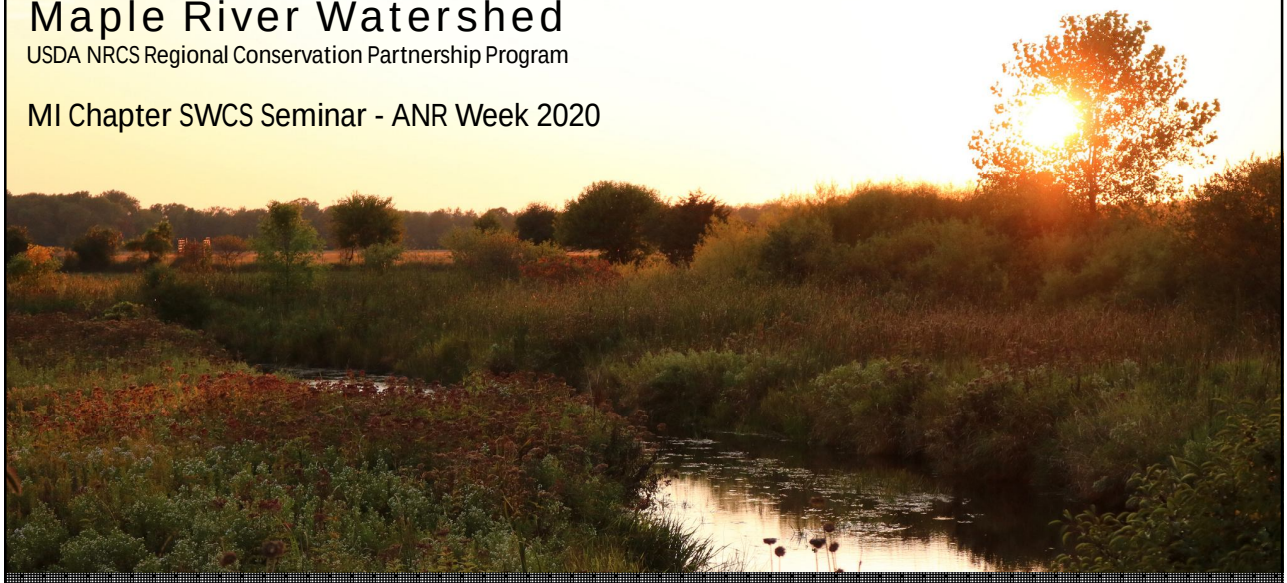
Improving Fish Habitat in the Maple River Watershed

USDA NRCS Regional Conservation Partnership Program

MI Chapter SWCS Seminar - ANR Week 2020



Jeremiah Asher

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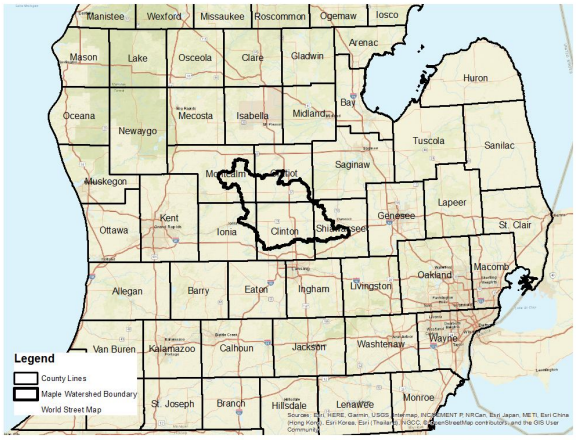
Project Overview

- 5 year (2019 – 2023) RCPP – Regional Conservation Partnership Program
- Provide new opportunities for NRCS, conservation partners, and producers to work together to harness innovation
- Working to improve fish habitat and water quality in the Maple River
- Nearly $1.5 M NCRS and Partner Match $600,000 in FA to farmers

Why Maple River Watershed?

- Tributary of the Grand River, drains to Lake Michigan
- Diverse set of stressors impacting streams
- Upper portion of Maple River is 513 sq miles and approx. 79% agriculture
- Upper Maple River WMP identified sediment as the highest priority pollutant, along with nutrients, temperature, and bacteria
- Number of watersheds are experiencing significant pressure from GW withdrawals, which compete for baseflow in streams



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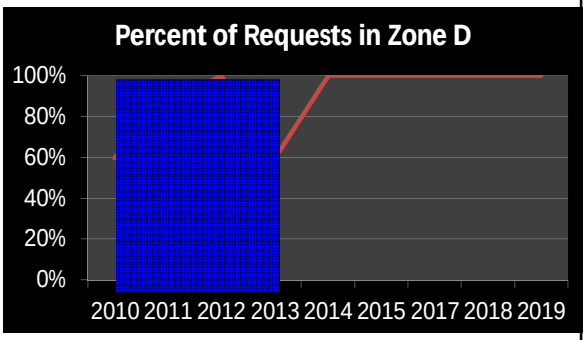
High Capacity Withdrawals

- 2009 Michigan began tracking high capacity water withdrawals (>70 GPM) through the Water Withdrawal Assessment Tool
- Maple Watershed has 221 new withdrawal requests through the WWAT and 103 were likely to have a negative impact on nearby fish



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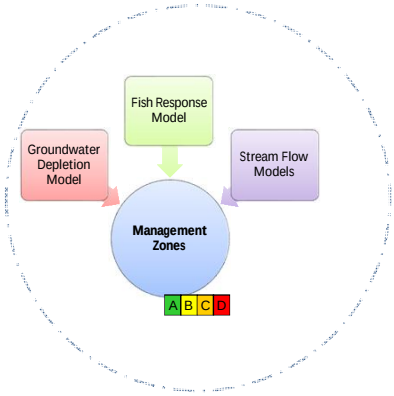
User Proposed Withdrawal



Registration

MDEQ, MDNR, USGS, MSU-IWR Developed a screening tool to assess the impact of new high capacity water withdrawals > 70gpm

Accounting Database

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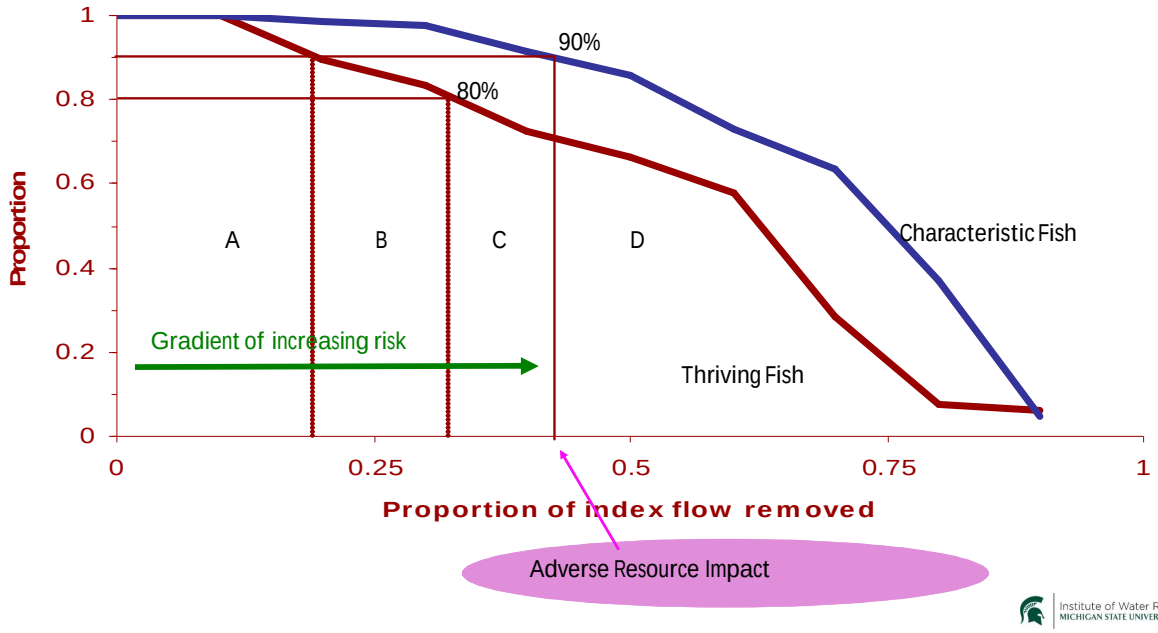
Interpreting the Fish Curves With an Eye to Policy



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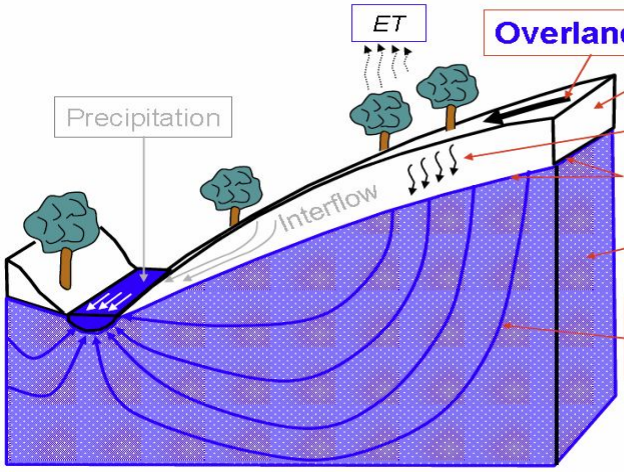
Why is Infiltration Important

