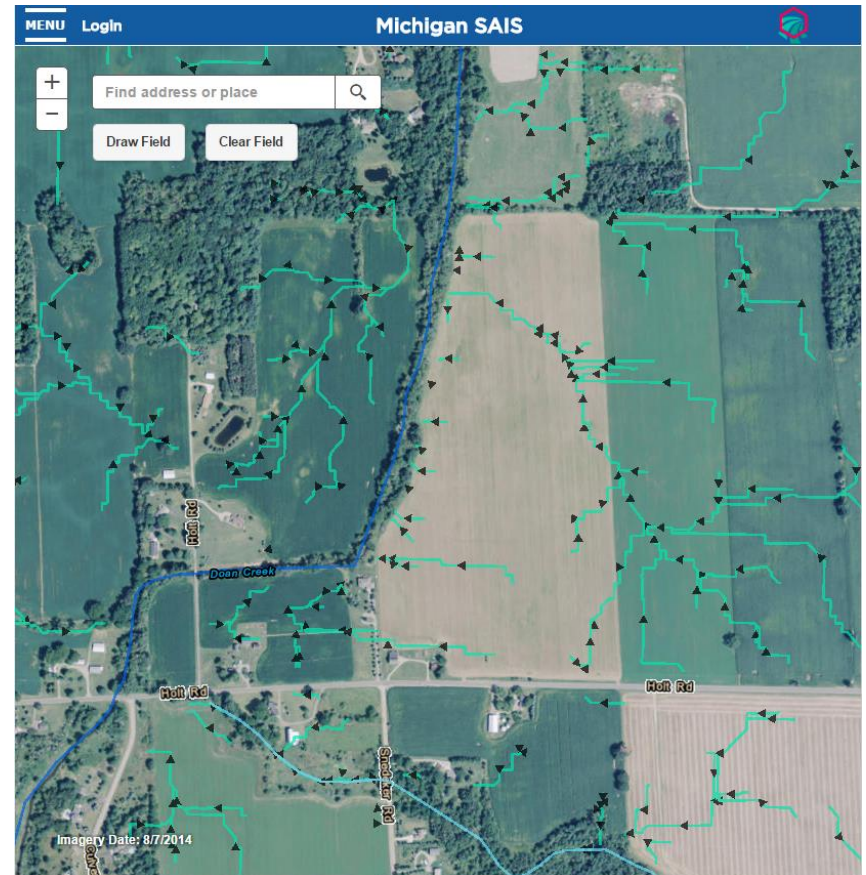


Map Layers

- The following layers are visible in the mapping interface:
 - Water bodies
 - Streams
 - Concentrated Flow
 - Sediment Delivery
 - Sheet and Rill Erosion by Water
 - Nitrate Leaching
 - Soil Erosion by Wind

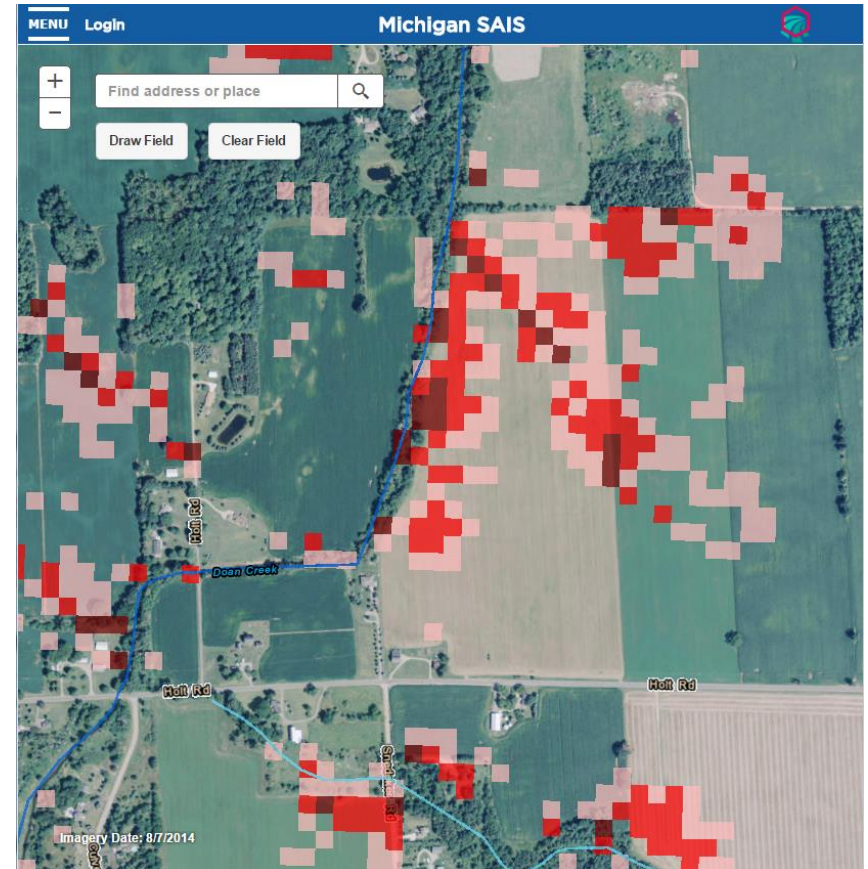
Concentrated Flow

- Developed from digital elevation models of 3-meter and 10-meter resolution.
- Represents surface flow of water with a minimum contributing area of 1 acre



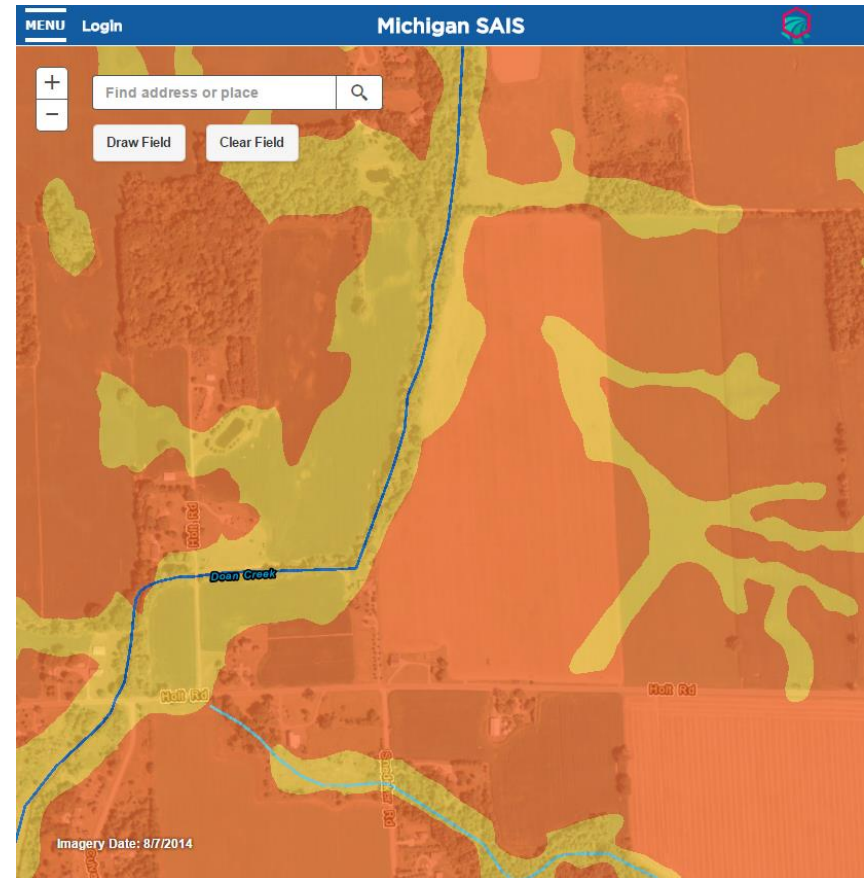
Sediment and Erosion

- Also found in High Impact Targeting and the Great Lakes Watershed Management System
- “Sediment Delivery” & “Sheet and Rill Erosion by Water” layers
- SAIS assumes a risk if a field has any areas eroding greater than 5 tons/acres/year.
- Some helpful definitions:
 1. Sediment Delivery - a 30-meter (or 10-meter) resolution raster dataset containing estimates for annual sediment loading for the selected 8-digit watershed as predicted by combining erosion estimates from RUSLE and delivery ratio estimates from SEDMOD.
 2. Sheet and Rill Erosion by Water - a 30-meter (or 10-meter) resolution raster dataset containing estimates for annual erosion for the selected 8-digit watershed as predicted by RUSLE.



