WI/MN Wetland Rapid Assessment Method User Guide

Version 1.0, July 2024

Version Information

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Users may also reference the Science Support Technical Guidance for additional context and rationale regarding the functions, indicators, and rankings used within this tool.

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Acronyms

AA Assessment area

AOI Area of interest

CEJST Climate and Economic Justice Screening Tool

DBH Diameter at breast height

FQA Floristic quality assessment

HGM Hydrogeomorphic

NLCD National land cover database

NWI National Wetland Inventory

RAM Minnesota and Wisconsin wetland rapid assessment methodology

RCA Runoff contribution area

SCA Streamflow contributing area

SHPO State Historic Preservation Officer

THPO Tribal Historic Preservation Officer

WSS Web Soil Survey

Definitions

Area of interest: An area of wetland identified as needing assessment of wetland functions for a particular regulatory purpose (e.g., wetland impact area, wetland restoration area, etc.).

Assessment area: A wetland or portion of a wetland being evaluated by this assessment method.

Catchment: The area of land draining into a wetland.

Commercial use: An activity in a wetland or part of it is used for producing wetland dependent products.

Bridge: Refers to a connection between different core areas of natural landcover associated with patterns of potential wildlife habitat landscape connectivity.

Core areas: Refers to areas of natural landcover associated with patterns of potential wildlife habitat landscape connectivity.

Cowardin System: The National Standard for mapping U.S. wetlands and deepwater habitats (Federal Geographic data Committee, 2013).

Driver: Refers to a factor or characteristic that enhances a particular wetland function.

EnviroAtlas: Interactive mapping application developed by the U.S. Environmental Protection Agency to provide geospatial data, tools, and other resources related to ecosystem services, their chemical and non-chemical stressors, and human health.

Floristic quality assessment: A vegetation-based assessment tool that evaluates an area's ecological integrity based on its plant species composition.

Function: What a wetland does.

Functional capacity: The ability of the wetland to perform a specific function.

Groundwater recharge: The ability of a wetland to recharge groundwater.

Indicator: Directly measurable or observable metrics of wetland condition.

Opportunity value: The potential for a wetland to perform a specific function and its relative value to society.

Surface water attenuation: The ability of a wetland to store or delay surface water over a period of time to influence the magnitude, frequency, and/or duration of inundation further downstream or within a watershed.

Surface water supply: The ability of a wetland to supply water to downstream/downslope waters or within a watershed via surface water outflows, saturation overland flow, and/or groundwater discharge.

Value: The worth or importance of wetland functions to society.

Water regime: Cowardin classification modifier describing the hydrologic characteristics of wetlands and deepwater habitats.

Wetland-dependent commercial activity: A commercial activity that is almost exclusively conducted within wetlands. Examples include peat mining, cranberry production, and sod farming.

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Wetland Functional Assessment Steering Committee

Bourdaghs, Michael (MPCA)
Brodzeller, James (Dane County WI, formerly WDNR)
Graser, Rebecca, (USACE)
Hofstad, Steve (BWSR)
Jarosz, Sally (WDNR)
Nedland, Tom (WDNR)
Parsons, Heather (USEPA)
Pearce, Tom (WDNR)
Peterson, Cami (WDNR)
Powell, Ken (BWSR)
Skancke, Jennie (MDNR)
Weaver, Kerryann (USEPA)

Development Support Provided By

Liam Kolb
Dan Salas
Nicole Staskowski
Elli Danielson

Additional contributions to the development of this tool was provided by the following people serving in various roles: Brian Anderson (WDNR), Ian Anderson (WDNR), Sheel Bansal (USGS), Julie Ballweg (WDNR), Ken Bradbury (WI Geological Survey), David Demmer (BWSR), Nicki Deweese (USEPA), Shawn Esser (Dane Co), Jay Fischman (MNDNR), Drew Fowler (WDNR), John Genet (MPCA), Mark Gernes (MPCA), Melissa Gibson (WDNR), Tom Gile (BWSR), Grace Graham (WI Geological Survey), Faye Healy (USACE), Celeste Hockings (Lac du Flambeau Tribe), Andy Hudak (WDNR), Terri Jicha (EPA Lab Duluth), Jon Kleist (WDNR), Scott Koehnke (WDNR), Zach Kron (SEWRPC), Alex Latzka (WDNR), Chris Lenhart (U. of Minnesota), Marissa Merriman (USACE), Nick Miller (TNC), Eric Norton (USACE), Ryan O'Connor (WDNR), John Overland (BWSR), Tyler Orgon (Red Lake Tribe), Barbara Peichel (BWSR), Rori Polaski (WDNR), Andy Robertson (St. Mary's University of Minnesota), Dan Shaw (BWSR), Cade Steffenson (BWSR), Anett Trebitz (EPA Lab Duluth), Henry Van Offelen (BWSR), Pete Wood (WDNR).

Introduction

Purpose

The state natural resource agencies of Wisconsin and Minnesota developed this rapid assessment method (RAM) for assessing wetland functions in terms of functional capacity and opportunity/value. The functions the RAM assesses were chosen based on regulatory requirements for wetlands in Wisconsin and Minnesota. The RAM is intended to be rapid, typically requiring less than one day of combined desktop and field review.

This user manual supplements and provides guidance on completing the RAM spreadsheet tool. The separate science support document for the RAM tool details how functions were selected and how questions and answers were developed to evaluate functional capacity and opportunity/value.

Overview of Rapid Assessment Method

Intended Uses

This tool evaluates wetland functions to inform regulatory and conservation decisions related to wetlands. Examples of regulatory decisions that the tool can inform include:

- The degree of wetland impact avoidance and minimization warranted in regulatory permit review processes;
- The amount and type of compensatory mitigation needed for a wetland that is impacted; and
- The amount and type of compensatory mitigation credit generated from a wetland restoration, creation, or mitigation projects.

Examples of conservation decisions that the tool can inform include:

- Determining which functions a particular wetland restoration project will enhance/improve;
- Monitoring, assessing and documenting wetland condition and functions; and
- Prioritizing wetland restoration and/or preservation projects for conservation funding.

Functional Definitions, Scope, and Overlap

The tool assesses 17 specific wetland functions under five broad categories. Function groups and specific functions are generally defined in relation to the relatively broad functional references in state statutes and administrative rules. Some closely related functions were consolidated under a broader function category in the tool. When this occurs, the output can be used to distinguish between these related functions.

Wetland functions interact and overlap. The tool necessarily limits the scope of each function where overlap could be problematic as follows:

Hydrologic focuses on three specific functions: *Surface Water Attenuation*, *Surface Water Supply*, and *Ground Water Recharge*. Wetlands play an important role in the hydrologic cycle – influencing and controlling surface water flows in watersheds in ways that often are an interface between surface and groundwater.

Water Quality focuses on the ability of a wetland to improve water quality of downstream resources and is comprised of five specific functions: *Nitrate Removal, Phosphorus Retention, Sediment and General Pollutant Retention, Shoreline Stabilization, and Thermoregulation*. The water quality of a wetland is accounted for in other functions, specifically the ecological function related to fish/wildlife habitat. Wetland water quality influences wetland condition which drives ecological functioning.