- **Sources of Water in Rivers**



70-77˚ F (Univ. MN, 95˚ F Construction Eco Services)

52˚ F (EPA)

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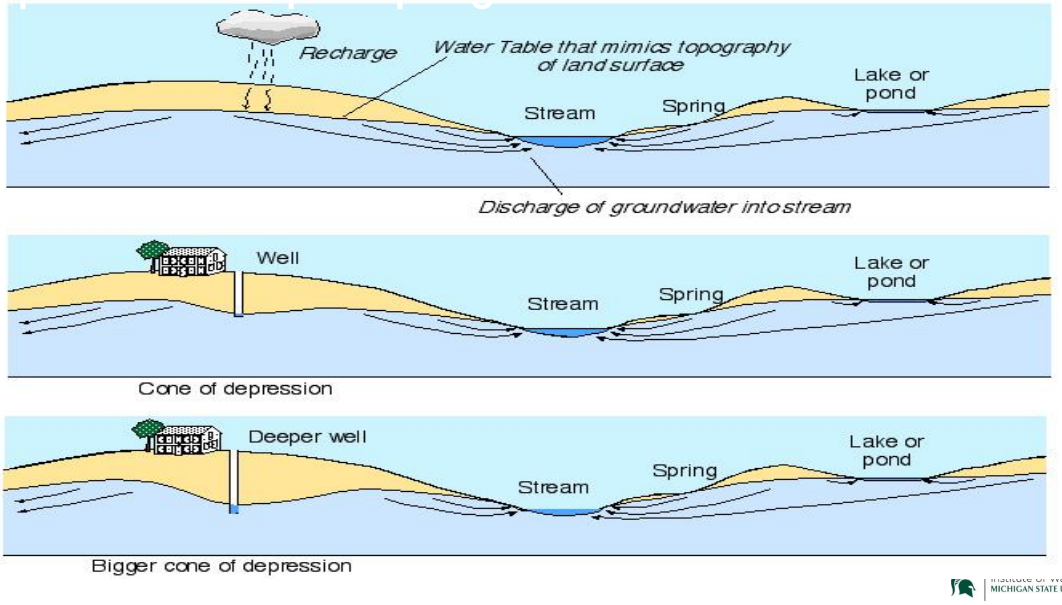
Impacts from pumping



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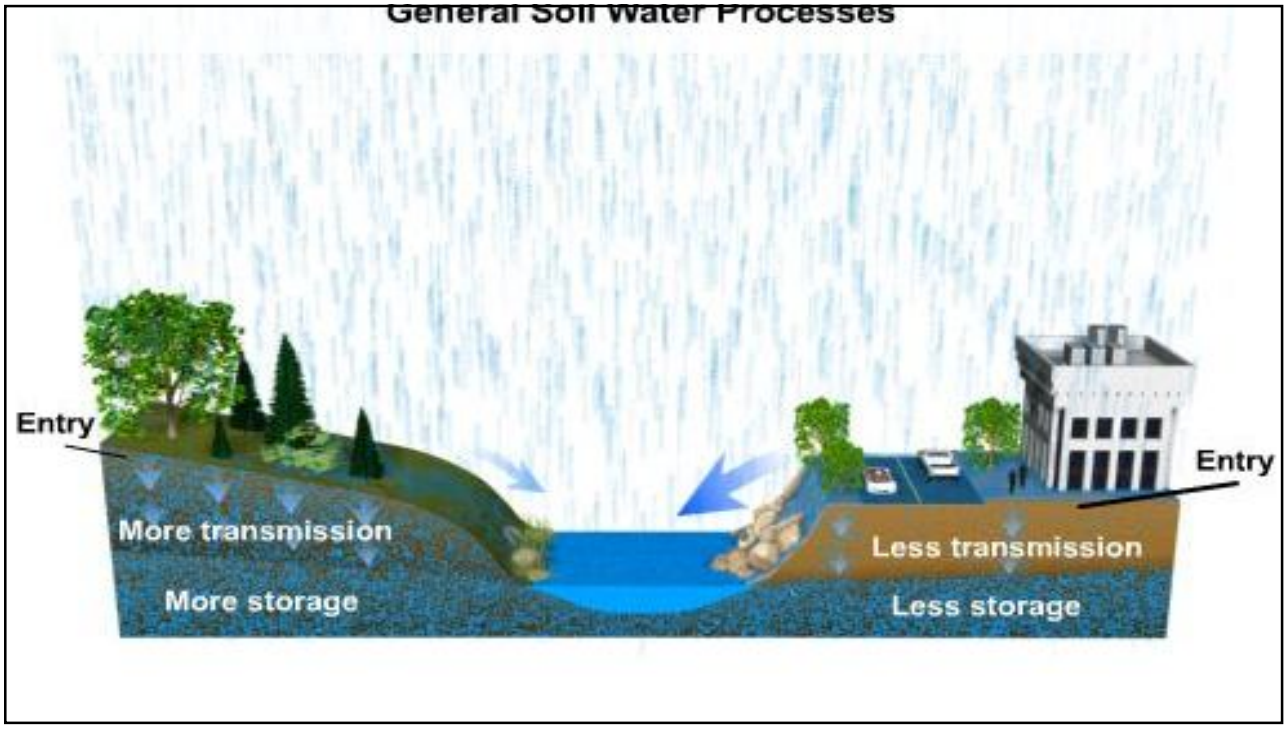
General Soil Water Processes
Entry
Entry
More transmission
More storage
Less transmission
Less storage


University of Delaware Extension

Temperature - Driving Factor for Fish Habitat

Summer Water Temperature: Major factor affecting growth, survival and distribution of fish

- Precipitation
- Evapotranspiration
- Infiltration
- Aquifer Storage
- Aquifer Loss
- Aquifer Transmissivity

Conservation Practices

(Brett 1979), (Smale and Rabeni 1995a), (Magnuson et al. 1979; Meisner et al. 1987; Smale and Rabeni 1995b; Lyons 1996; Wehrly et al. 2003; Zorn et al. 2004; Steen et al. 2008)

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Available Practices

Practice	
328	Conservation Crop Rotation
327	Conservation Cover
342	Critical Area Planting
554	Drainage Water Management
393	Filter Strip
412	Grassed Waterway
449	Irrigation Water Management
391	Riparian Forest Buffer
329	Residue and Tillage Mgmt, No Till
345	Residue and Tillage Mgmt, Reduced Till
340	Cover Crop
587	Structure for Water Control
442	Sprinkler System
590	Nutrient Management

Example: Average Impact on Infiltration from Farming Practices

Farmer 1
100 acres enrolled

- Conventional Tillage -> No Till
- 275,000 gallons annually

Farmer 2
80 acres enrolled

- Corn Soy Rotation -> Pasture
- 4.6 M gallons annually

Farmer 3
200 acres enrolled

- Conventional Tillage to -> Conservation Tillage
- 375,000 gallons annually

5,250,000
gallons per year

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Goals

EQIP acres contracted	Water replenished (gal)	Sediment reduced (lbs)
4,334	155,435,975	3,467,200