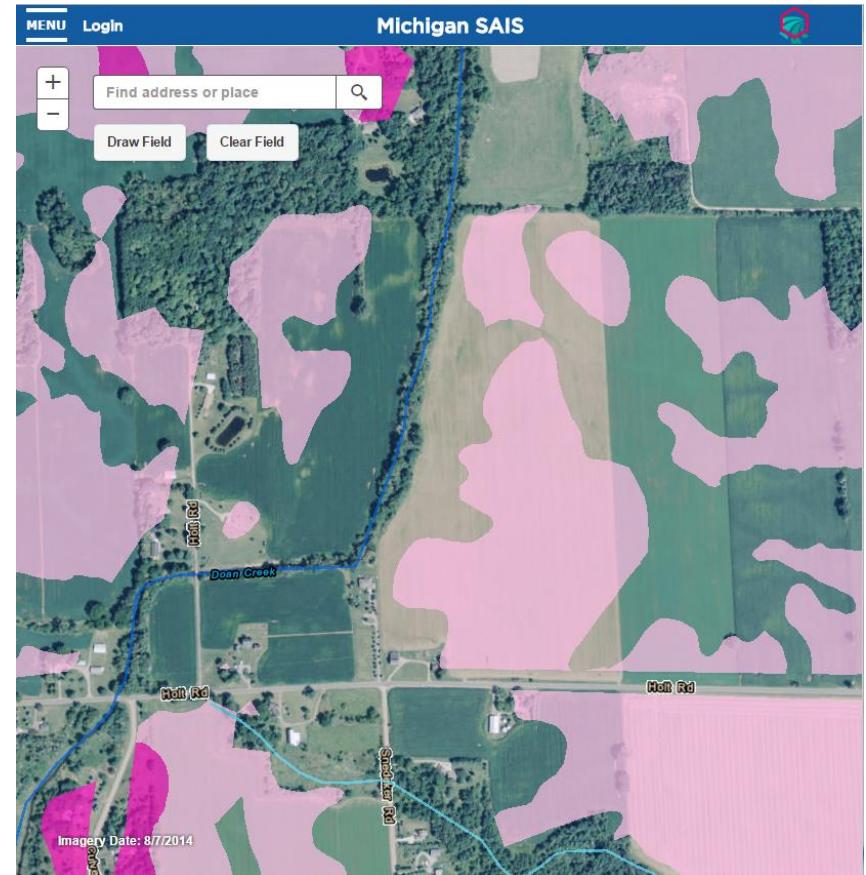
Nitrate Leaching

- Nitrate Leaching Index: The Leaching Index (LI) is an estimate of the inches of precipitation that infiltrates in a crop field and percolates to below the rootzone (1 meter).
- Based upon SSURGO dataset.
- SAIS assumes a risk if a field has areas of “high” risk present.



Wind Erosion

- Based upon **Wind Erodibility Groups**.
- A wind erodibility group is a grouping of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to blowing. The wind erodibility index, used in the wind erosion equation, is assigned using the wind erodibility groups.
- SAIS displays groups 1-3 (high) and assumes a risk if any of the “high” groups are present.



Manure Application Risk Index (MARI)

MARI uses twelve specific field features to obtain an overall rating for each site:

- *Soil Hydrologic Group (A)*
- *Soil Management Group (A)*
- *Percent Slope (A)*
- *Soil Test P Value (Q)*
- *Concentrated Water Flow or Surface Inlet Discharge (A/Q)*
- *Nitrogen Leaching Index for Soil Hydrologic Group (A)*
- *Residue/Cover Crops or Perennial Cover (Q)*
- *Surface Water Setback (A)*
- *Vegetative Buffer Width (Q)*
- *Manure P205 Application Rate (Q)*
- *Manure N Application Rate (Q)*
- *Manure Application Method (Q)*

A = automatically gathered data

Q = user supplied data

Michigan Phosphorus Risk Assessment (MPRA)

MPRA uses nine specific field features to obtain an overall rating for each site:

- *Water Erosion (A)*
- *Runoff Curve Number (A)*
- *Distance to surface water and/or surface inlets (A)*
- *Subsurface drainage (Q)*
- *Buffers (Q)*
- *Soil Test P (Q)*
- *P fertilizer method (Q)*
- *Manure method (Q)*
- *P₂O₅ rate all sources (Q)*

A = automatically gathered data

Q = user supplied data

Michigan SAIS

- Now for a system demo....

Homepage at <http://sais.iwr.msu.edu/>



MAPPING SENSITIVE AREAS

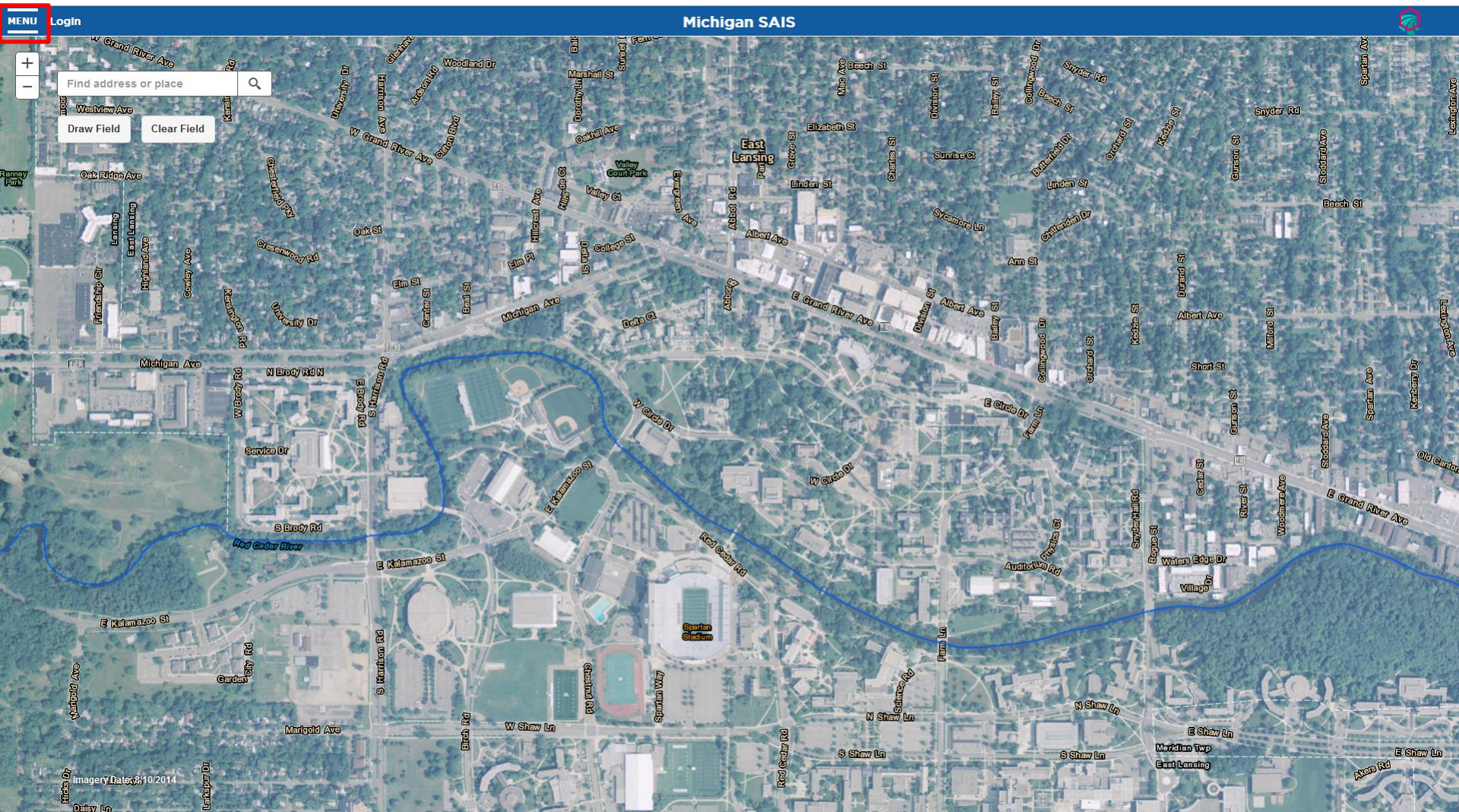
Evaluate fields, generate reports, and protect sensitive areas.

[Evaluate Your Field](#)

[Contact Local NRCS Agent](#)

[Learn More](#)

Accessing SAIS Menu



Creating an Account

Instructions

1. Find your field of interest using the map search bar.
2. Select "Draw Field" and outline your field boundary.
3. Select an option:
 - Continue exploring the map
 - Generate a basic report
 - Answer questions to generate a detailed report
4. Review and save your report.