Ecological focuses on fish and wildlife habitat of endemic species. Specific functions include *Native Plant Habitat, Wildlife Habitat, and Fish Habitat*. This group also emphasizes the natural, ecological functioning of a wetland in its landscape.

Climate relates to the physical attributes and biochemical processes of wetlands that mitigate the effects of excess atmospheric carbon and methane gas. The specific function evaluated is C*arbon Sequestration*. Wetlands accumulate carbon through internal (e.g., vegetation growth) and external (e.g., runoff) processes, and store much of that accumulated carbon in anoxic sediment over decadal and longer timescales, thereby decreasing atmospheric CO_2 concentrations as well as avoiding loss of terrestrial carbon as CO_2.

Anthropogenic function represents the attributes of wetlands that affect direct human uses, including commercial production of goods, recreation, education and research. Specific anthropogenic functions are *Historic or Cultural Uses, Scientific or Educational Importance, Commercial Uses, Recreational Uses, and Scenic Beauty*.

Many drivers and metrics from the different functions overlap. When possible, the tool combines overlapping metrics into a single question or set of questions. A question that is used across different specific functions is typically ranked differently for each function.

Existing Data and Metrics

The tool leverages the use of existing data sets and information that are readily available to potential users such as GIS layers, guidebooks, keys, web-based applications, and similar resources. Selected data sources are all publicly available, generally accepted in the states as reliable sources of information and maintained or supported by public entities.

Functional Assessment Considerations

Within an assessment area (AA), each function is assigned a rating of Higher, Moderate, or Lower. Functional ratings should not be combined to produce an "overall wetland rating". The functional rankings are relative, not absolute. A lower rank implies a lower level of a particular

wetland function compared to other wetlands and vice versa for a higher rank. All rankings are based on indicators of wetland function entered by the user.

The tool addresses two functional assessment aspects:

- The functional capacity of a wetland to perform a specific function based on the observable characteristics of the wetland and its position in the landscape.
- The societal benefit of a wetland to perform a specific function based on both the opportunity to perform the function and the value given the societal context of the wetland (i.e., opportunity-value)

Value considerations refer to the value of the function to the general public, not to specific individuals. Public value determinations are based on state statutes and administrative rules, publicly derived plans and policies, prioritization by public agencies, and public investments in conservation and natural resources. The tool accommodates a certain level of flexibility for users and reviewers to incorporate localized public values in the assessment of some functions.

Transparency

The basis for functional rankings can be discerned from the tool outputs. Each ranking includes information on indicators of characteristics in the wetland (vegetation, soils, hydrology, etc.) and drivers related to the position of the wetland in the landscape (surrounding land use, presence/absence of outside stressors, etc.). This distinction can be useful in evaluating a function's ability to be maintained into the future. Transparency in ranking also facilitates evaluation of collected data and observations by others.

Limitations of Use

Limitations of a rapid assessment

The tool is intended to rapidly assess wetland functions in a one-day effort. More time-intensive measures of functioning have not been included. In some cases, alternative assessment methods and metrics may provide a more precise and robust evaluation. Users of this tool will need to evaluate if or when evaluations require assessment methods beyond the scope of this tool.

Limitations of online tools and mapping

Online tools and mapping used to answer some tool questions provide easy and accessible methods for rapid assessment of variables. However, mapping and online data sources are often gathered through remote sensing and data analysis, which does not substitute for the data quality obtained by on-the-ground observations or field-based sampling methods. Users and reviewers of the tool should understand the limitations of online information resources and give preference to field-based sampling where that information is available.

Considerations and functions excluded

The tool provides a broad assessment of select functions based on the information gathered at the time of the assessment by the user conducting the evaluation. The functions included are based on state statutes and administrative rules, publicly derived plans and policies, prioritization by public agencies, and public investments in conservation and natural resources. There may be other non-statutory functional considerations that exist in nature and society beyond those assessed by the tool, which may require consideration under certain use scenarios or context.

Information Sources

The following information sources are used as part of the desktop assessment required for the RAM tool.

EnviroAtlas

EnviroAtlas was developed by EPA in partnership with the U.S. Geological Survey (USGS), the U.S. Department of Agriculture (USDA), and other federal and non-profit organizations, universities, and communities including state, county, and city-level stakeholders. EnviroAtlas provides geospatial data alongside query tools to provide accessible information related to ecosystem services, human and community health, and ecological stressors.

EnviroAtlas informs aspects of the hydrologic and ecological functions. The EnviroAtlas Interactive Map is free and accessible via the EPA website at https://www.epa.gov/enviroatlas/enviroatlas-interactive-map.

Web Soil Survey

Web Soil Survey (WSS) provides a free and accessible portal for soil data produced by the National Cooperative Soil Survey. It is operated by the USDA Natural Resources Conservation Service (NRCS) and provides access to soil maps and data available online for most counties across the nation. Web Soil Survey informs aspects of hydrologic, water quality, and carbon sequestration functions. The Web Soil Survey is available at https://websoilsurvey.nrcs.usda.gov/app/.

CEJST

Climate and Economic Justice Screening Tool (CEJST) maps census tracts across the U.S. that are overburdened and underserved for a variety of disadvantaged community indictors related to climate change, human health, pollution exposure, and other factors. Federally Recognized Tribes, including Alaska Native Villages, are also considered disadvantaged communities. The CEJST is used to inform aspects of anthropogenic functions.

Other Sources

Occasionally other sources of information will be referenced within the tool itself. Often these data sources differ depending on if the survey is occurring in Minnesota or Wisconsin. Links are provided in this guide as well as in the tool Excel data form.

Overview of the Assessment Process

Assessment Area Overview

The RAM tool is intended to be applied to an entire contiguous wetland as opposed to a small wetland area, such as an area proposed to be impacted by a project. However, the assessment tool can be used to evaluate changes in wetland functions due to alteration of a smaller area(s).

The assessment area (AA) is the wetland area where the tool evaluation is completed. An AA is limited to 250 acres or less so that field data collection and observations may be completed in a half day of effort, allowing for rapid assessment. In many situations, the AA will likely be smaller than the maximum 250 acres. Larger AAs are more common in large, structurally homogonous organic flats in the northern range of this tool.

Additionally, an AA can be a combination of non-contiguous wetlands in certain circumstances as described below. The following guidelines help users define an AA in a relatively objective and repeatable manner consistent with the scope of the assessment tool. The guidelines are the default method of defining an AA for use of the assessment tool.

Establishing an AA is an iterative process. An AA is first delineated using a mapping application based on National Wetland Inventory (NWI), soil maps, and aerial photography. A delineated AA will be necessary to complete the desktop observations and questions. Delineated AA boundaries must then be verified and/or modified as necessary in the field. Users are encouraged to use best professional judgement when determining the final AA boundary with desktop and field observations. A significant change to the AA boundary may require that a user complete the desktop portions of the tool again using the new boundary.

Users may deviate from the prescribed method to adapt to unique situations and circumstances when warranted. For example, access to the entire AA may not be available due to property boundaries, landscape barriers, flooding, or other factors. If a user does not have access to the entire AA, they should use any available tools, such as aerial photos, binoculars, or other information.

Any deviation from the prescribed method for determining the AA should be documented and justified in writing and noted on maps when reporting assessment results. If one or more questions could not be answered due to constraints, this should be documented in the notes section for each question.