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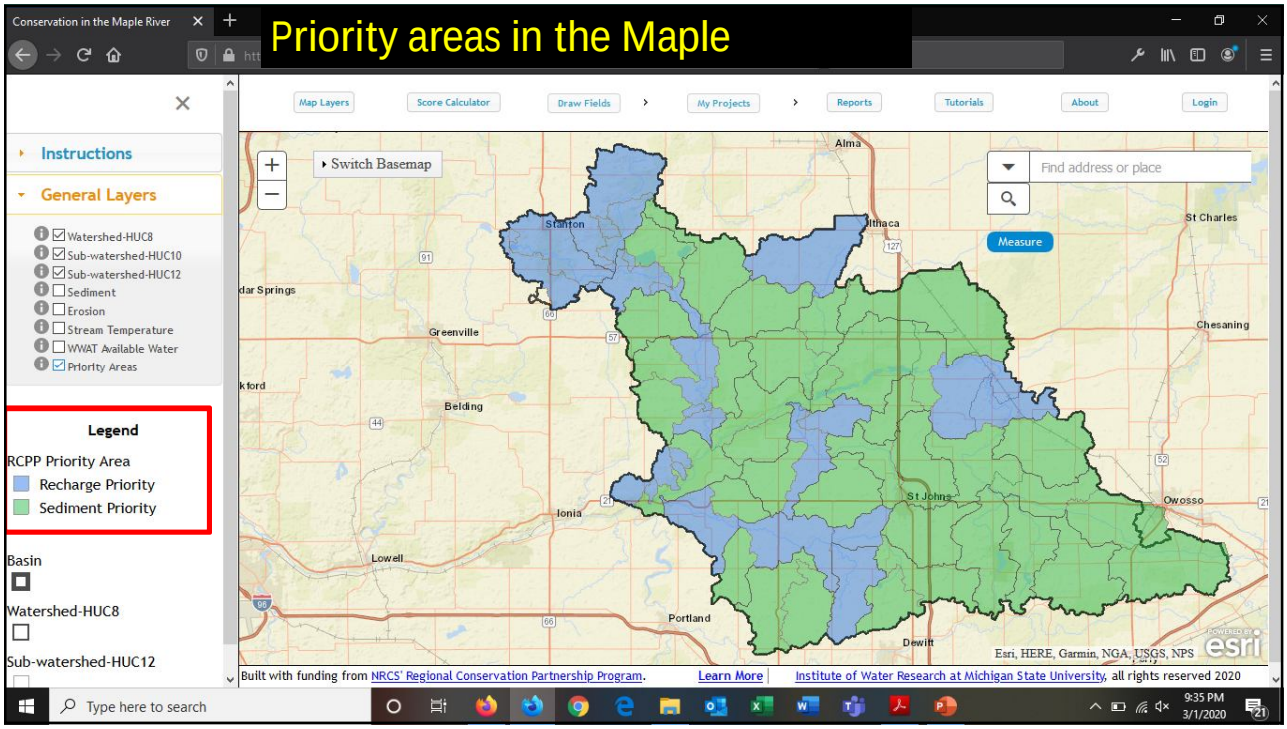
Priority areas in the Maple
Conservation in the Maple River
Map Layers
Score Calculator
Draw Fields
My Projects
Reports
Tutorials
About
Login
Instructions
General Layers
Watershed-HUC8
Sub-watershed-HUC10
Sub-watershed-HUC12
Sediment
Erosion
Stream Temperature
WWAT Available Water
Priority Areas
Legend
RCPP Priority Area
Recharge Priority
Sediment Priority
Basin
Watershed-HUC8
Sub-watershed-HUC12
Switch Basemap
Find address or place
Measure
Alma
Stanton
Ithaca
St Charles
Greenville
Belding
Chesaning
Ionia
St Johns
Owosso
Lowell
Portland
Dewitt
Esri, HERE, Garmin, NGA, USGS, NPS
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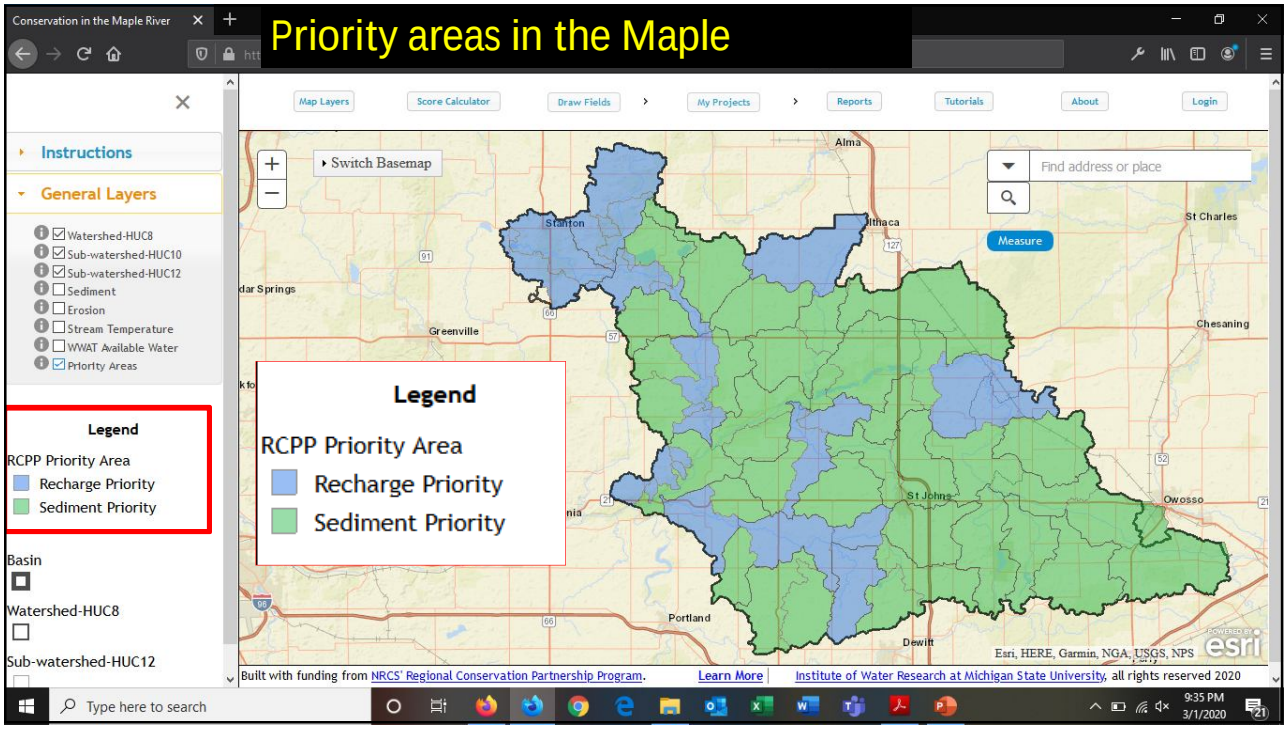
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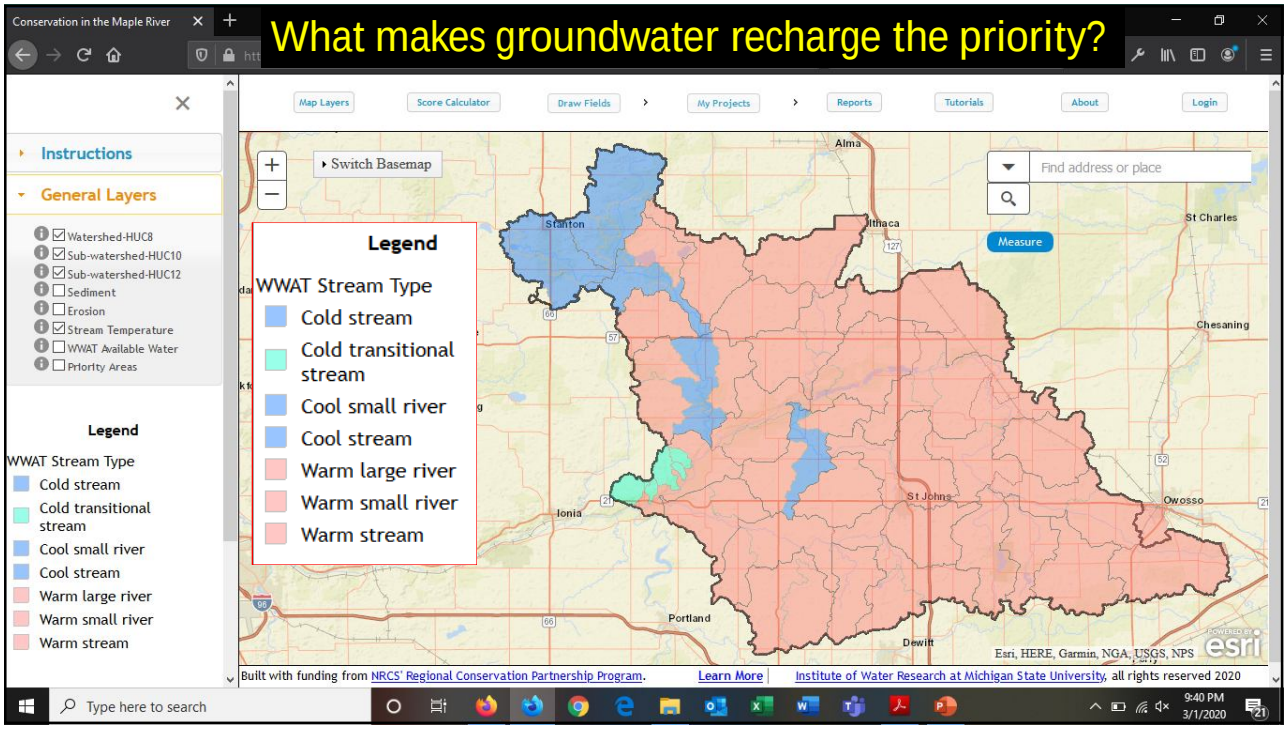
What makes groundwater recharge the priority?
Conservation in the Maple River
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Draw Fields