Layer Toggle:

- ☒ Waterbodies
- ☒ Streams
- ☐ Concentrated Flow
- ☐ Sediment Delivery
- ☐ Sheet and Rill Erosion by Water
- ☐ Nitrate Leaching
- ☐ Soil Erosion by Wind

Legend

Waterbodies

- Lake/Pond
- Reservoir

Streams

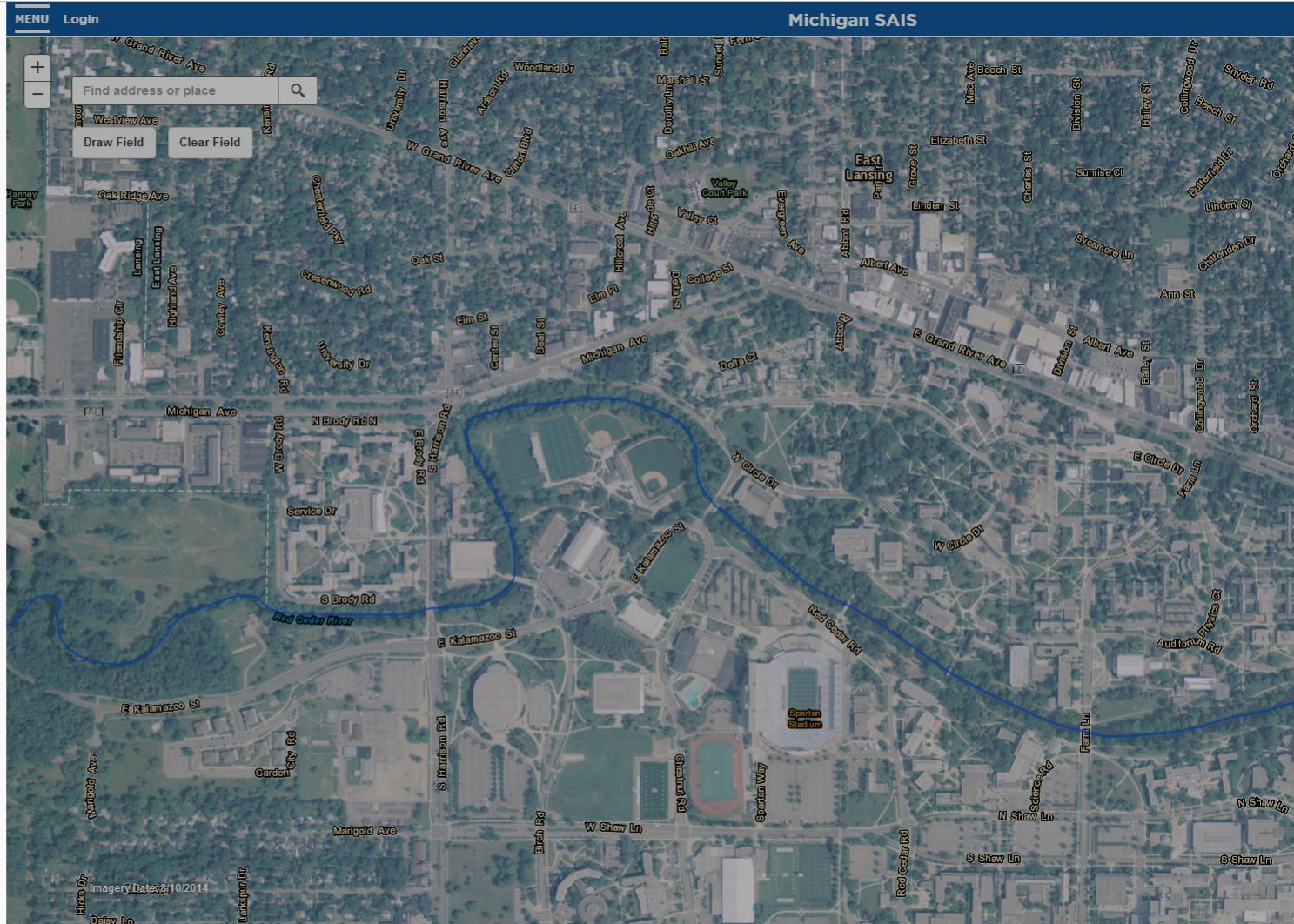
- Canal/Ditch
- Stream/River

Account Management Options.

Create Account

Reset Password

Delete Account



Creating an Account

MENU Login Michigan SAIS

Find address or place

Draw Field Clear Field

Please fill out the fields below:
* Indicates required field.
Please limit username length to 15 characters.

Username*	<input type="text" value="username"/>
Password*	<input type="password" value="password"/>
Retype password*	<input type="password" value="retype password"/>
First name	<input type="text" value="first name"/>
Last name	<input type="text" value="last name"/>
Email*	<input type="text" value="youremail@example.co"/>
Organization*	<input type="text" value="Please select an option..."/>