Assessment Area Establishment

Step 1. Identify the area of interest (AOI).

The AOI depends on the intended use of the functional assessment. Some examples include:

1. For wetland regulatory compliance the AOI may be a specific wetland area proposed to be impacted or restored or a specific wetland area on a property where it is important to determine its functional value compared to other wetlands as part of a wetland avoidance and/or minimization analysis.
2. For conservation planning the AOI may be an entire wetland basin or contiguous wetland area.

Step 2. Delineate the contiguous wetland area containing the AOI.

Routine level 1 offsite methods such as desktop mapping and aerial photos should be used to estimate the overall size of the wetland and set an AA. A user should then use field data and professional judgement to modify the AA if needed.

Step 3. Determine the Hydrogeomorphic (HGM) type(s) of the wetland area.

Use the HGM type classification definitions and key in Appendix A. An AA should typically only include wetland area in one HGM type.

If the AOI overlaps more than one HGM type, multiple RAM assessments may be required – one for each primary HGM type found within the AOI.

Step 4. Use this decision tree to determine the bounds of the AA.

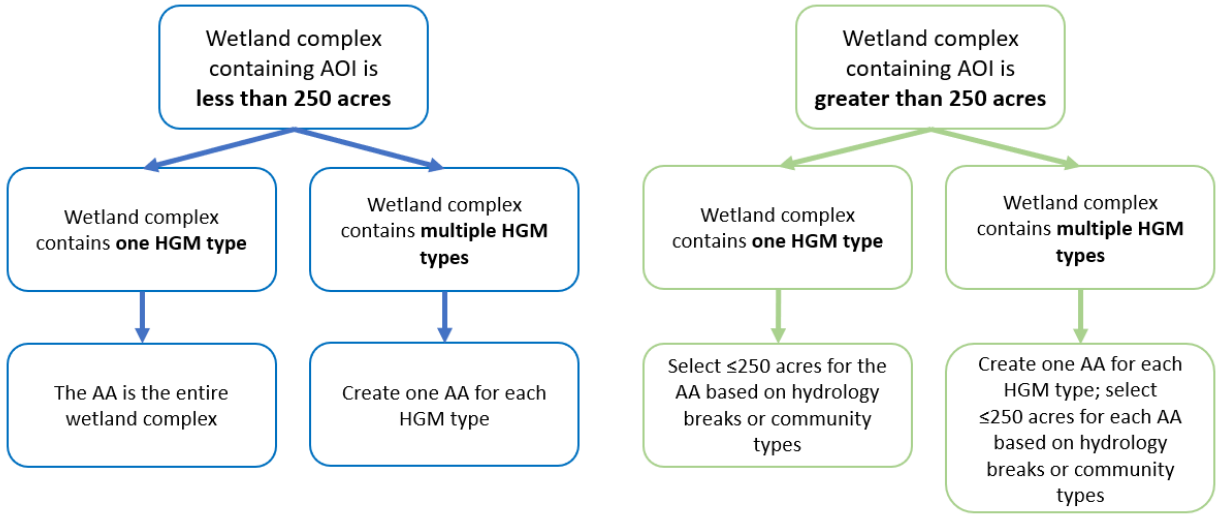


Figure 1. Decision tree for determining the wetland AA

Step 5. Appropriately refine a large AA.

Property boundaries alone should not be used for dividing the wetland, and a division or reduction of the AA should aim to encompass as large of an area as possible within the 250-

acre limit. First consideration for reduction should be differences in hydrology. This includes ditches, tiles, hydrologic constriction points, beaver dams, and any other features that could potentially affect the hydrology of one portion of the wetland differently from another. If there is no basis for splitting the wetland into manageable units based on hydrologic factors, then look for significant changes in land use and/or vegetative community composition. If the wetland is relatively homogenous in hydrology, vegetation, and land use, establish an arbitrary AA boundary that delineates 250 acres and includes the AOI.

Assessment Area Adaptations

Application of these methods may sometimes result in an AA that is difficult or otherwise inappropriate to assess in relation to the intended purpose of the assessment. A user may adapt the AA to fit the assessment needs and site conditions and should provide justification for the adaptations, as well as documentation of the methods used. In such instances the general approach and parameters in the methodology should be adhered to as much as feasible.

Scenarios for Combining Wetlands in an AA

While the Assessment Tool is designed to assess each wetland separately, similar wetlands in close proximity may be combined for efficiency. In general, wetlands should not be combined for assessment if they are of a different HGM type, have significant differences in key features (e.g., soil type, plant community types, hydrologic alterations, etc.), or are more than 1,000 feet apart. If it is appropriate to combine wetland impact areas of similar wetlands on the same overall development site or parcel, the AA should be defined as the collective area of wetland on the same site up to a limit of 250 acres.

Note that Users will likely be required to do extra steps in EnviroAtlas and other mapping platforms to estimate various AA metrics such as contributing watershed or surrounding land coverages adjacent to the AA if the AA is made up of multiple polygons that are close but not contiguous.

Setting the AA for Wetlands Bordering Lakes and Streams

When defining the AA, it is important to separate the wetland from any adjacent and contiguous other aquatic resources such as lakes and streams. Professional judgement should be used to make a reasonable separation between the wetland and the aquatic resource. Some wetlands may occur as a long narrow band of contiguous wetland adjacent to the perimeter of a lake or the edge of a stream. In such instances where the wetland is narrow and the AA would have to be longer than 1,500 linear feet adjacent to a lake or stream to reach the 250-acre limit, a user may limit the AA to 1,500 linear feet or a natural break in hydrology or community type, whichever is smaller. The AOI should be centered along the 1,500-foot length to the extent possible.

For ditches and 1st and 2nd order streams that have contiguous vegetated wetlands on both sides, the AA should typically include the wetlands on both sides of the waterway. For 3rd order streams or greater, the AA should include only the wetland on the side of the AA that includes the AOI.