My Projects
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Tutorials
About
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Instructions
General Layers
Watershed-HUC8
Sub-watershed-HUC10
Sub-watershed-HUC12
Sediment
Erosion
Stream Temperature
WWAT Available Water
Priority Areas
Switch Basemap
Find address or place
Measure
Legend
WWAT Stream Type
Cold stream
Cold transitional stream
Cool small river
Cool stream
Warm large river
Warm small river
Warm stream
Alma
Stanton
Ithaca
St Charles
Chesaning
Ionia
St Johns
Owosso
Portland
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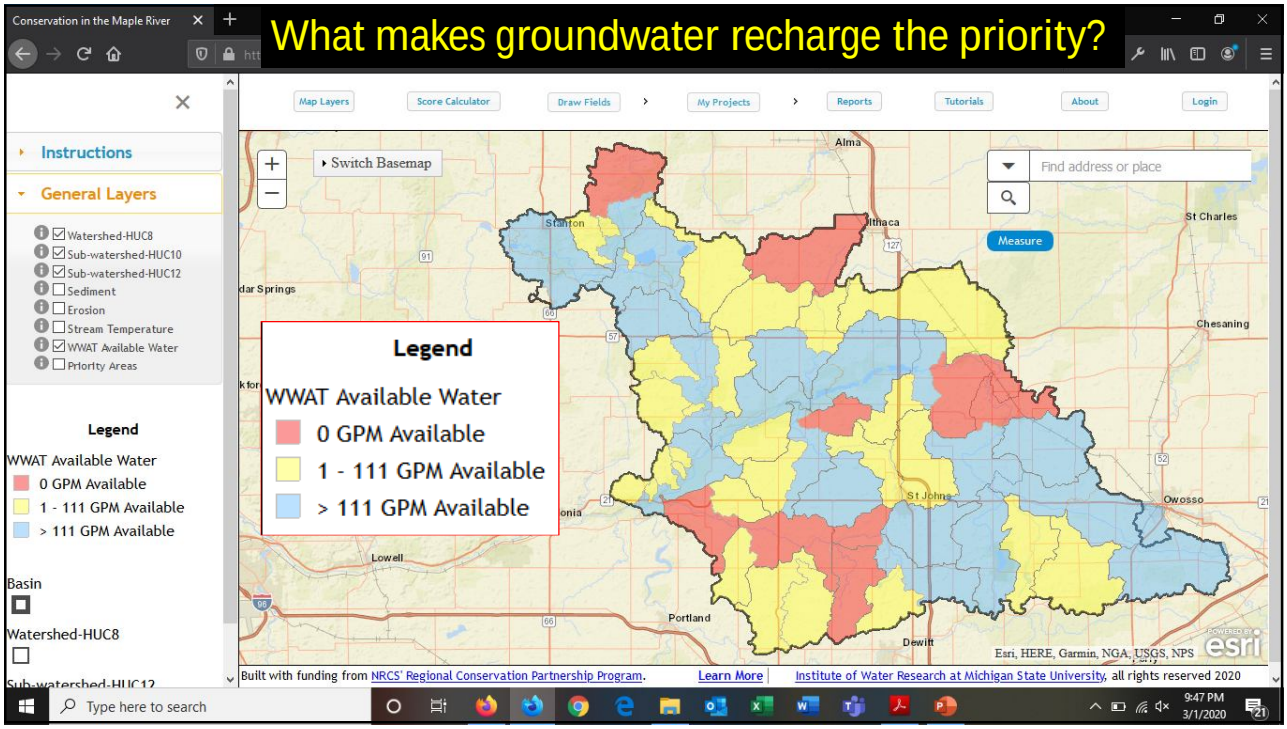
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Erosion
Stream Temperature
WWAT Available Water
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Switch Basemap
Find address or place
Measure
Legend
WWAT Available Water
0 GPM Available
1 - 111 GPM Available
> 111 GPM Available
Basin
Watershed-HUC8
Alma
Stanton
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St Charles