Create Account

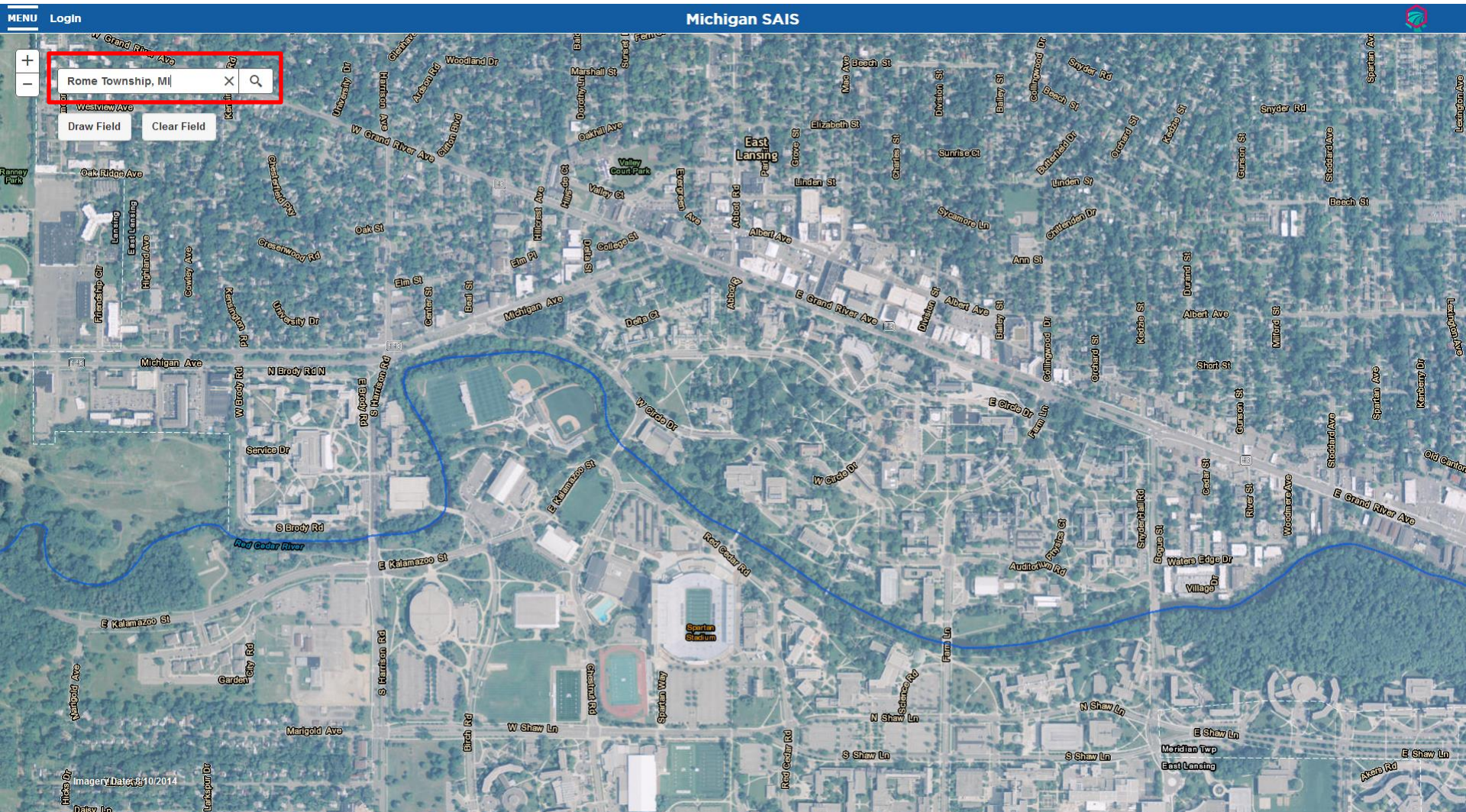
Close

Imagery Date: 10/2014

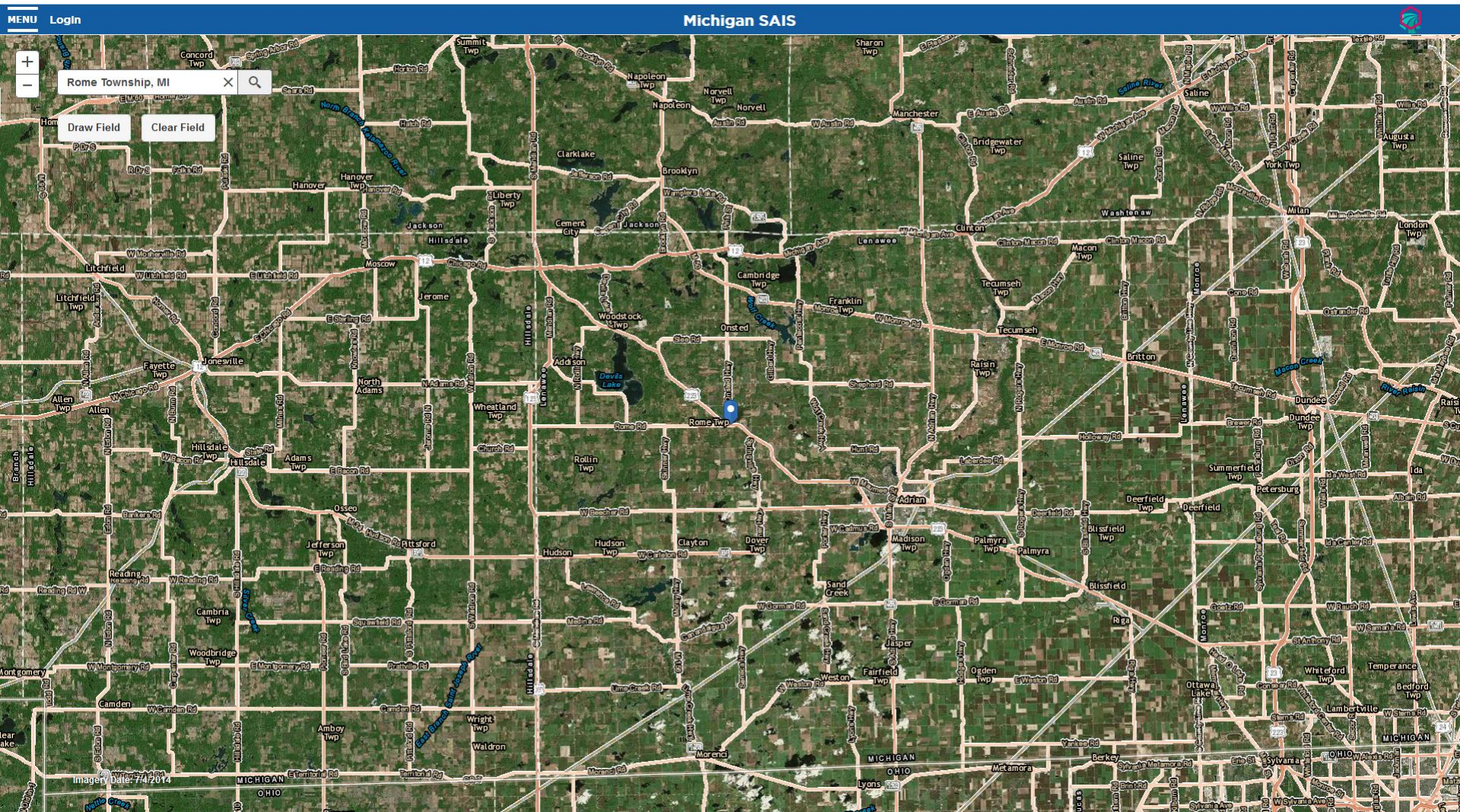
Logging in



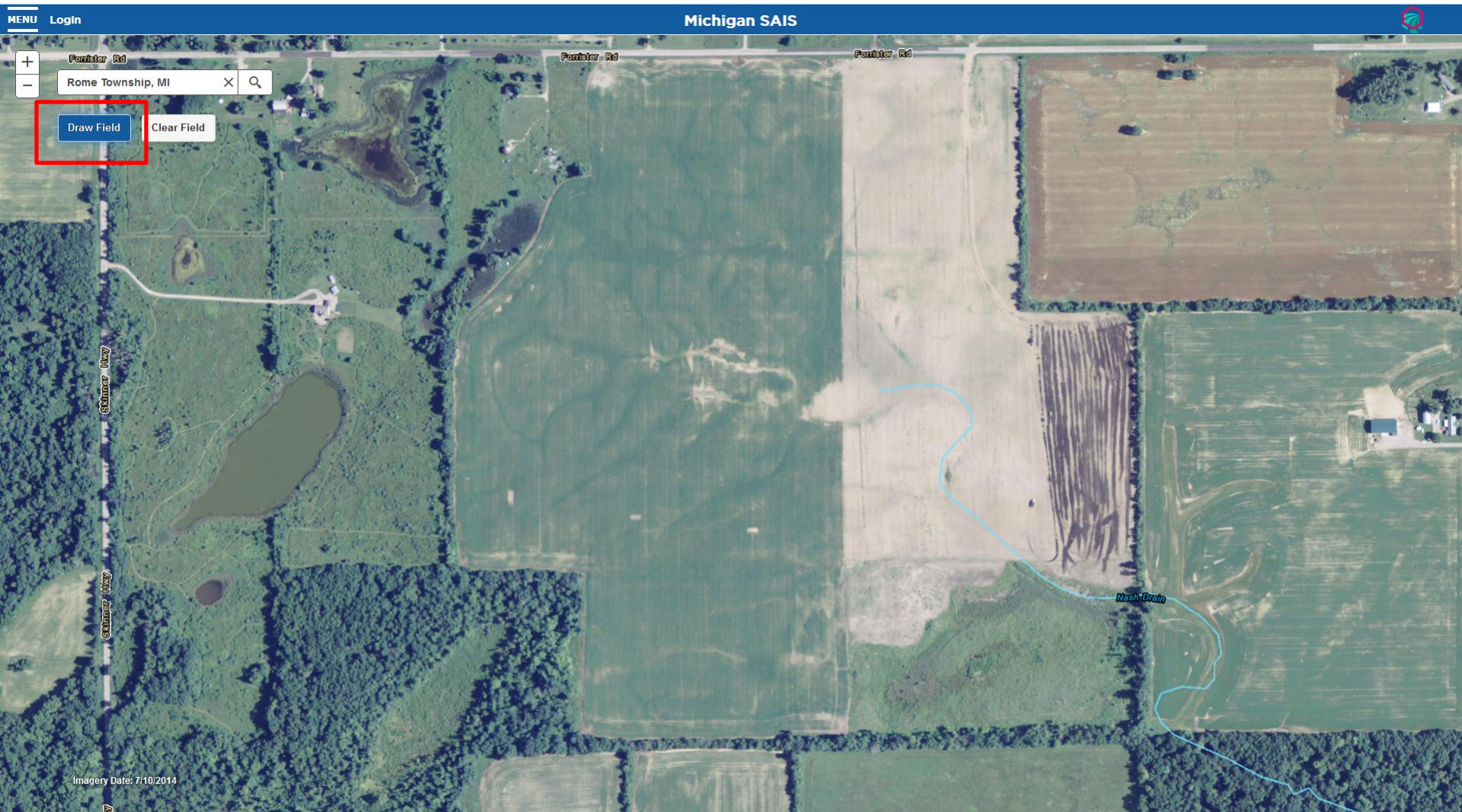
Step 1: Locate field



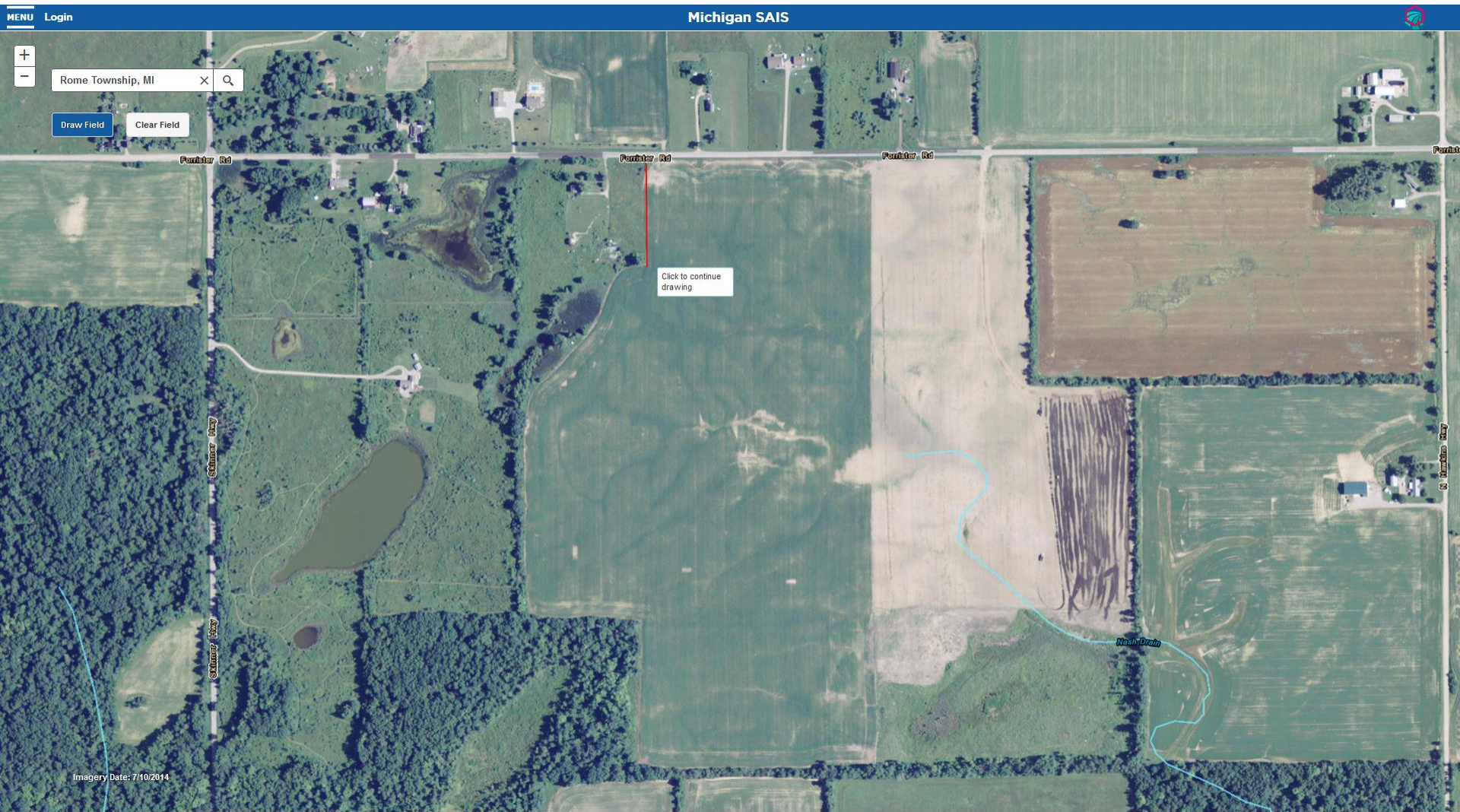
Step 1: Locate field



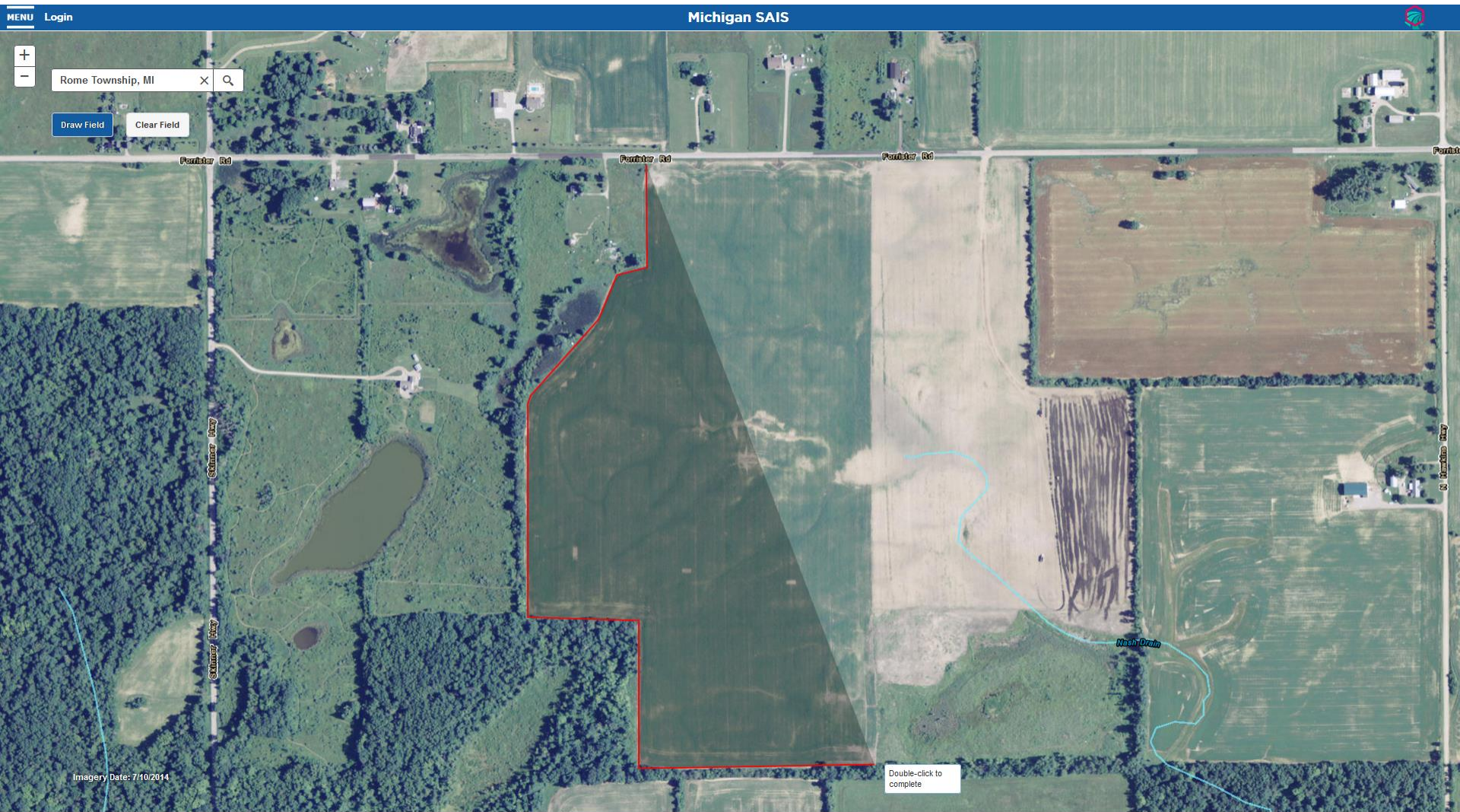
Step 2: Draw Field



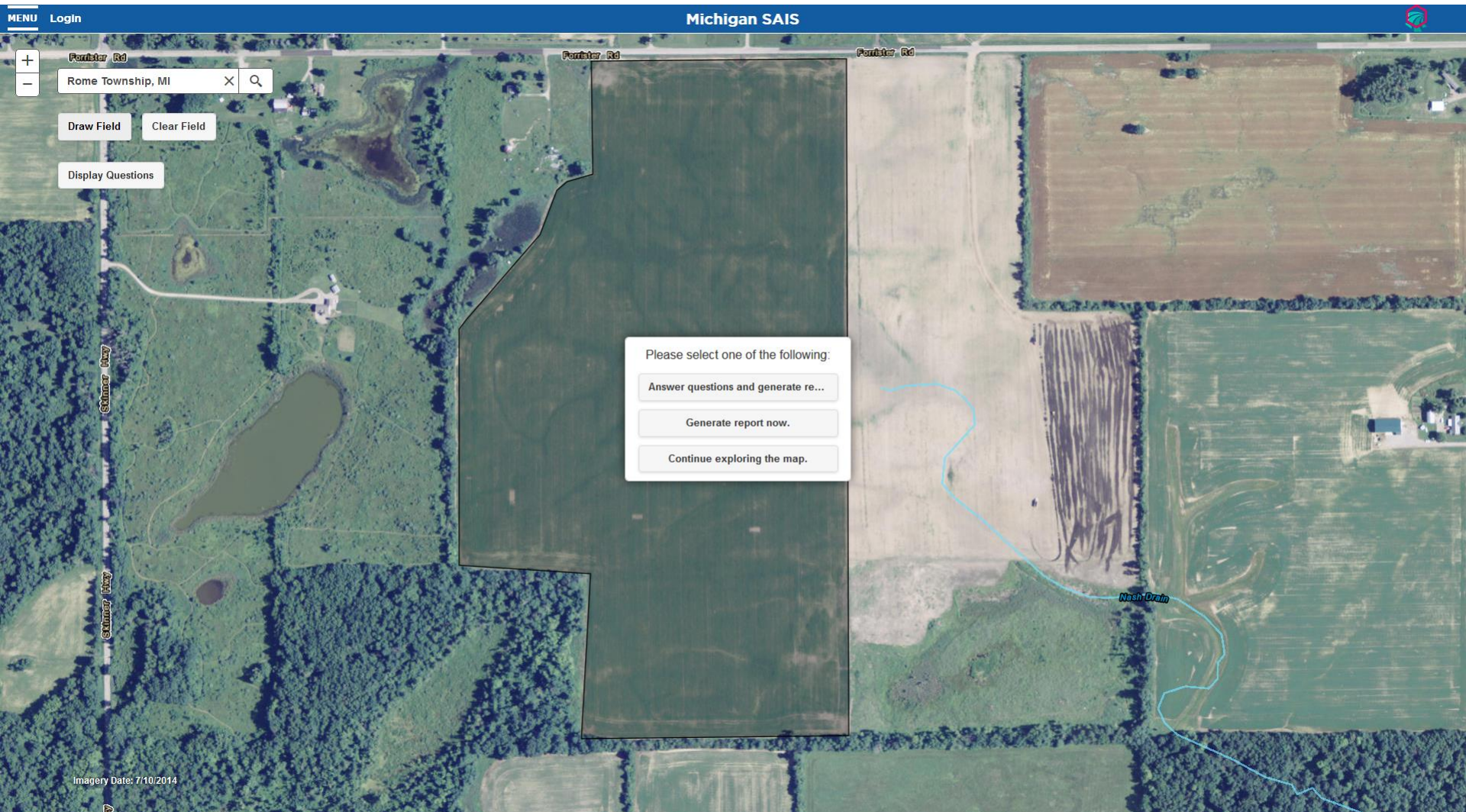
Step 2: Draw Field



Step 2: Draw Field



Step 3: Answer questions (optional)



Step 3: Answer questions

MENU

Login

Michigan SAIS

+

-

Pondexter Rd

Rome Township, MI

X

Q

Draw Field

Clear Field

Display Questions

Pondexter Rd

Pondexter Rd

Pondexter Rd

Stinner Hwy

Stinner Hwy

Mesh Drain

Is there subsurface drainage (tile drainage) in the area?