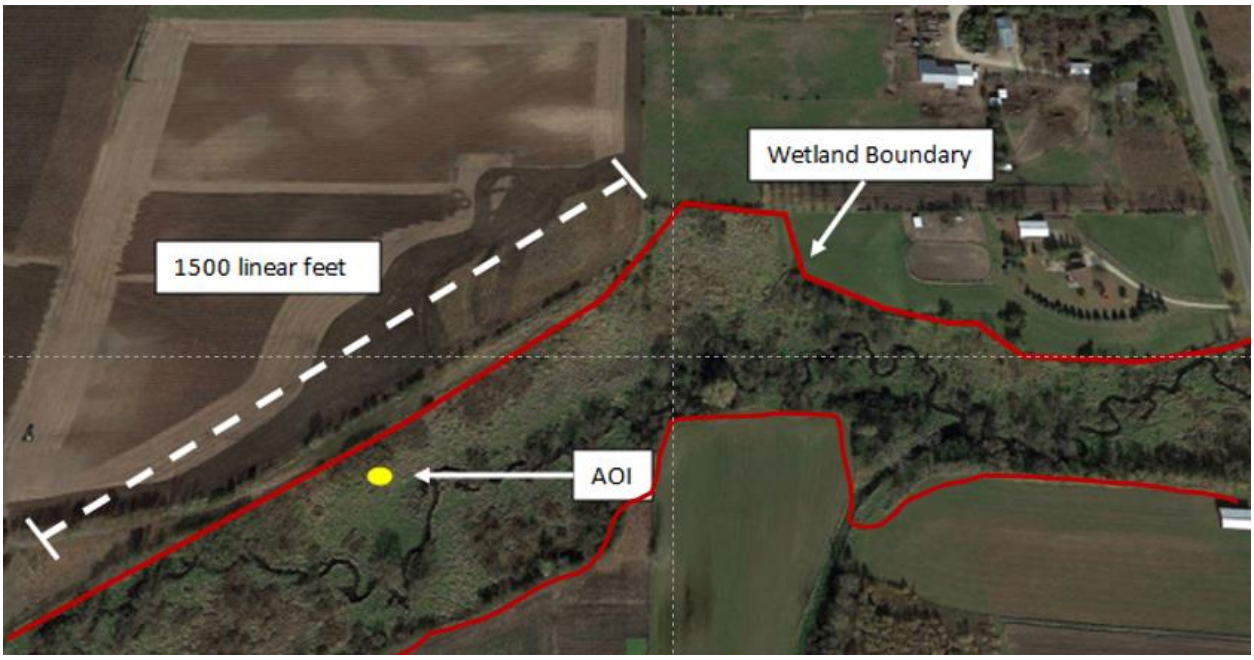


Figure 2. Example of setting an AA on a narrow wetland adjacent to a small stream

Completing the RAM Form

Important RAM Form Considerations

Users should note that the RAM form should **only be used in Microsoft Excel**. Multiple format and calculation issues have occurred when the form is used in Google Sheets or other spreadsheet platforms.

User Expertise Requirements

RAM form users should be trained wetland professionals and proficient with other wetland assessment protocols and tools such as wetland delineation and use of MN and/or WI rapid floristic quality assessments.

Preparing for the Assessment

The RAM is a tool used to broadly assess the relative level of wetland function across five functional groups: ecologic, hydrologic, anthropogenic, water quality, and carbon sequestration. The tool is designed to conduct a site assessment in a maximum of four hours desktop review and four hours on site data collection. The methods used to complete an assessment are objective, repeatable, and rapid. When completing the assessment, practitioners can use GIS or other tools at their disposal. However, for accessibility and completeness of data this guide uses EnviroAtlas, Web Soil Survey, and an environmental justice screening tool for the desktop review portion.

When filling out the RAM form all inputs from the user will be completed in the AA DATA ENTRY tab. Data will be entered either through manual input in answer cells with tan boxes or via drop

down menu in answer cells with yellow boxes. Additionally, there are gray boxes that either auto-populate based on earlier data entries or remain grayed out when not relevant to the assessment being conducted.

This user guide serves as a reference for practitioners when completing a RAM assessment. The user guide follows the same order as the tool and is labeled similarly for quick reference. The source used for answering each question is listed in the row it is being asked. Certain questions may be answered either in the field or by desktop review. The user is encouraged to complete as much of the assessment as possible during the desktop review prior to going into the field. The field data collection may then further confirm what was input during desktop review or change the answers provided at that time. Therefore, we recommend the user review previous answers to amend any changes identified during the field visit.

Conducting the Assessment

The RAM is intended to be a *rapid* assessment. As a rapid assessment, full RAM for a typical site is intended to be completed in a one-day effort. This method is not intended to replace other more detailed studies evaluating aspects of vegetation, soils, hydrology, functional capacity, or landscape context. More in-depth studies and evaluations may be required for more comprehensive research, evaluation, or regulatory requirements.

Completion of the RAM requires accessing online mapping coupled with field data collection. To verify assessments and their results, we recommend users document their findings in the tool with the following:

- Note sections are provided along each data entry field within the AA DATA ENTRY tab.
- Maps and images from desktop reviews can be pasted into the Supporting Screenshots tab or accompanying report files.
- Photos documenting indicator observations, wetland conditions, or notable observations should accompany the tool in accompanying report files.

Conducting Desktop Review

Users are required to access a series of online data tools. See Information Sources for examples. These online tools require users to navigate to, delineate, and query data for the assessment area. However, users may encounter drawing or measurement limitations depending on the assessment area size and configuration, or tool capabilities.

User discretion may be required when mapping in EnviroAtlas. Small assessment areas may not be measurable using polygon drawn features. In such instances, users may be required to use point or line features to draw and buffer areas as representative to the assessment area as possible. Screenshots of such scenarios can help both users and reviewers to confirm accurate representation of the location and area analyzed.

Conducting Field Assessment

Following completion of the desktop review, users should prepare for a site visit. Users should determine the location, time needed, and safety considerations required for field surveys within the assessment area and surrounding lands.

The RAM tool is designed to require minimal equipment in the field. Still, users will find some field essentials useful when conducting the field assessment:

1. **Camera**: A high-quality camera is essential for documenting wetland features. A suitable camera may either be on a personal electronic device (such as a phone or tablet), or digital camera.
2. **GPS Device**: A handheld GPS unit helps users map or verify the assessment area boundaries and accurately record the location of other features.
3. **Power Booster or Battery Charger**: Use of electronic devices in the field may drain personal device battery power faster than typical indoor use. Carrying an extra battery charger as a backup power source to avoid low battery or loss of data.
4. **Field Notebook**: A waterproof field notebook may be useful to record additional observations or notes or sketch unique features during your assessment.
5. **Measuring Tools**: Users may find a measuring tape or laser rangefinder useful to measure distances between features.
6. **Flagging Tape or Flags**: While not required, users may want to mark wetland boundaries, vegetation zones, and other points of interest.
7. **Soil Testing Equipment**: A soil auger or soil probe may be required when soil mapping is not complete. **Plant Identification Guides**: Users should carry field guides or apps to help identify wetland plants necessary for vegetation inventories associated with the rapid floristic quality assessment (FQA).
8. **Rubber Boots or Waders**: Since users may be working in wet conditions, waterproof footwear is recommended.
9. **Safety Gear**: Safety essentials may include sunscreen, insect repellent, traffic cones, high-vis clothing, gloves, eye protection, and a first aid kit.

After arriving at the site, users should:

1. **Identify the Area of Interest (AOI)** identified for the AA and navigate to the location to conduct the field assessment.
2. **Verify the location and extent** of the assessment area as mapped is accurate to current field conditions and observe whether the AA contains consistent or variable conditions.
3. **Conduct a Rapid FQA meander sample** and make field observations that require walking to a specific place, such as an outflow.
4. **Enter answers to remaining questions** according to the Assessment Area Information identified in the RAM tool.

5. **Review data entries** before leaving the site. Take final notes and photographs of observations that informed tool completion. Refine notes as needed.

Saving the Assessment

Once the field assessment has been completed:

1. **Verify** all information is entered and all required supplemental mapping or materials necessary accompany the completed assessment.
2. **Save** the completed assessment to appropriate file storage. Backing up files when working for long periods and in remote locations is recommended.
3. **Coordinate** with other stakeholders as appropriate to verify the timing necessary for conducting quality control verifications and any accompanying reporting.

Interpreting Results

The results of the assessment can be found on the Results Summary tab alongside individual functional group tabs (Hydro, WtrQlty, Eco, Carbon, Anthro) in the assessment tool data form. The function rankings can be used to inform decision-making around restoration, conservation, and regulatory uses.