Chesaning
Lowell
St Johns
Owosso
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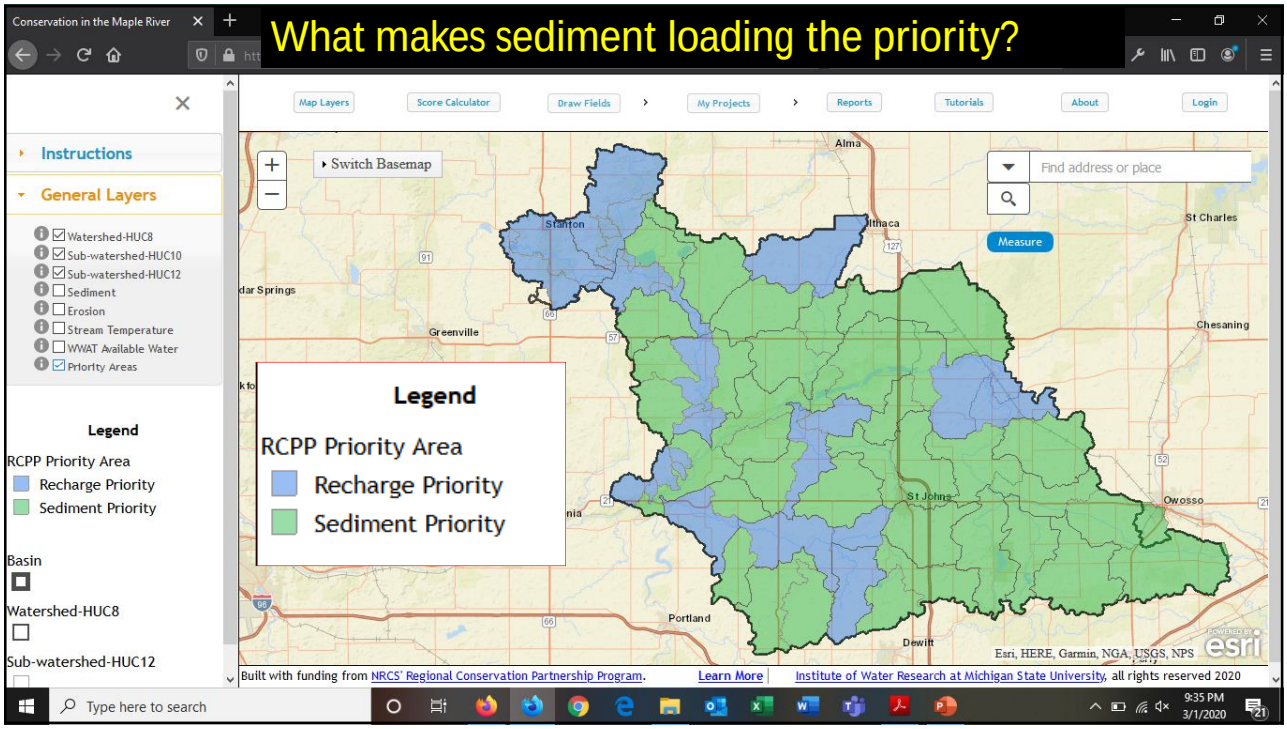
What makes sediment loading the priority?
Conservation in the Maple River
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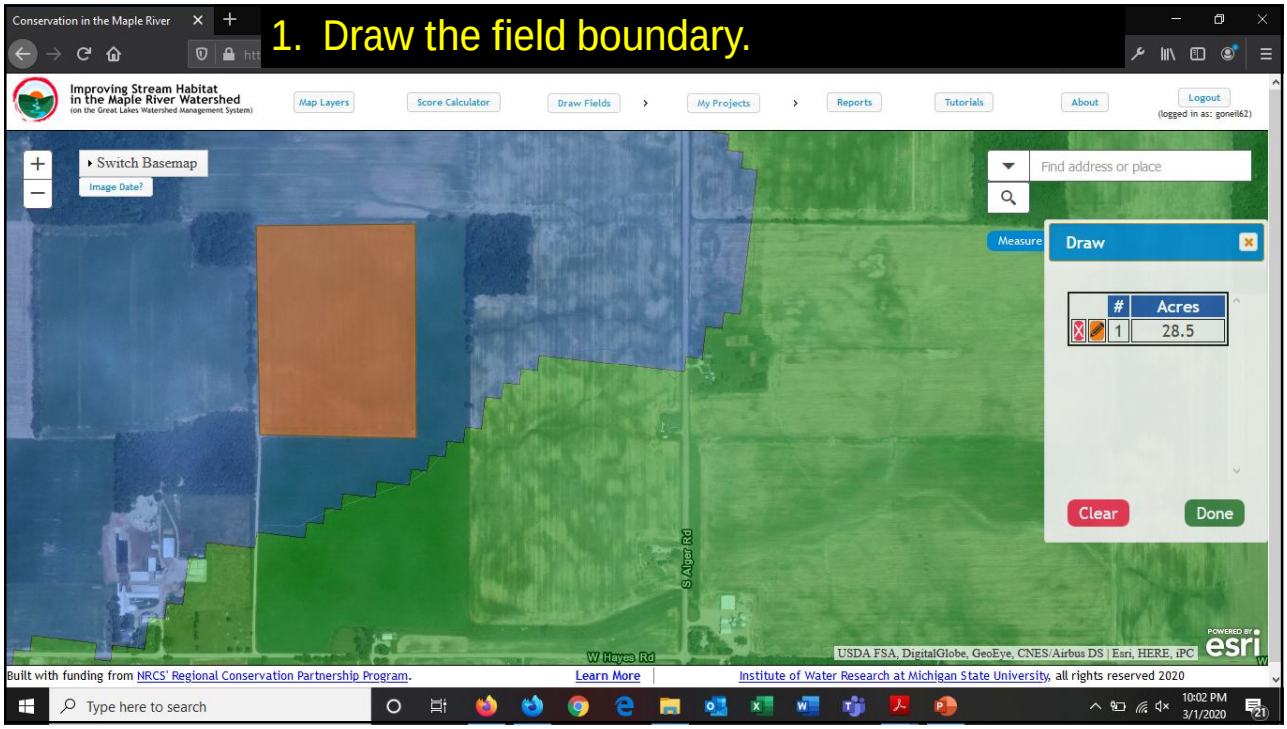
1. Draw the field boundary.
Conservation in the Maple River
Improving Stream Habitat in the Maple River Watershed
(on the Great Lakes Watershed Management System)
Map Layers
Score Calculator
Draw Fields
My Projects
Reports
Tutorials
About
Logout
(logged in as: goneil62)
Switch Basemap
Image Date?
Find address or place
Measure
Draw
Acres
1 28.5
Clear
Done
S Alger Rd
W Hayes Rd
USDA FSA, DigitalGlobe, GeoEye, CNES/Airbus DS | Esri, HERE, iPC
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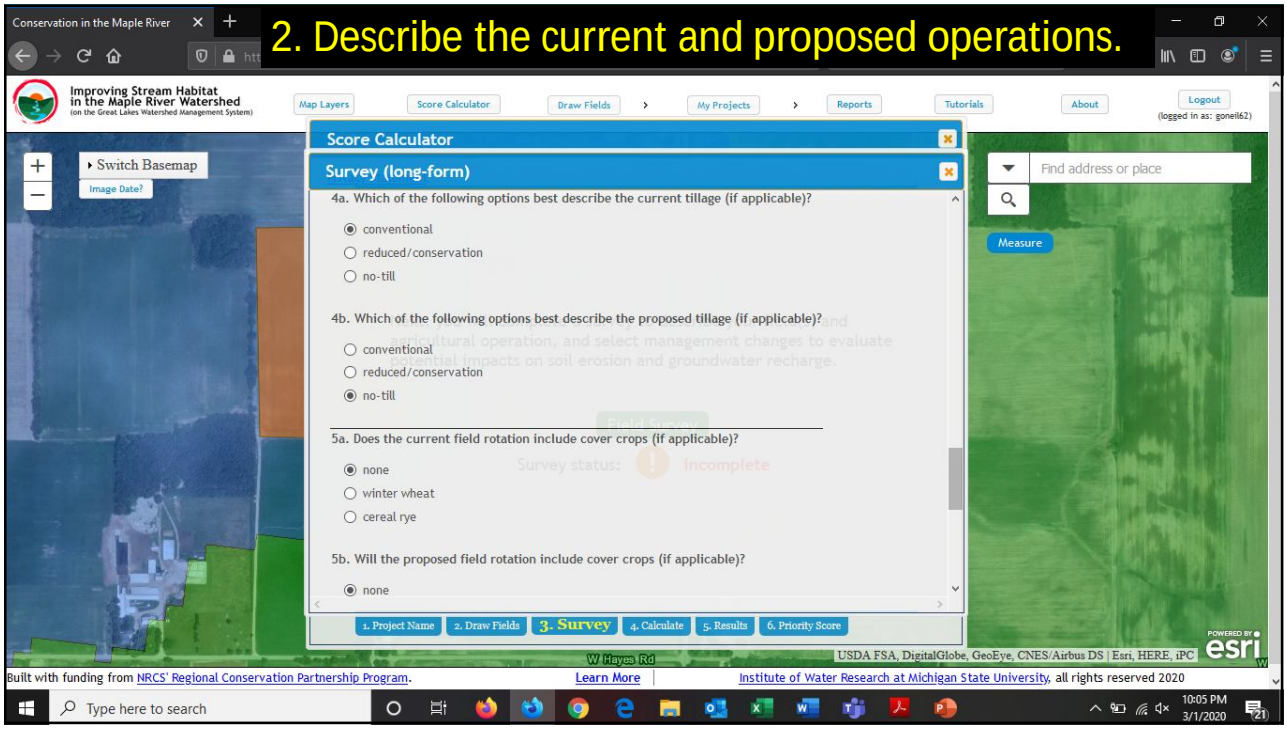
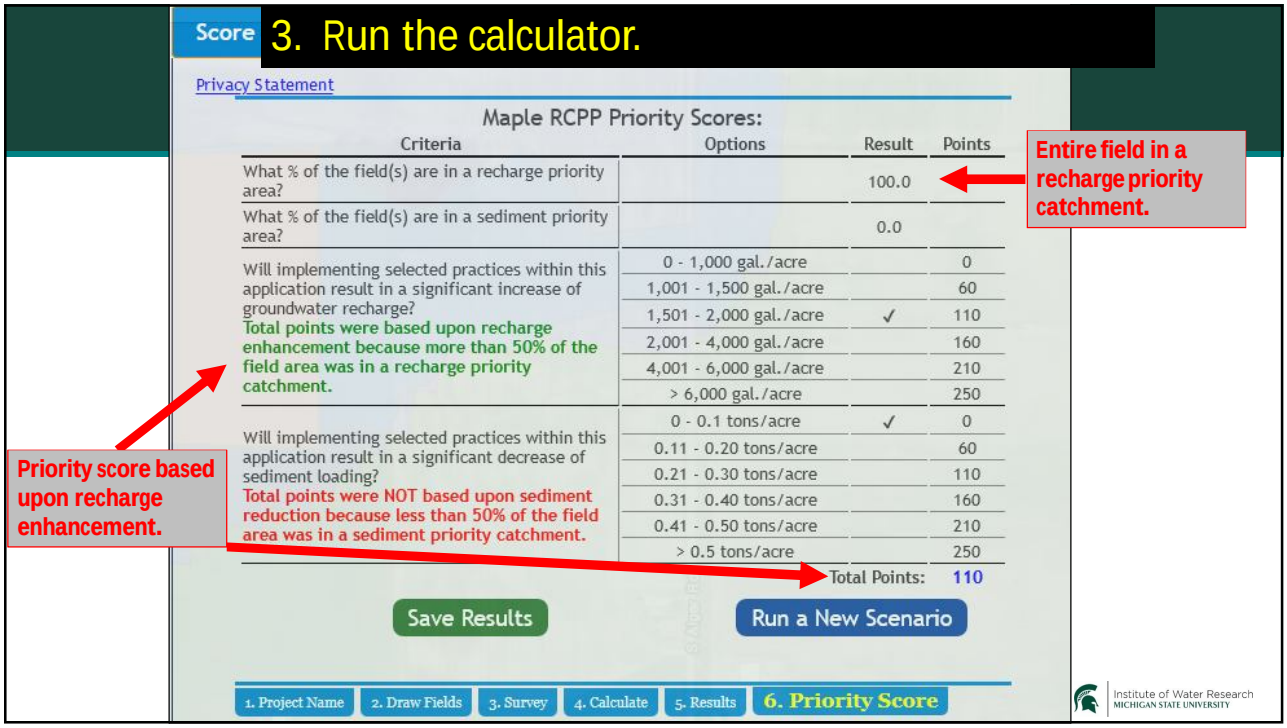
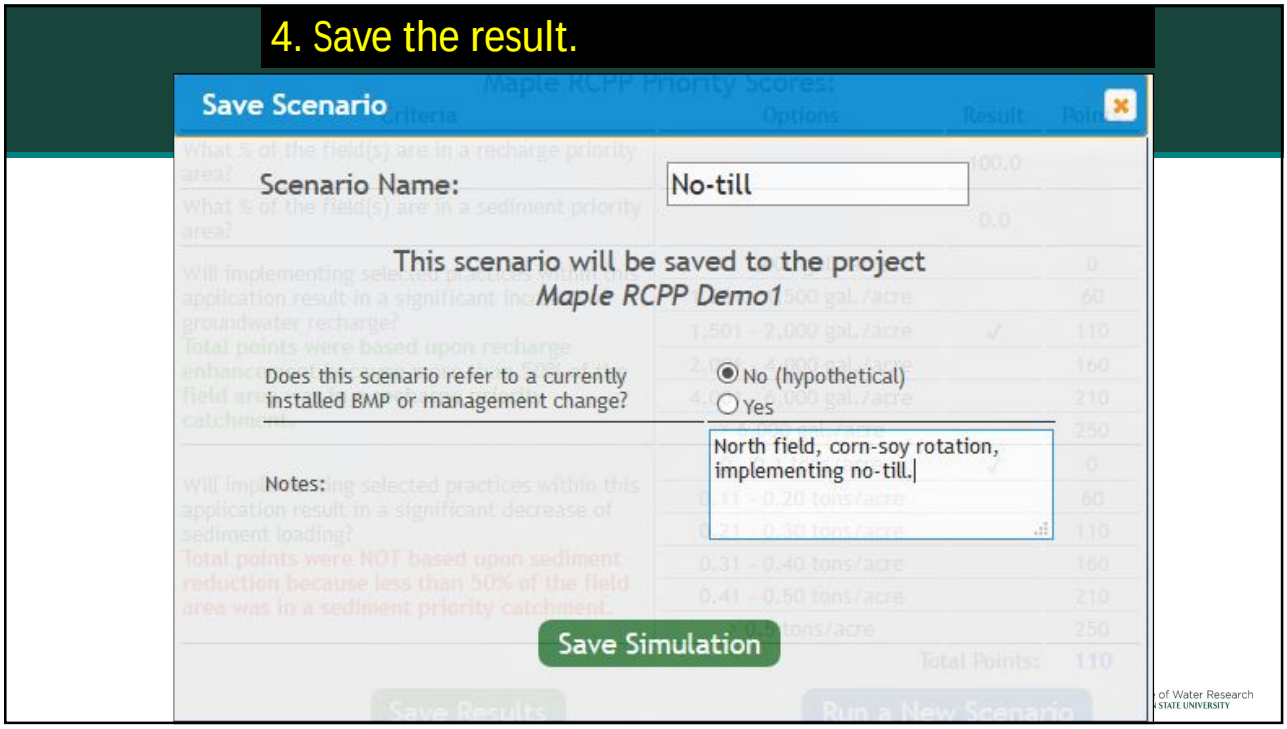
2. Describe the current and proposed operations.