Yes

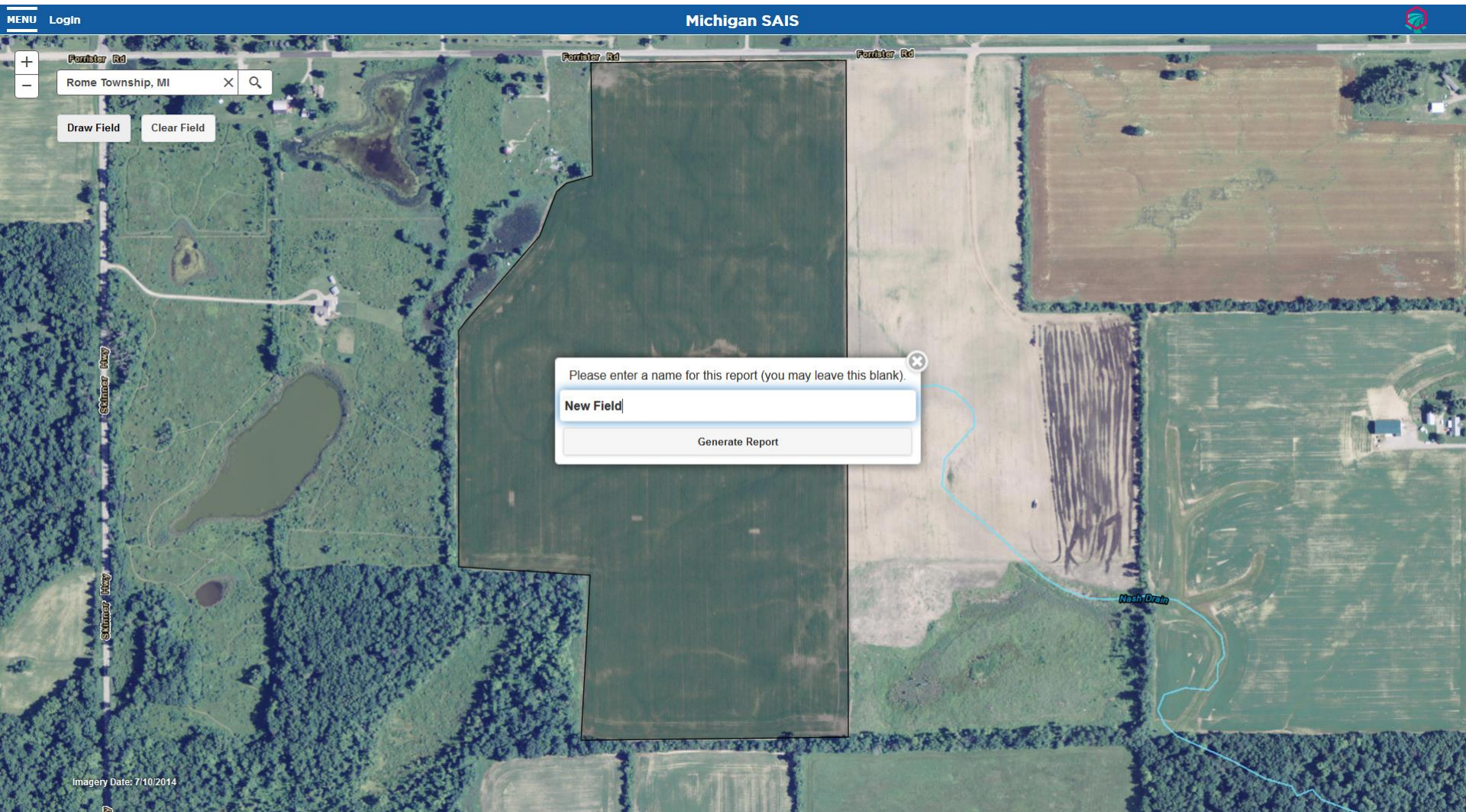
No

Back

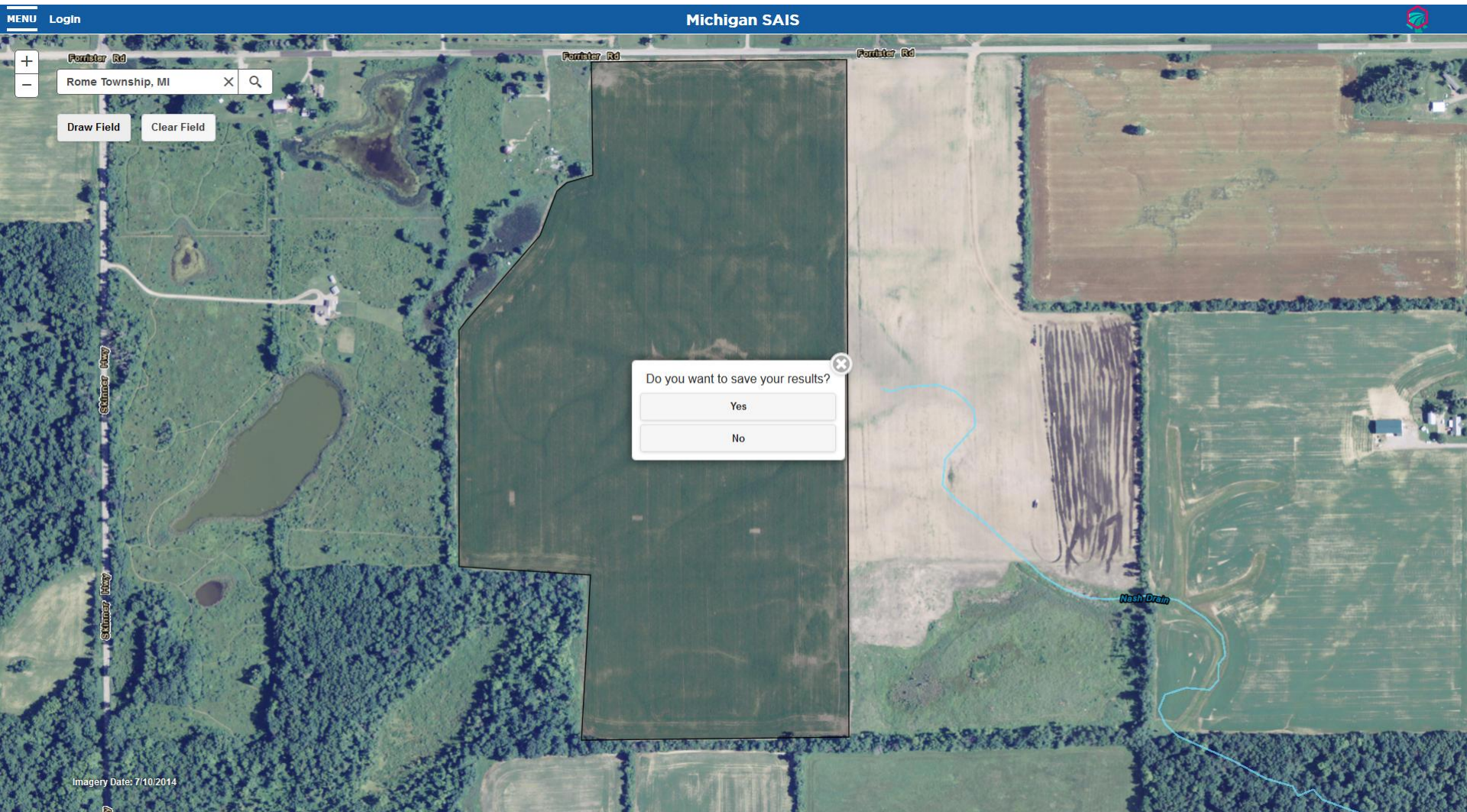
Step 3: Answer questions

1. Is there subsurface drainage (tile drainage) in the area?
2. Are there any surface inlets, catch basins, risers in the field(s)?
3. Are there any vegetated buffers between the field(s) and nearby surface water (ditch, drain, stream, lake, etc.)?
 - Describe your vegetative buffer.
4. Do you have recent (less than 3 years old) soil test results for the field(s)?
 - What phosphorus levels were found?
5. Was fertilizer being applied to the selected farm field(s)?
 - How and when was fertilizer applied to the farm field(s)?
 - What amount of fertilizer was applied to the farm field(s)?
6. Was manure applied to the selected farm field(s)?
 - What was the rate of phosphorus ($P^{2}O^{5}$) applied with manure?
 - What was the rate of nitrogen (N) applied with manure?
7. Do you leave any crop residue on the soil surface after all pre-plant tillage operations have been completed?