Results are represented as a three-tiered qualitative scale (Table 1). The assessment uses a scoring system for several specific functions; however, as most input questions are categorical RAM outcomes are best represented as qualitative rankings. If more precise comparison or evaluation of individual functions are desired, users should consider more intensive and quantitative assessment methods.

***Table 1**. Qualitative scale used in RAM wetland function rankings*

Tier	Description
Higher	Functional capacity or opportunity-value to provide a function is at a higher level relative to other wetlands for a specific function.
Moderate	Functional capacity or opportunity-value to provide a function is at a moderate level relative to other wetlands for a specific function.
Lower	Functional capacity or opportunity-value to provide a function is at a lower level relative to other wetlands for a specific function.

Results Summary

The Results Summary includes a summary of the site name, assessment area and date of evaluation. This tab also includes a functional group summary that highlights the functional capacity, opportunity value, and overall rank. This summary is intended as a brief overview of the five functional groups evaluated by the RAM tool.

Below the functional group summary is the individual function rankings. This table provides a more detailed summary of the 17 functions that make up the five functional groups. The functional capacity, opportunity value, and overall rank are identified for each function. Table 2 highlights the relationship between the functional groups and individual functions.

***Table 2**. Functional groups and their related functions*

Functional Group	Function
Hydrology	Surface Water Attenuation
	Surface Water Supply
	Groundwater Recharge
Water Quality	Nitrate Removal
	Phosphorus Retention
	Sediment and Pollutant Retention
	Shoreline Stabilization
	Temperature Maintenance
Ecological	Native Plant Habitat
	Wildlife Habitat
	Fish Habitat
Climate	Carbon Sequestration
Anthropogenic	Historic or Cultural Uses
	Scientific or Educational Importance
	Commercial Uses
	Recreational Uses
	Scenic Beauty

Individual Functional Groups

Individual function group results are summarized on the individual functional group tabs within the RAM tool. Users can review individual functional group tabs to determine how information input into the AA Data Entry tab influences the resulting outputs of the tool. Each tab includes detailed breakdowns of the scored indicator, the resulting score associated with the data entered, and comparison matrices that reflect the combination of factors resulting in a lower, moderate, or higher ranking.

Preparing for Sharing

Most RAM users will likely be sharing the tool and its outputs with other reviewers for restoration, conservation, and regulatory uses. Users are responsible for verifying the sharing or submittal requirements specific to the regulatory agency requesting the information. For non-

regulatory uses, users should coordinate with collaborators to determine what information should be shared, and the formats desired.

Instructions for Answering Assessment Tool Questions

Users will complete the assessment by answering all relevant questions in the AA Data Entry tab in the Assessment Tool. Instructions for answering the questions are grouped below in order of their appearance in the tool. For questions that use data from EnviroAtlas, Web Soil Survey, or CEJST, users can find instructions below and/or in the appendices.

Assessor Details

Begin the form by filling out details regarding the assessment using known information. There are five manual entries in this section of the assessment.

1. **Site Name**: Descriptive name to identify the site.
2. **Assessor Name**: the name of the individual(s) that conducted the assessment.
3. **Date of Desktop Assessment**: DD/MM/YYYY
4. **Date of Field Assessment**: DD/MM/YYYY
5. **If delineated, file reference number (if known)**: User-defined reference number.

Location Details

This section is used to identify AA location, size, and surrounding features of importance. Information can all be sourced from desktop review with HGM type verifiable in the field. There are eight manual entries, two drop down entries, and two auto-populated entries in this section of the assessment.

6. **Nearest Town**: Municipality names are visible on the base map in EnviroAtlas or can be found in other supporting mapping.
7. **County**: The county in which the assessment area lies. This can be found in EnviroAtlas in the “Political Boundaries” layer group, turn on the “States, County, and Census Block Group boundaries”, or other supporting mapping.
8. **State**: The state in which the assessment area lies. This can be found in the EnviroAtlas layer: “States, County, and Census Block Group boundaries”, or other supporting mapping.
9. **Latitude (decimal degrees):** coordinates for the AOI centroid. Available in EnviroAtlas at the bottom of the screen. Provides coordinate from where the mouse pointer is positioned. Alternatively, the user can select the button left of coordinates to be able to click a location for the coordinates.
10. **Longitude (decimal degrees):** Refer to steps in question 9.

11. **PLSS, quarter/quarter section or tax lot(s) reference**: Optional. Available in county or state online mapping tools.

12. **Size of the AA ():** EnviroAtlas can be used to approximate the AA and note that area measurements default to metric. The tool will convert the measurement into acreage. See full EnviroAtlas instructions in Appendix B1. Determining the Catchment Area. See Assessment Area Establishment section for details on delineating the AA.

13. **Size of the catchment area draining into the AA (in acres)**: After the AA has been measured in question 12, users can use LiDAR derived topography and the Raindrop Tool in EnviroAtlas to determine the size of the catchment draining into the AA. See full EnviroAtlas instructions in B2. Delineate and determine the size of the catchment area.

14. **The percentage equal to the assessment area divided by the Catchment Area?** Value is automatically calculated from answers to questions 12 and 13; *Users do not need to manually enter anything for this question.*

15. **What is the dominant HGM class?** User-defined dominant HGM class determined by using the Wetland HGM Determination Key (see Appendix A.) Users select one choice from the dropdown menu of options:

    - Depressional
    - Depressional - Floodplain
    - Riverine - Upper Perennial
    - Riverine - Lower Perennial
    - Lacustrine Fringe
    - Mineral Soil Flat
    - Organic Soil Flat
    - Slope - Surface Water
    - Slope – Groundwater

Land Cover and Connectivity

This section identifies how the assessment area fits into the surrounding area landscape context. Information can be sourced entirely from desktop analysis using EnviroAtlas. There is one manual entry question and two drop down menu questions.

16. **Use the Summarize My Area tool in the EPA's EnviroAtlas Interactive Map to determine the acreage of different land cover types within the AA, 0.1 miles from the edge of the AA as well as within the catchment area. Enter the acreages in the table below.** For Riverine HGM classes, delineate the approximate total catchment for the stream system with the AA as the pour point with the Summarize My Area tool. For all other HGM classes, summarize the immediate catchment. The total developed cover and total agricultural cover values are calculated as percentages and omit the area within the AA for the 0.1 miles buffer and catchment area values. Attach screenshot of results in the Supporting Screenshots tab. Enter the percentages by copying and pasting from EnviroAtlas into the table provided. Attach a screenshot of results in the Supporting Screenshots tab. Additional instructions on how to use this tool for RAM purposes is summarized in the Summarize My Area Tool (see Appendix B4. Summarize My Area Tool)

Land cover will be gathered at three different scales. Each informs different functional assessments within the RAM tool. Using this tool, copy and paste the land cover values in each column according to the appropriate area:

- Area within the AA.
- Area within 0.1 miles of the edge of AA
- Area within the Catchment Area.

17. **Use EnviroAtlas to assess landscape scale habitat and connectivity of the AA. Is the AA in a core (green symbol) area?** Use the *MSPA connectivity with water as foreground and 30-meter edge width for the conterminous United States* map. The assessment area only has to be partially in the core area to answer "Yes". Additional instructions on how to use this data layer for RAM purposes is summarized in Appendix B5. Habitat Core Area. User selects either "Yes" or "No" from the dropdown menu provided.