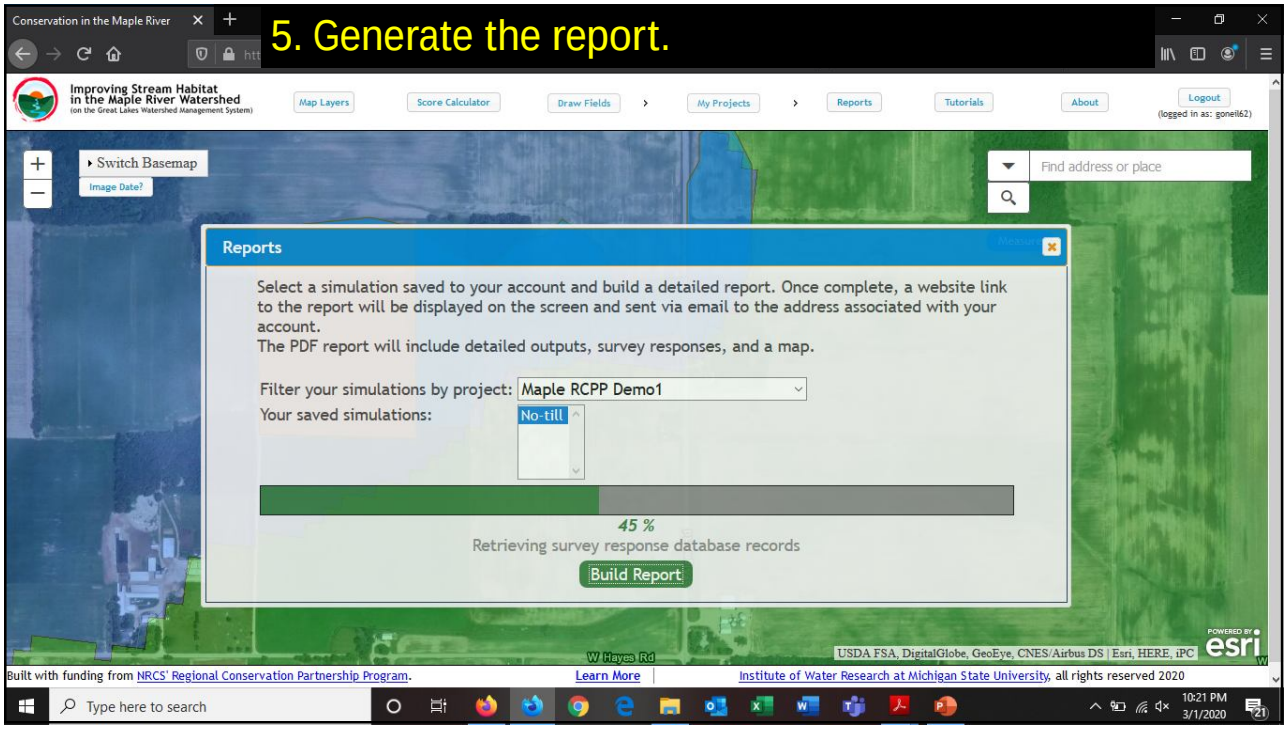
3. Run the calculator.