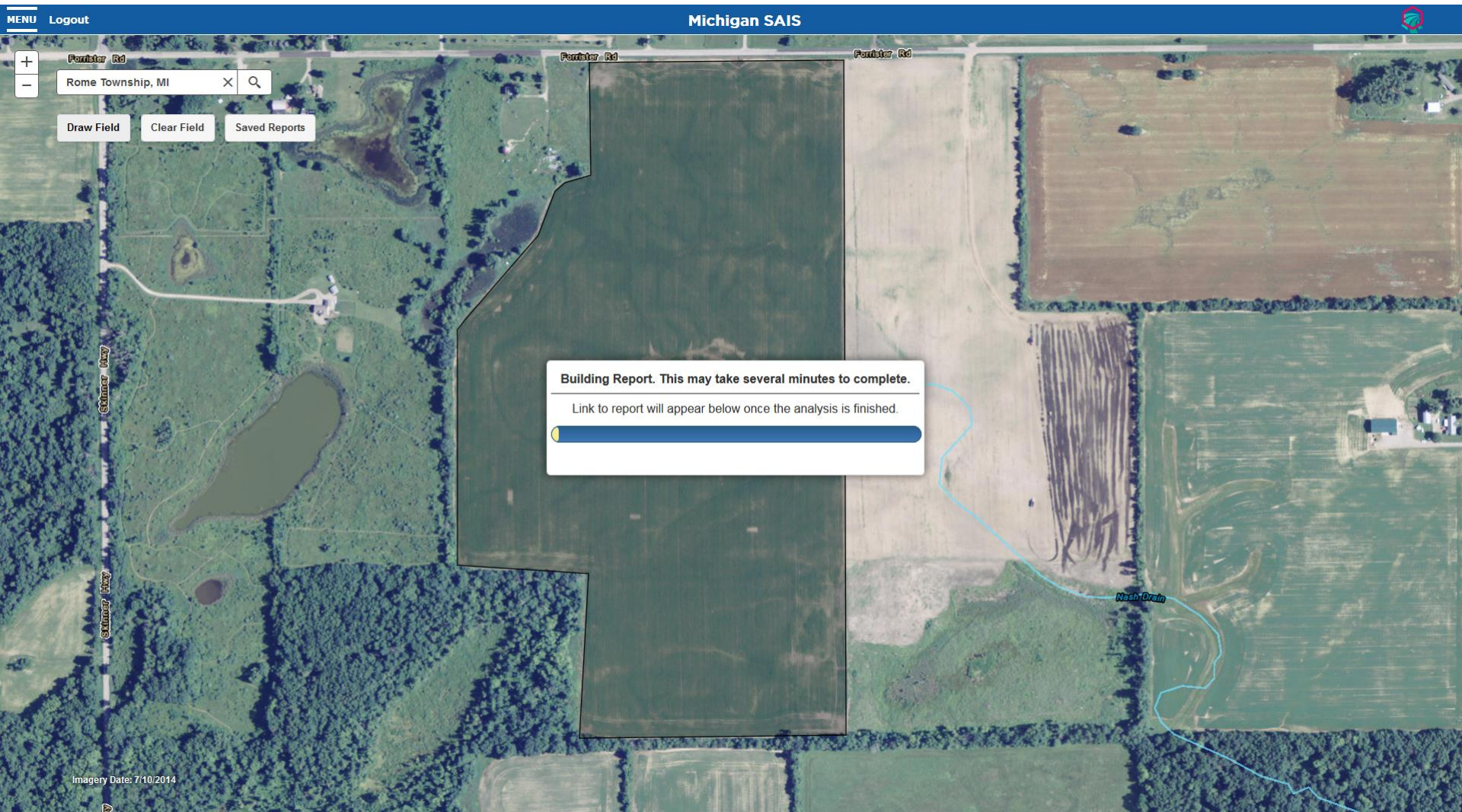
Step 4: Generate Report – Field Name



Step 4: Generate Report – Save Results



Step 4: Generate Report



Step 4: Generate Report

The screenshot displays the Michigan SAIS web application interface. At the top, a blue header bar contains the text "MENU Logout" on the left and "Michigan SAIS" on the right, accompanied by a small circular logo. Below the header, a map of Rome Township, MI, is shown. The map includes labels for "Pondster Rd" at the top and "Stinner Hwy" on the left. A search bar in the top left corner contains the text "Rome Township, MI" and a magnifying glass icon. Below the search bar are three buttons: "Draw Field", "Clear Field", and "Saved Reports". A large, irregularly shaped field is highlighted in dark green on the map. A blue line, labeled "Mesh Drain", is visible on the right side of the map. A white dialog box with a close button (X) is centered over the map. The dialog box contains the text "Building Report. This may take several minutes to complete." and "Link to report will appear below once the analysis is finished." Below this text is a yellow progress bar that is approximately 80% full. At the bottom of the dialog box is a blue link labeled "Open Report". In the bottom left corner of the map, the text "Imagery Date: 7/10/2014" is visible.

MENU Logout

Michigan SAIS

Pondster Rd

Rome Township, MI

Draw Field

Clear Field

Saved Reports

Stinner Hwy

Building Report. This may take several minutes to complete.

Link to report will appear below once the analysis is finished.

Open Report

Mesh Drain

Imagery Date: 7/10/2014

Step 4: Generate Report - Summary



Michigan Sensitive Areas Identification System

Report Name: New Field

Report Summary

[Print Version](#)

The Michigan Sensitive Areas Identification System has conducted an analysis of the field you selected. Results are based upon the field's physical characteristics (e.g., soils, slope) and any answers you provided in the questionnaire. After reviewing this report, it is recommended that you contact your local NRCS Field Office and further pursue the recommended practices presented to you in this report.

Location Summary

County Name: Lenawee

Township Name: Rome

Township and Range: T6S R2E

Area: 72.5 acres

Watershed Name: Stony Creek-South Branch River Raisin

Identified Risks

Concentrated Flow, Water Erosion, Manure Runoff, Phosphorus Runoff

Michigan Phosphorus Risk Assessment

Assessed value: 27

High: > 17
Medium: 12-17
Low: 0-11

Explanation:

Risk of phosphorus leaving the field is **HIGH**. There is a "high" potential risk of offsite phosphorus movement, and no manure or fertilizer phosphorus should be applied to the field. (An exception to fertilizer phosphorus application when receiving a "high" risk is allowed under MSU Extension Bulletin E2904, when starter phosphorus is applied to field corn.).

Manure Application Risk Index

Assessed value: 47

High: > 75
Medium: 38-75
Low: 19-37
Very Low: < 19

Explanation:

MEDIUM potential for manure movement from the field. The chance of organic material and nutrients getting to surface water is likely. Buffers, setbacks, lower manure rates, cover crops, crop residues, etc. in combination may reduce impact. These fields have limited potential for winter spreading and only a partial area of the field may be acceptable.

Hydrologic Soil Groups Breakdown

C: 83.8% B/D: 0.7% C/D: 15.5%

Explanation:

Soils are classified into hydrologic soil groups (HSG's) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. An "A" HSG indicates sand, loamy sand, or sandy loam. A "B" HSG indicates silt loam or loam. A "C" HSG indicates sandy clay loam, silty clay loam, sandy clay, silty clay, or clay. If there is a slash between two HSG, this represents "drained"/"undrained".

Step 4: Generate Report – Recommended Practices

Recommended Practices

Highlight indicates practice that addresses multiple risks.

** This practice implemented at a farm headquarters may help reduce this risk.*

Concentrated Flow
Residue and Tillage Management, No-Till
Critical Area Planting
Residue and Tillage Management, Reduced Till
Grassed Waterway
Water Erosion
Conservation Crop Rotation
Residue and Tillage Management, No-Till
Cover Crop
Critical Area Planting
Residue and Tillage Management, Reduced Till
Filter Strip
Vegetated Treatment Area
Water and Sediment Control Basin
Manure Runoff
Agrichemical Handling Facility *
Waste Storage Facility *
Filter Strip
Nutrient Management
Phosphorus Runoff
Agrichemical Handling Facility *
Waste Storage Facility *
Filter Strip
Nutrient Management

Step 4: Generate Report – Service Center and Client Gateway Information

NRCS Service Center Contact Information

Recommended Service Center:

Adrian NRCS Service Center
1100 Sutton Road
Adrian, Michigan 49221
517-265-5887

Alternative Service Center:

Jonesville NRCS Service Center
588 Olds Street, Bldg. 2
Jonesville, Michigan 49250
517-849-9890

Client Gateway:

Conservation Client Gateway is a secure online web application that gives landowners and land managers the ability to track their payments, report completed practices, request conservation assistance, and electronically sign documents anytime, anywhere. Conservation Client Gateway provides users the flexibility to determine when they want to engage with NRCS online and when they prefer in-person conservation planning assistance.

Please visit www.nrcs.usda.gov/clientgateway for more information.



Step 4: Generate Report - Maps

Satellite Imagery Map



Hydrology
Lake/Pond Canal/Ditch
Reservoir Stream/River

Area of Interest
Field Boundary

0 0.1 0.2 Miles



Map Produced by the Michigan Sensitive Areas Identification System: www.iwr.msu.edu/sais

USGS Topographic Map



Step 4: Generate Report – Practice Descriptions

Recommended Practices Descriptions



Agrichemical Handling Facility An agrichemical handling facility is built with an impervious surface to provide an environmentally safe area for the handling of on-farm agrichemicals. The facility provides for the containment and isolation of spillage from on-farm agrichemical mixing, loading, unloading, and rinsing operations to minimize pollution of, or harm to, the soil, water, air, plant, animal resources, and humans. The facility must be carefully located to minimize the potential for impact on neighbors, surface and groundwater resources, and farm production.



Waste Storage Facility A waste storage facility is an agricultural waste storage impoundment/containment made by constructing an embankment and/or excavating a pit or dugout, or fabricating a structure. The waste storage facility provides temporary storage of manure, agricultural by-products, wastewater, and/or contaminated runoff. The facility allows agricultural operation management flexibility for waste utilization. Storage structure types include liquid waste storage ponds or tanks, and solid waste stacking structures. An operation and maintenance plan is developed to specify requirements for emptying the storage facility. The plan specifies timing, rates, and volume of waste applications.