18. **Estimate the percentage area the core (green) occupies within a 3.2-kilometer (2-mile) radius. If the core containing the AA is connected to other cores as indicated by a bridge (red), include all connected cores in the estimate.** If the core containing the assessment area is connected to other cores as indicated by a bridge (red), include all connected cores in the estimate. Additional instructions on how to use this data layer for RAM purposes is summarized in Appendix B5. Habitat Core Area. Select the option from the drop-down menu that represents the percent core area 2 miles of the AA:

    - <25%
    - 25-75%
    - >75%

Watershed Catchment Area

This section expands upon the landscape context by identifying the slope and position of the wetland within the catchment area. Information can be sourced entirely from desktop using EnviroAtlas. There are two dropdown menu questions. Additional instructions on this step are summarized in Appendix B3. Obtaining Catchment Area Characteristics.

19. **What is the slope across the catchment area?** Use the elevation tool in EnviroAtlas to draw a line from the topographic high to the topographic low of the catchment area. The change in elevation divided by distance then multiplied by 100 equals the percent slope. Select the option from the drop-down menu that represents the calculated slope:

    - 0-2%
    - 2-6%
    - >6%

20. **Is the AA situated in elevation closer to the HUC12 watershed's local high or the local low for topography?** *This question applies only to wetlands with Depressional and Organic or Mineral Flat HGM types only. Slope, Riverine, and Lacustrine Fringe HGM types are assumed to have relatively low local watershed positions.*

In EnviroAtlas: Create an elevation profile between the local elevation high (typically the HUC 12 boundary) and the local elevation low (typically the nearest down elevation lake, stream, or large wetland)

a. Use the Raindrop tool in EnviroAtlas to determine the general surficial drainage pathway from the AA to the local elevation low
b. Activate the Elevation Profile tool in EnviroAtlas (see below example)
c. Begin the profile at the HUC 12 boundary
d. Layout the profile to follow the general slope from the HUC 12 boundary through the AA and continue from the AA to the local elevation low
e. Find where the AA occurs on the elevation profile and categorize the local watershed position according to the following choices available in the dropdown menu:
    - Local high
    - Local low
    - In between the local high and local low
    - In a flat landscape without a local high or low

Hydrology

This section evaluates how water moves in, through, and out of the assessment area. Information will be sourced from field and desktop review. There is one manual entry and fourteen dropdown menu questions. Many of these questions will initially be grayed out and only become visible in the tool if they require answering based on prior answers to questions.

Users are advised to answer these questions using their best professional judgement about what the “normal” or most commonly occurring hydrologic conditions are. For example, the user should select from the water regimes that are likely occurring in non-flood and non-drought conditions by using a combination of the NWI codes found in EnviroAtlas or the NWI viewer and by what is observed in the field during the field visit component of the assessment.

21. **Determine the normal water regime(s) within the assessment area.** Based on NWI and field observations, enter the percent of the assessment area occupied by each of the water regimes listed below:

    - **Temporarily flooded (A)** – Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for most of the season.
    - **Seasonally saturated (B)** - The substrate is saturated at or near the surface for extended periods during the growing season, but unsaturated conditions prevail by the end of the season in most years. Surface water is typically absent but may occur for a few days after heavy rain and upland runoff.
    - **Seasonally flooded (C)** - Surface water is present for extended periods (generally for more than a month) during the growing season but is absent by

the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.

- **Continuously saturated (D)** - The substrate is saturated at or near the surface throughout the year in all, or most, years. Widespread surface inundation is rare, but water may be present in shallow depressions that intersect the groundwater table, particularly on a floating peat mat.
- **Seasonally saturated - Flooded (E)** - Surface water is present for extended periods (generally for more than a month) during the growing season but is absent by the end of the season in most years. When surface water is absent, the substrate typically remains saturated at or near the surface.
- **Semi-permanently flooded (F)** – Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.
- **Intermittently exposed (G)** - Water covers the substrate throughout the year except in years of extreme drought.
- **Permanently flooded (H)** - Water covers the substrate throughout the year in all years.

22. **Is the AA located in an area with notable groundwater use?**

a. **Minnesota Sites**: A Notable groundwater use area may be within a designated boundary that requires local groundwater use knowledge or may require aerial photo interpretation. If any of the following is true, select “Yes” for the question:

- AA is within a state or local government designated groundwater management or protection area.
- AA is within a municipality that withdraws groundwater for drinking water and/or industrial uses.
- AA is within a 2-mile radius of a center-pivot irrigation (based on aerial photo interpretation and using the measurement tool in EnviroAtlas).

If none of the above is true select “No” for the question.

b. **Wisconsin Sites**: Notable groundwater use is any high capacity well within a 2-mile radius from the center of the wetland AA. This should be determined using the Wisconsin Water Quantity Data Viewer at https://dnrmaps.wi.gov/H5/?viewer=Water_Use_Viewer.

- Turn on the “High Capacity Withdrawal Locations” layer and then turn OFF the “Surface Water Withdrawals” layer.
- Under the “Tools” tab, utilize the Buffer tool to buffer 2 miles from the center of the AA. In the buffer settings tab, User should change “Buffer Units” to “Miles” and “Buffer Distance” to “2”.
- Select “Point” under Buffer Tool and click near the center of the AA. The 2-mile radius will automatically generate.
- User should say “Yes” to question 22 if any high capacity well polygon overlaps with the 2-mile buffer.

23. **Are there springs or seeps in the AA?** Use desktop resources to determine if springs or seeps are mapped within 2 miles of the center of the AA. During the field surveys, the User should search for presence of springs or seeps within the AA. User selects either "Yes" or "No" from the dropdown menu based on information from the following resources:

    a. WI and MN both have maps available of known springs or seeps – if either of these mapping layers show mapping springs or seeps within the AA or within 2 miles of the center of the wetland AA, select "Yes".

        i. **Minnesota Sites**: Data sources to be determined.

        ii. **Wisconsin Sites**: Users should utilize the Wisconsin Water Quantity Data Viewer to answer this question. https://dnrmaps.wi.gov/H5/?viewer=Water_Use_Viewer.

            1. Turn on the "WGNHS Spring Monitoring" layer.
            2. Turn on the "Groundwater Protection Features" layer.
            3. Under the "Tools" tab, utilize the Buffer tool to buffer 2 miles from the center of the AA. In the buffer settings tab, User should change "Buffer Units" to "Miles" and "Buffer Distance" to "2".
            4. Select "Point" under Buffer Tool and click near the center of the AA. The 2-mile radius will automatically generate.
            5. User should say "Yes" to question 23 if any surveyed springs or groundwater protection features overlaps with the 2-mile buffer.

    b. During the Rapid FQA survey (see Question 39), assessors should look for active springs and pay attention to secondary indicators of groundwater discharge (see 23.d. below). If assessors have access to the contributing area and suspect these areas could have springs or seeps then these areas should be surveyed for springs and secondary indicators as well.

    c. If assessors have identified any of the following secondary indicators, they should select "yes" for this answer.

    d. Groundwater discharge secondary indicators:

        i. Abnormally cold water (especially observed during hottest summer months).
        ii. AA is located near a groundwater divide or headwater wetland.
        iii. Iron and marl deposits in AA soils.
        iv. Rainbow film on surface water that breaks apart (unlike an oily film, see Figure 3 below).