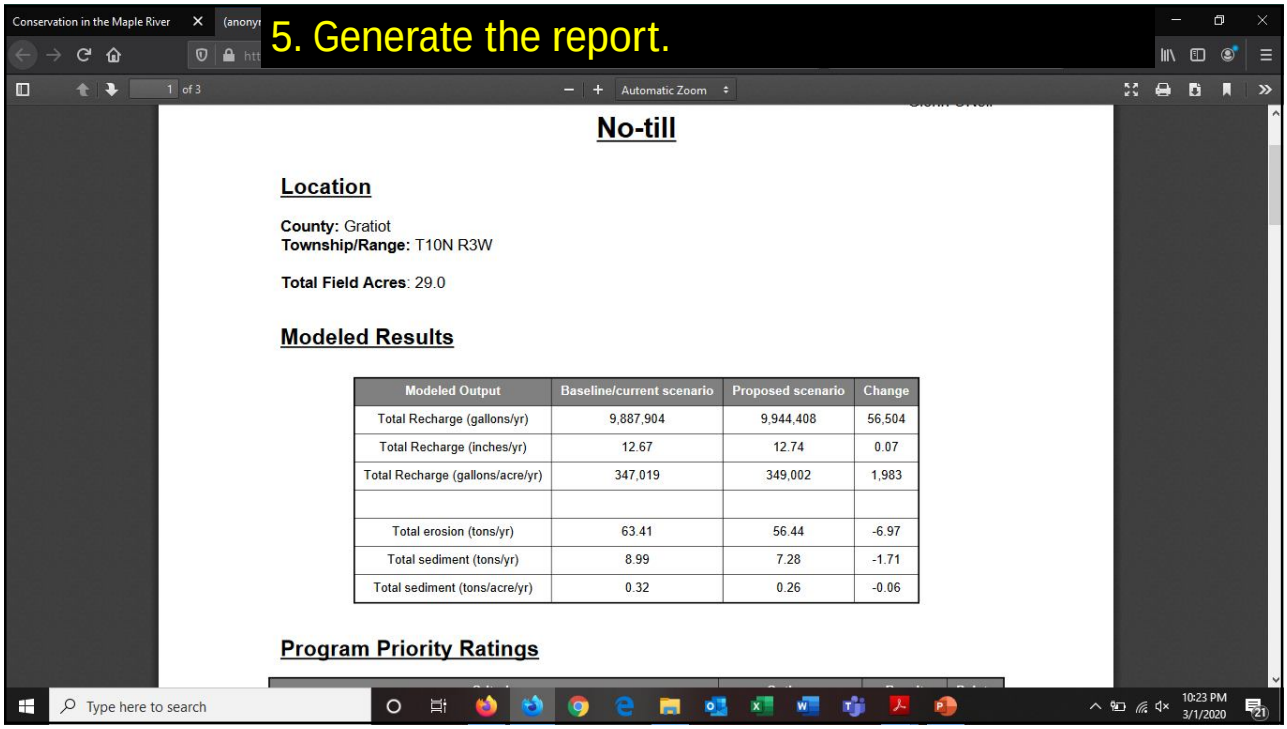


4. Save the result.



5. Generate the report.




5. Generate the report.
Conservation in the Maple River
1 of 3
Automatic Zoom
No-till
Location
County: Gratiot
Township/Range: T10N R3W
Total Field Acres: 29.0
Modeled Results
Modeled Output | Baseline/current scenario | Proposed scenario | Change
Total Recharge (gallons/yr) | 9,887,904 | 9,944,408 | 56,504
Total Recharge (inches/yr) | 12.67 | 12.74 | 0.07
Total Recharge (gallons/acre/yr) | 347,019 | 349,002 | 1,983
Total erosion (tons/yr) | 63.41 | 56.44 | -6.97
Total sediment (tons/yr) | 8.99 | 7.28 | -1.71
Total sediment (tons/acre/yr) | 0.32 | 0.26 | -0.06
Program Priority Ratings
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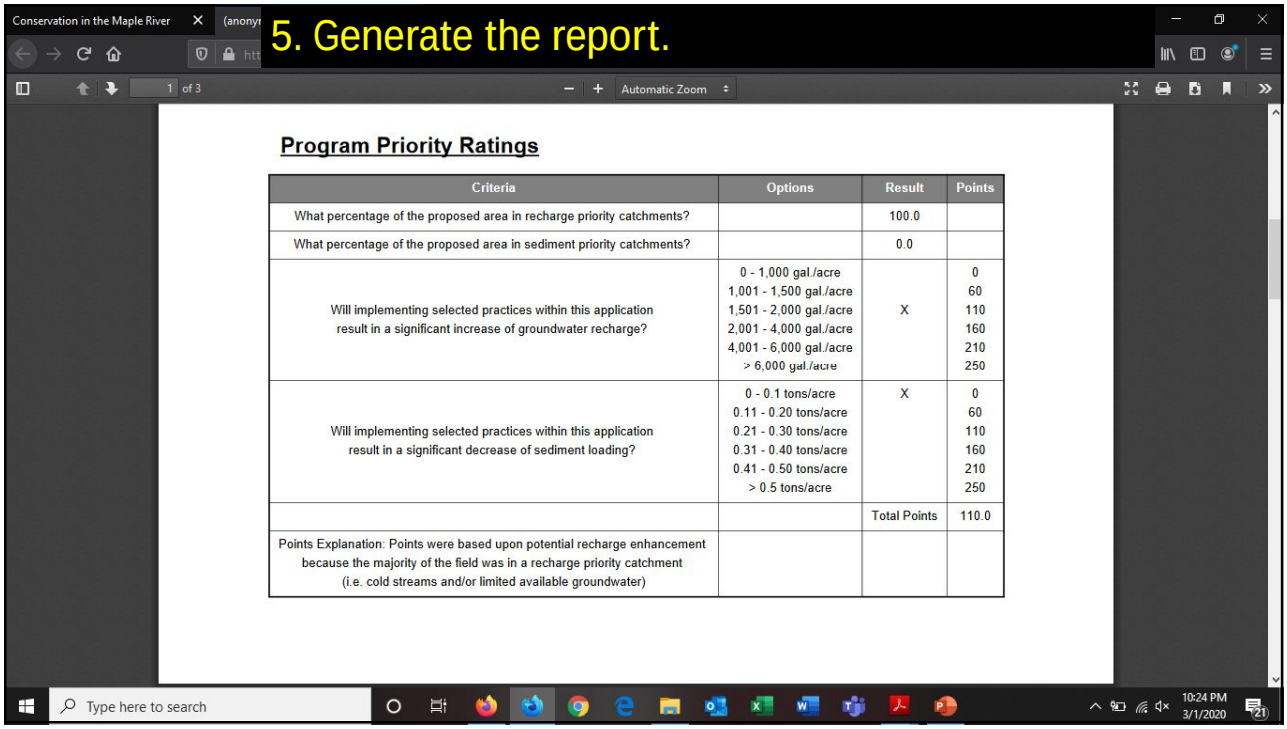
5. Generate the report.
Conservation in the Maple River
1 of 3
Automatic Zoom
Program Priority Ratings
Criteria | Options | Result | Points
What percentage of the proposed area in recharge priority catchments? | | 100.0 |
What percentage of the proposed area in sediment priority catchments? | | 0.0 |
Will implementing selected practices within this application result in a significant increase of groundwater recharge? | 0 - 1,000 gal./acre
1,001 - 1,500 gal./acre
1,501 - 2,000 gal./acre
2,001 - 4,000 gal./acre
4,001 - 6,000 gal./acre
> 6,000 gal./acre | X | 0
60
110
160
210
250
Will implementing selected practices within this application result in a significant decrease of sediment loading? | 0 - 0.1 tons/acre
0.11 - 0.20 tons/acre
0.21 - 0.30 tons/acre
0.31 - 0.40 tons/acre
0.41 - 0.50 tons/acre
> 0.5 tons/acre | X | 0
60
110
160
210
250
Total Points | 110.0
Points Explanation: Points were based upon potential recharge enhancement because the majority of the field was in a recharge priority catchment (i.e. cold streams and/or limited available groundwater)
Type here to search
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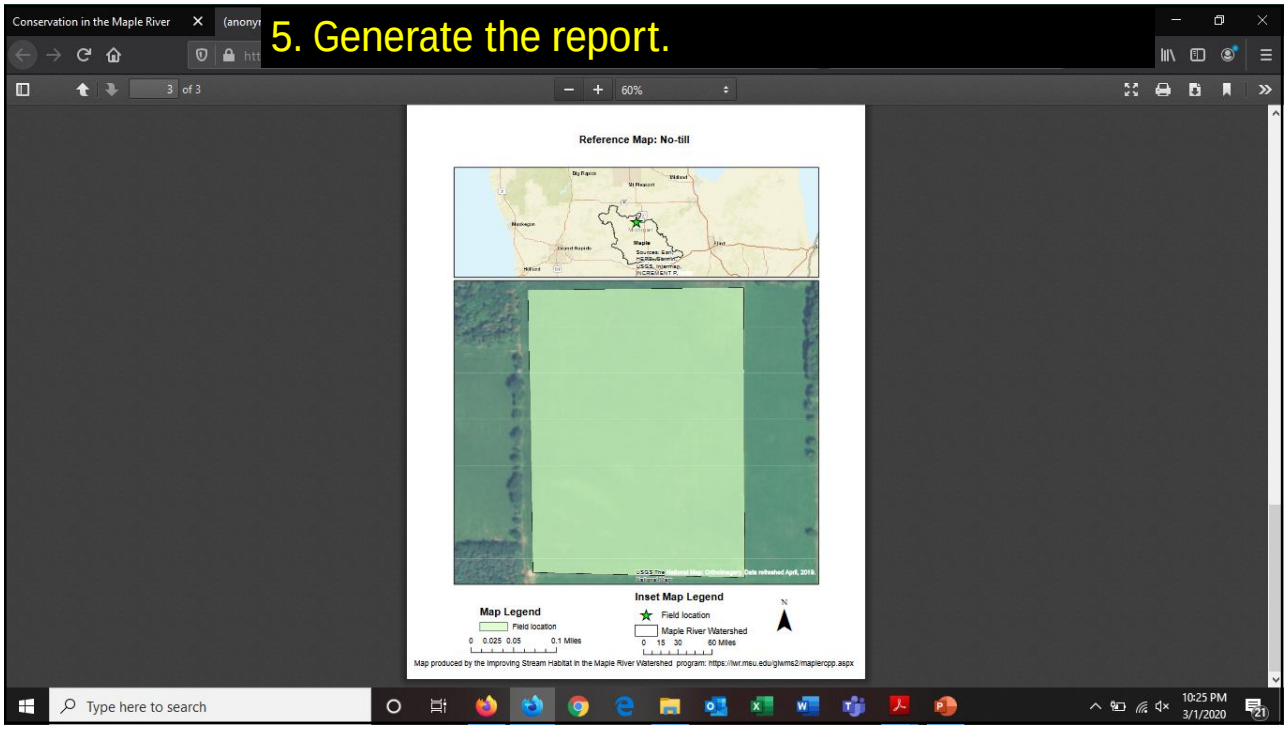
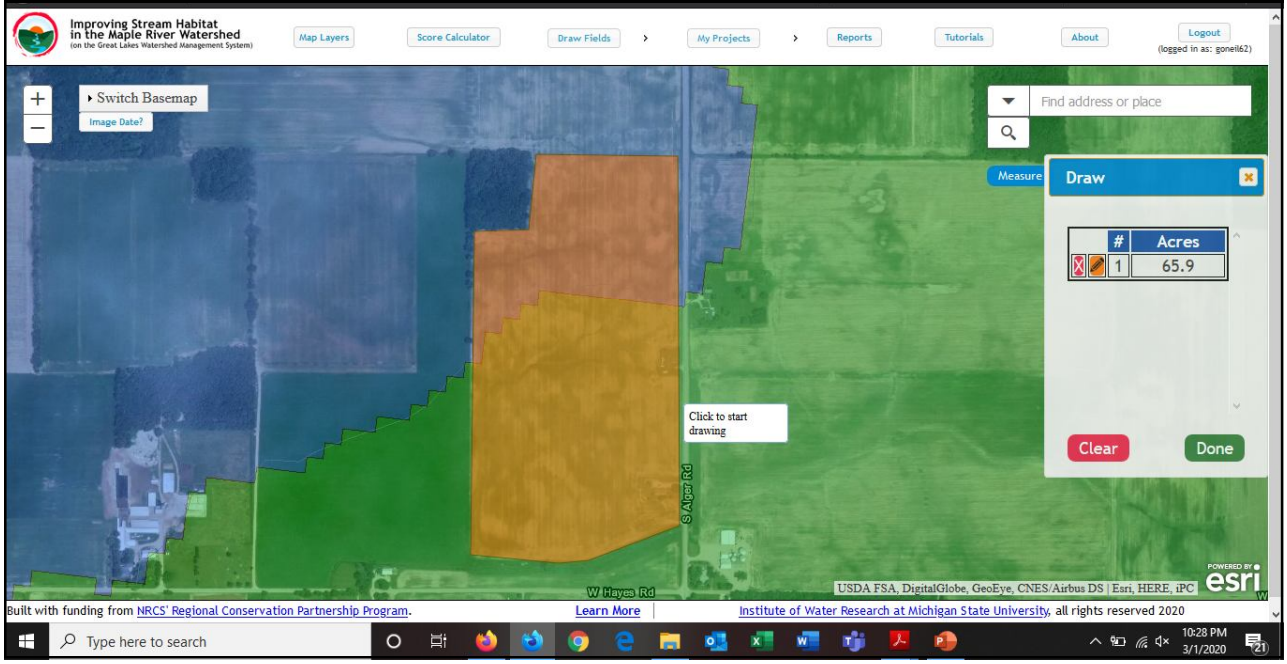
3/1/2020

5. Generate the report.



What if a field straddles recharge and sediment priority catchments?