Step 4: Generate Report – Responses to Questions

Question and Answer Summary:

1. Is there subsurface drainage (tile drainage) in the area?
 - o Answer: Yes
2. Are there any surface inlets, catch basins, risers in the field?
 - o Answer: No
3. Are there any vegetated buffers between the field and nearby surface water (ditch, drain, stream, lake, etc.)?
 - o Answer: No
4. Do you have recent (less than 3 years old) soil test results for the field?
 - o Answer: Yes
 - o 41 - 74 ppm (82 - 148 lbs/acre)
5. Is fertilizer being applied to the selected farm field?
 - o Answer: Yes
 - o Surface applied and incorporated 8 - 15 days before planting
 - o 1-2 year phosphorus crop removal application
6. Was manure applied to the selected farm field?
 - o Answer: Yes
 - o Incorporate manure 8 - 30 days after application
 - o 61 - 99 lbs/acre of phosphorus
 - o 131 - 200 lbs/acre of nitrogen
7. Do you leave any crop residue on the soil surface after all pre-plant tillage operations have been completed?
 - o Answer: Yes
 - o 30% Corn Residue

Accessing Reports – From the Menu

MENU

Login

Instructions

1. Find your field of interest using the map search bar.
2. Select "Draw Field" and outline your field boundary.
3. Select an option:
 - Continue exploring the map
 - Generate a basic report
 - Answer questions to generate a detailed report
4. Review and save your report.

Layer Toggle:

☒

Waterbodies

☒

Streams

☐

Concentrated Flow

☐

Sediment Delivery

☐

Sheet and Rill Erosion by Water

☐

Nitrate Leaching

☐

Soil Erosion by Wind

Legend

Waterbodies

Lake/Pond

Reservoir

Streams

Canal/Ditch

Stream/River

Previous Reports this Session:

Report #1


Account Management Options:

Create Account

Reset Password

Delete Account

Michigan SAIS

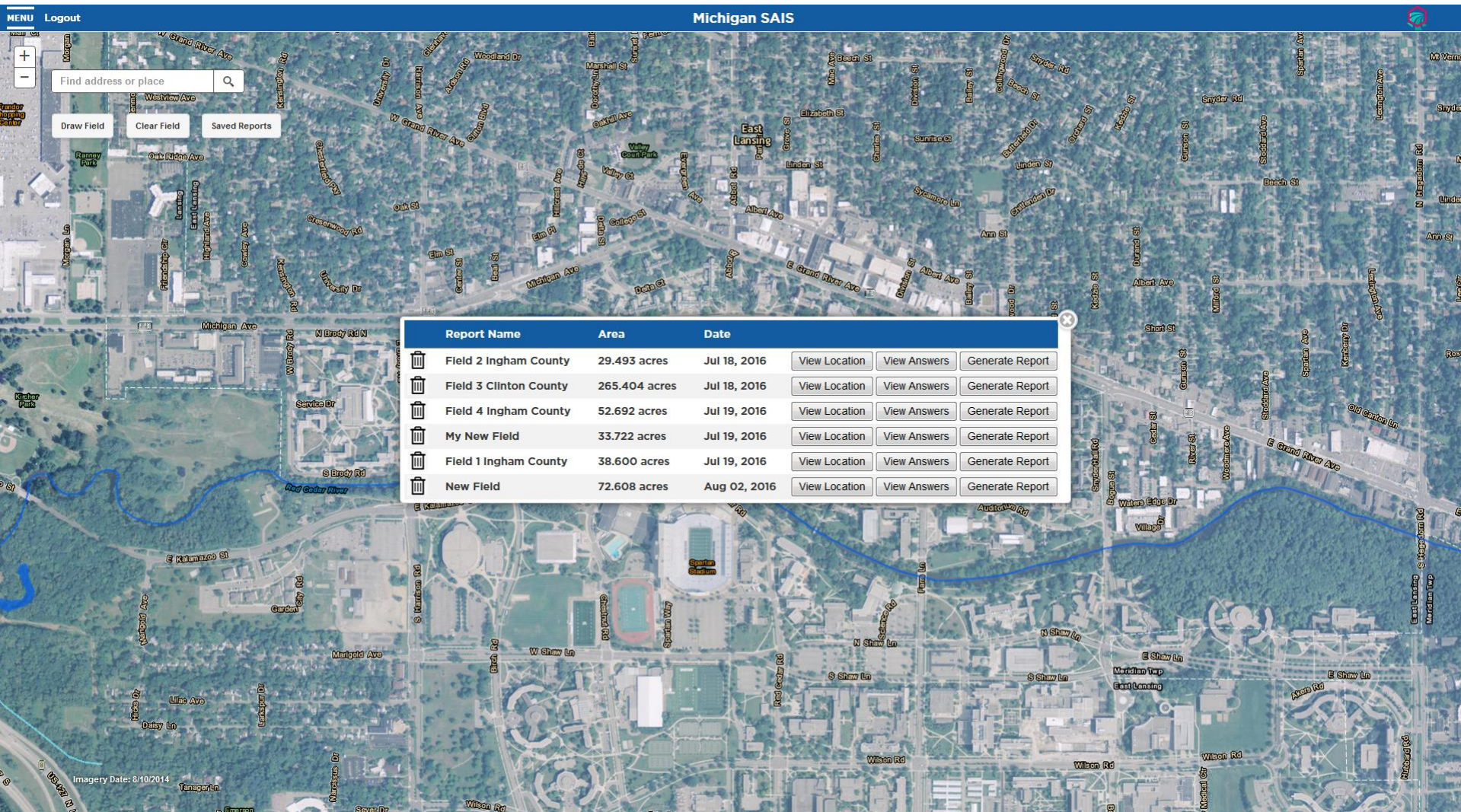








Accessing Reports – From “Saved Reports”

MENU Logout Michigan SAIS

Find address or place

Draw Field Clear Field Saved Reports



Report Name	Area	Date			
 Field 2 Ingham County	29.493 acres	Jul 18, 2016	View Location	View Answers	Generate Report
 Field 3 Clinton County	265.404 acres	Jul 18, 2016	View Location	View Answers	Generate Report
 Field 4 Ingham County	52.692 acres	Jul 19, 2016	View Location	View Answers	Generate Report
 My New Field	33.722 acres	Jul 19, 2016	View Location	View Answers	Generate Report
 Field 1 Ingham County	38.600 acres	Jul 19, 2016	View Location	View Answers	Generate Report
 New Field	72.608 acres	Aug 02, 2016	View Location	View Answers	Generate Report

Imagery Date: 8/10/2014

Updating Field Information

The screenshot displays the Michigan SAIS web application interface. At the top, there is a blue header bar with the text "Michigan SAIS" and a "Logout" link. Below the header, a map of East Lansing, Michigan, is shown. A white dialog box titled "SAIS Report Answer Summary" is overlaid on the map. The dialog box contains the following information:

Report Name: New Field

1. Is there subsurface drainage (tile drainage) in the area?
o Answer: Yes
2. Are there any surface inlets, catch basins, risers in the field?
Answer: No
3. Are there any vegetated buffers between the field and nearby surface water (ditch, drain, stream, lake, etc.)?
o Answer: No
4. Do you have recent (less than 3 years old) soil test results for the field?
o Answer: Yes
o 41 - 74 ppm (82 - 148 lbs/acre)
5. Is fertilizer being applied to the selected farm field?
o Answer: Yes
o Surface applied and incorporated 8 - 15 days before planting
o 1-2 year phosphorus crop removal application
6. Was manure applied to the selected farm field?
o Answer: Yes
o Incorporate manure 8 - 30 days after application
o 61 - 99 lbs/acre of phosphorus
o 131 - 200 lbs/acre of nitrogen
7. Do you leave any crop residue on the soil surface after all pre-plant tillage operations have been completed?
o Answer: Yes
o 30% Corn Residue

At the bottom of the dialog box, there are two buttons: "Update Answers" and "Back to Saved Reports".

Updating Field Information

MENU Logout Michigan SAIS

Find address or place

Draw Field Clear Field Saved Reports

SAIS Report Answer Summary

Report Name: New Field

1. Is there subsurface drainage (tile drainage) in the area?
☐ Yes
2. Are there any surface inlets, catch basins, risers in the field?
☐ No
3. Are there any vegetated buffers between the field and nearby surface water (ditch, drain, stream, lake, etc.)?
☐ No
4. Do you have recent (less than 3 years old) soil test results for the field?
☐ Yes
41 - 74 ppm (82 - 148 lbs/acre)
5. Is fertilizer being applied to the selected farm field?
☐ Yes
Surface applied and incorporated 8 - 15 days before planting 1-2 year phosphorus crop removal application
6. Was manure applied to the selected farm field?
☐ Yes
Incorporate manure 8 - 30 days after application
61 - 99 lbs/acre of phosphorus
131 - 200 lbs/acre
7. Do you leave any crop residue on the soil surface after all pre-plant tillage operations have been completed?
☐ Yes
30% Corn Residue

Save Answers

Back to Saved Reports

Imagery Date: 8/10/2014

Additional Resources

- Training materials will be posted online at www.iwr.msu.edu/sais
- Webinar TBD; will be recorded and posted online
- IWR assistance for holding a SAIS farmer workshop
- Ways to promote
 - Front office kiosk
 - County Fairs or Field Days
 - Customize template flyer

Contact

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