Figure 3. Photo showing rainbow sheen on the surface of groundwater-fed water. Note that the sheen can be broken apart unlike the sheen from oils. Photo credit: Sally Jarosz, WDNR.

v. Prevalence of any of the following groundwater indicator plants:

A. Skunk cabbage – *Symplocarpos foetidus.*
B. Marsh marigold – *Caltha palustris.*
C. Great angelica – *Angelica atropurpurea.*
D. Watercress – *Nasturtium officianale.*

24. **Does the AA have a surface water outlet to another waterbody?** Using desktop resources, determine if surface water flows out of the AA to another surface water body. If necessary, confirm surface water outlets in the field while completing rapid FQA sampling (see question 28). Select the option most representative of the AA:

- **No, isolated** – Wetland AA has no surface water connection to any other wetland or waterbody.
- **Yes, wetland** – Occurs when the AA is a portion of a larger contiguous wetland area or a series of interconnected depressional wetlands.
- **Yes, river, stream, or ditch** – A discrete stream or ditch outflows from the AA or bi-directional surface water flow with an adjacent stream or river.
- **Yes, lake** – Bi-directional surface water flow with an adjacent lake or reservoir.

In situations where the wetland AA is adjacent to a river/stream/ditch and a lake, the user should select the answer that corresponds to the HGM type selected in question 15 (e.g., if the user selected an HGM type of Riverine, then they would select “Yes, river, stream, or ditch” for question 24).

25. **What is the primary source of surface water input?** When characterizing surface water inputs consider size and slope of the catchment draining into the AA, any direct stream inputs or structures that may direct flow to the AA, and the surface water

interaction with adjacent wetlands, streams, and lakes. Select the option most representative of the AA:

- Overland flow from surrounding upland/wetland.
- Flooding from stream or lake.
- Stream input (e.g., a stream into a depressional basin).
- Directed input from constructed conveyances (e.g., ditches, human-made swales, overflows from stormwater ponds, tile outlets).

26. **Characterize predominant water flow through the AA:** Consider whether there are conveyances (natural or artificial) or open water conditions within the AA that do not slow surface water flow.

    - Natural overland flow across the soil surface. There are no constructed channels, ditches, or streams that significantly facilitate flow.
    - Natural flow through persistent, standing open water.
    - Natural channels or streams facilitate flow.
    - Constructed ditches, channels, or straightened streams facilitate flow.

27. **Characterize the density of live or dead, rooted vegetation material intercepting water flowing through the wetland**: Persistent, erect stems are those that stand vertically on their own in the absence of standing water and are evident throughout the year (excludes annual crops and other vegetation that is periodically harvested or removed). Consider the normal vegetative condition of the wetland during a normal growing season.

    Vegetation that should be considered here includes living plants and plants that are senesced but still rooted/connected (e.g., last year's sedge leaves that are still attached – see below). Vegetation that should NOT be included in the density assessment would include fallen leaves (no longer attached to the tree) or dislodged leaves (e.g., cattail thatch that is no longer attached).

    Select the appropriate response from the following drop-down menu options:

    - High stem density, stems occupy >75% of the soil surface.
    - Moderate stem density, stems occupy 50-75% of the soil surface.
    - Low stem density, stems occupy <50% of the soil surface.

Figure 4. Photo showing both living and dead vegetation that are both rooted/connected. Both the living and dead sedge leaves in this photo should be counted in the stem density. Photo credit: Sally Jarosz, WDNR.

28. **Characterize the surface water outflow from the AA:** Consider the amount of water that would move through the AA during precipitation events or seasonally high surface water flows. Then consider how restricting the outflow would be.

    - **Surface water outlet is highly restricted** – Water flow is pinched/artificially narrowed at the outlet or overflows upland/artificial structures during extreme flow events. Examples would be naturally pinched outflows, undersized culverts, perched culverts, natural/artificial berms where outlet elevation is well above normal AA surface water level. Often see marks of inundation several feet above elevation of the outlet.
    - **Surface water outlet is moderately restricted** – Water flow at the AA outlet is restricted intermittently/seasonally from natural/low-head artificial berms that are over-topped during rain events, beaver dams, or artificial berms with frequent/appropriately sized culverts.
    - **No constriction of outflowing surface water** – AA is adjacent to the receiving waterbodies where water can flow freely between the AA and the water body. Examples include return flow to adjacent streams/lakes, headwater streams, and saturation overland flow to adjacent wetland.
    - **Surface water leaving the AA is expedited via ditching** – Water that flows through the wetland AA is primarily routed through artificially created ditches or swales.

29. **What is the stream order of the receiving waterbody?** *This question applies only if question 24 is answered as "Yes, river, stream, or ditch".* Use EnviroAtlas **NHD Plus V2 tool** to identify the stream order of the receiving waterbody and select the appropriate order from the following drop-down menu options.

    In EnviroAtlas, open the "Hydrologic Features" layer menu and check the box next to "NHD Plus V2 features". Then click on the receiving waterbody and an info box will pop up that will list the stream order. The higher order the stream, the larger the river (e.g., the Mississippi River near La Crosse, WI is an 8th order stream).

    - 1st or 2nd order
    - 3rd order
    - 4th order or greater

    If the stream or ditch is not mapped in NHD, consider the feature as a 1st order stream in this assessment.

30. **What percentage area of the active shoreline is bare ground?** For the purposes of this question, the active shoreline (aka "bank") should be the less of the following two criteria: roughly 75' landward of the edge of the water (roughly uphill from the ordinary high water mark line) or until the shoreline experiences a topographic break. For example, if the waterway has a berm running parallel to the river, and the top of a berm is 15 feet landward from the water's edge, then the active shoreline would be 15 feet from the water to the top of the berm. Estimate the extent of bare ground on the active shoreline. For this answer, the User should be looking for unvegetated, bare soil (see Figure 5 below for example photo). Natural rock shorelines or artificially placed riprap is less susceptible to erosion and therefore falls into the lowest category with less than 30% of the shoreline having bare soil. See Appendix F. Graphic for Estimating Percentage Cover. Select the appropriate response from the following drop-down menu options:

    - <30% or hard armored
    - 30-59%
    - 60-90%
    - >90%

31. **Describe the slope in degrees of the immediate shoreline at the intersection of the wetland complex and the receiving waterbody**: See Appendix G. Graphic for Angle Estimation and the photo below in Figure 5 for reference. Select the appropriate response from the following drop-down menu options:

    - 0-20
    - 21-60
    - 61-80
    - 81-90
    - >90

Figure 5. View of an active shoreline along the Black River. Note the unvegetated, bare ground along the shoreline (~75% unvegetated) and the moderate slope (~30%) of the shoreline leading down to the river. Photo credit: Sally Jarosz, WDNR.

32. **Enter the approximate size of the connected receiving lake or wetland in acres**: *This question applies only if question 24 is answered as "Yes, wetland" OR "Yes, lake".* Use Summarize my Area Tool in EnviroAtlas (see Appendix B4. Summarize My Area Tool) to estimate lake or wetland size in acres. Enter the measured area in acres.