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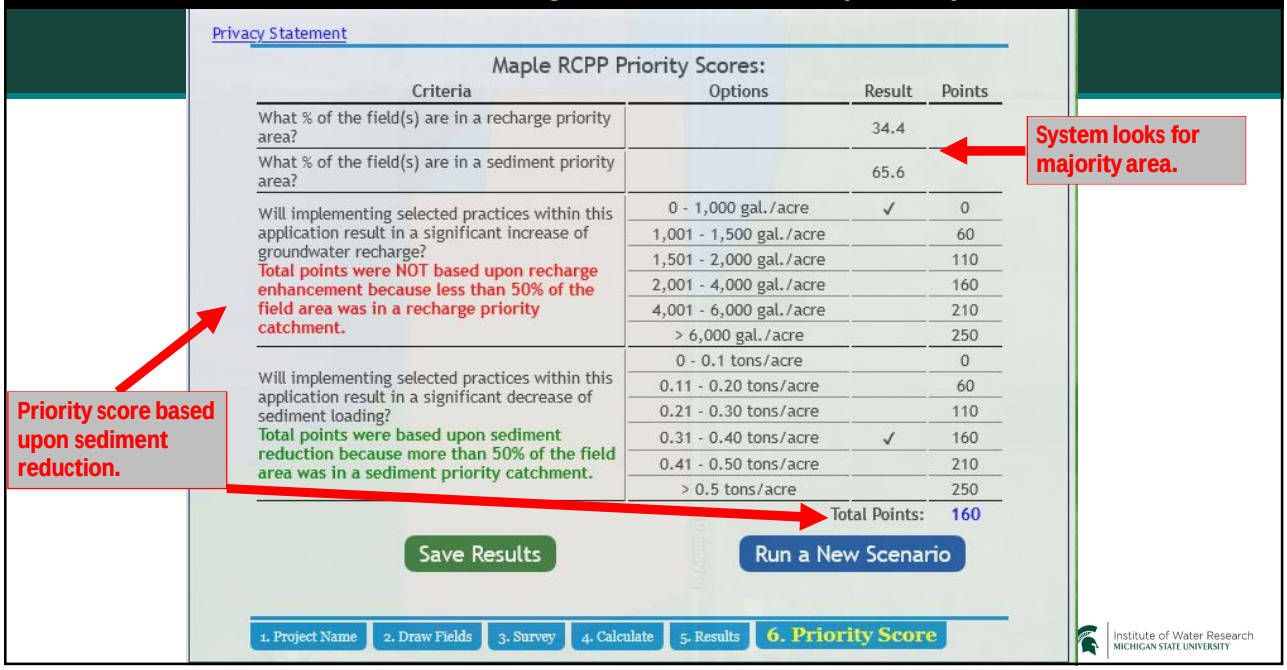
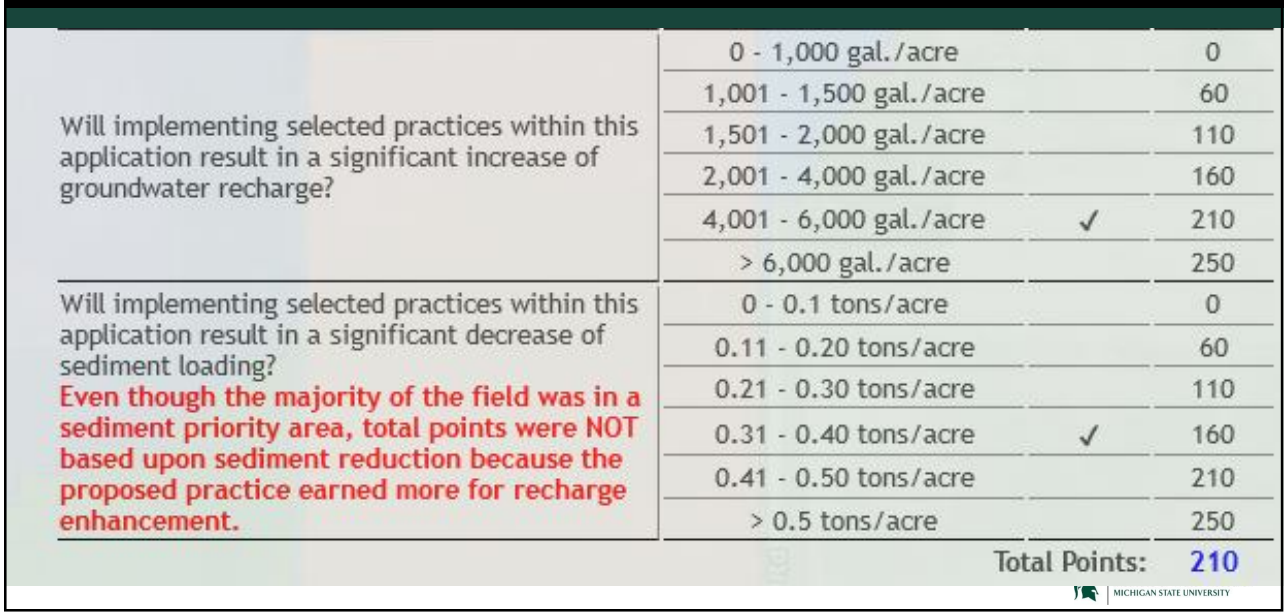
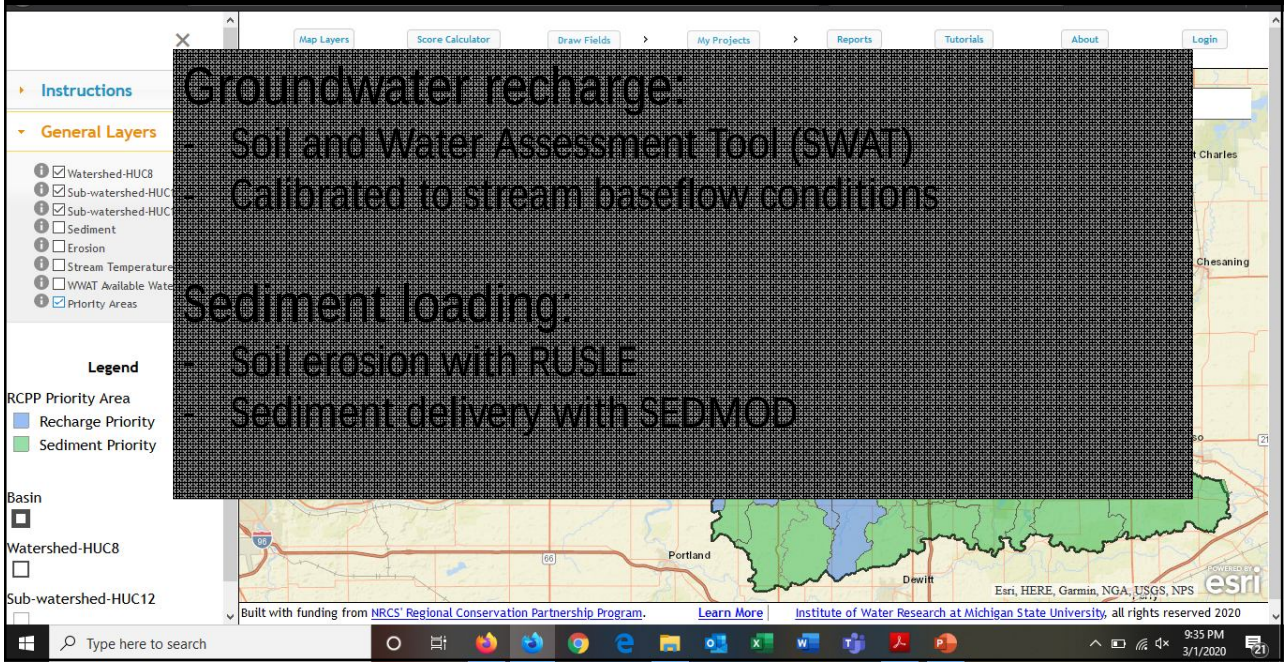


In sediment priority catchments, recharge enhancement can still earn points.



How are sediment reduction and recharge estimated?



The Online Tool

Potential Payments

Conservation Program	Conservation Practice	Modeled Result	Current Payment Rate	Potential Payment
SBW Groundwater Recharge Pay for Performance		681,456 increase gal./yr.	$0.000849 per gallon of recharge	$578.56
SBW Sediment Reduction Pay for Performance		9.06 tons/year	$300.00 per ton of sediment reduction	$2,718.00
SBW RCPP	No-till with cover crop	24.5 acres	$77.86 per acre	$1,907.57

Click here for more information about payment options through RCPP.

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Monetizing Infiltration to pay for Conservation and Ecological Health

The Nature Conservancy

Saginaw Bay Ground Water Recharge Program

Paw Paw River Watershed Recharge Program

method a cleaner clean

Coca-Cola

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Partners

MAEAP

USDA NRCS United States Department of Agriculture Natural Resources Conservation Service

The Nature Conservancy

Kellogg's

Clinton Conservation District

Michigan Trout Unlimited

Gratiot Conservation District

Shiawassee Conservation District

Soil and Water Conservation Society

Michigan Potatoes Michigan Potato Industry Commission

Michigan Farm Bureau

MABA

Great Lakes Commission des Grands Lacs

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Questions

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