33. **If the AA outlets to a lake or wetland, what is the ratio of the area of the AA to the area of the receiving lake or wetland?** *This is calculated (AA area divided by the receiving lake or wetland area) and scored automatically in the tool. See the Hydro tab for scoring criteria; Users do not need to manually enter anything for this question.*

34. **For a Riverine HGM wetland, what is the dominant floodplain vegetation and woody debris?** *This question applies only if the HGM class (question 15) is answered as "Riverine-Upper Perennial or "Riverine-Lower Perennial".* Select the most appropriate response based on field observations.

    - Emergent
    - Tall shrub
    - Spaced trees, open understory, large woody debris
    - Mature trees, shrub understory, large woody debris

35. **For a Riverine HGM wetland, is any portion of the AA located in a mapped floodplain?** *This question applies only if the HGM class (question 15) is answered as*

"Riverine-Upper Perennial or "Riverine-Lower Perennial". Use EnviroAtlas Estimated Floodplains layer to determine whether any of the AA is within the floodplain; this layer can be found under the "Wetlands and Lowlands" layer menu. User selects either "Yes" or "No" from the dropdown menu provided.

36. **Use the NRCS Web Soil Survey to determine the average organic matter (OM) content of the upper soils surface within the AA.**

- For AAs with fully mapped soil survey data available:
    - Delineate the AA in the Web Soil Survey using the Area of Interest (AOI) tool
    - Select the Soil Data Explorer tab
    - Select the Soil Properties and Qualities tab
    - Under the Properties and Qualities Rating menu select the Soil Physical Properties menu item
    - Expand the Organic Matter menu item
    - Select the Depth Range Layer option and enter 0 for the top depth and 18 for the bottom depth and select inches as the unit
    - Select View Rating
    - Enter the map unit, the ratings (percent organic matter), and percent of the AOI into the tool
    - Do not enter any mapped soil units less than 1% of the AOI
    - See instructions and screenshots in Appendix E. NRCS Web Soil Survey.

- For AAs that lack complete organic matter soil information in the Web Soil Survey:
    - In the field, excavate/auger a test hole in a representative area within each designated water regime to a depth of 18"
    - List each water regime in the AA as a map unit in question 37 with an estimated percent extent of the AA
    - Determine the cumulative thickness (in inches) of any organic (i.e., Peat, Mucky Peat, Muck) or mucky modified (Mucky-Loamy, Mucky-Sandy) soil layers within the top 18" of soil for each unit
    - Enter one of the following Organic Matter Ratings into the tool for each map unit based on the following cumulative organic/mucky modified thickness:
        - < 6" enter 5 for the Organic Matter Rating
        - 6 – 12" enter 20 for the Organic Matter Rating
        - >12" enter 50 for the Organic Matter Rating

37. **Use the NRCS Web Soil Survey to determine the predominant soil texture within the AA within the top 18".**

- For AAs with fully mapped soil survey data available:
    - For each mapped soil unit in the AA choose one of the following generalized texture classes that most closely corresponds to the texture class provided in the typical profile description from the Web Soil Survey
        - Peat
        - Mucky Peat
        - Muck

    - Mucky-Sandy
    - Mucky-Loamy
    - Loamy/Clayey
    - Sandy
  - If more than one horizon or texture class typically occurs within the top 18" enter the predominant texture class that is expected to occur.
  - Do not enter any mapped soil units less than 1% of the AA
  - See instructions and screenshots in Appendix E. NRCS Web Soil Survey.

- For AAs that lack complete texture information in the Web Soil Survey:
  - In the field, excavate/auger a test hole in a representative area within each designated water regime to a depth of 18"
  - List each water regime in the AA as a map unit in question 38 with an estimated percent extent of the AA
- Make a field soil texture determination according to the generalized texture classes listed above of the predominant soil texture and record the value in the tool.

Vegetation

This section looks at the quality and diversity of vegetation in the AA. Information can be sourced from field assessment. There is one manual entry, four drop down menu questions, and one auto-populated question.

38. **Estimate percentage cover of each Cowardin plant class.** Map the areal extent of each Cowardin plant class in the AA and enter the percent of the AA occupied by each class. Percentages for all classes should total 100%. See Appendix F. Graphic for Estimating Percentage Cover. Wetland classes are defined as:
    a. **Forested** – consists of the canopy of woody plants (rooted in the wetland) that are over 6m (20 ft.) tall and cover at least 30% of the ground.
    b. **Scrub/shrub** – consists of woody plants less than 6m (20 ft.) tall that are the top layer of plants and cover at least 30% of the ground.
    c. **Emergent** – consists of erect, rooted herbaceous wetland plants where, in the absence of surface water, cover at least 30% of the ground.
    d. **Aquatic bed or unconsolidated bottom**: where water (with no vegetation at or above the surface) occupies at least 30% of the surface of the water.
    e. **Moss-lichen**: consists of areas where mosses or lichens cover at least 30% of the ground.

39. **What is the floristic quality condition category of the assessment area?** Assess the wetland using the rapid FQA methodology for Minnesota or Wisconsin (Minnesota Rapid FQA, WI Rapid FQA User Guide, WI Rapid FQA field form) as applicable. While completing the Rapid FQA, Users should also be observing the AA for springs and seeps (see Question 23). Select the appropriate response from the following drop-down menu options:23). Select the appropriate response from the following drop-down menu options:
    - Exceptional
    - Good ("High" for WI Rapid FQA)

- Fair (“Medium” for WI Rapid FQA)
- Poor (“Low” for WI Rapid FQA)
- Absent

Descriptions for the floristic quality condition categories in Minnesota and Wisconsin differ slightly. Users should refer to the terms included in the applicable state rapid FQA for categories identified in their assessment.

40. **Estimate the average level of interspersion of plant communities** across the entire AA according to the illustrations in Figure 6. Select the appropriate response from the following drop-down menu options:

    - High
    - Moderate
    - Low

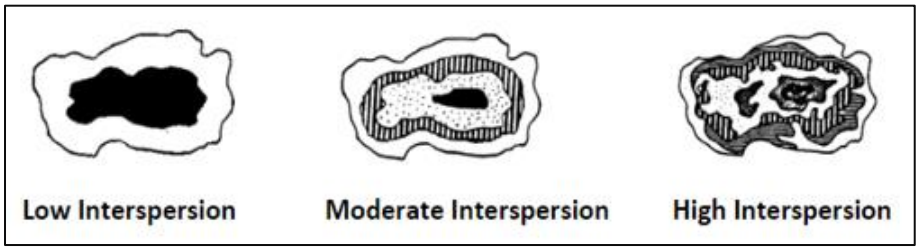


Figure 6. Conceptual diagram of qualitative degrees of interspersion

41. **Assess the presence of standing or downed dead trees that could provide habitat niches.** Estimate the percentage of the AA with standing dead and/or downed trees. See Appendix F. Graphic for Estimating Percentage Cover. Select the appropriate response from the following drop-down menu options:

    - <1%
    - 1-10%
    - >10%

42. **If present, what is the percent cover of sphagnum in the AA?** See Appendix F. Graphic for Estimating Percentage Cover. Select the appropriate response from the following drop-down menu options:

    - <50%
    - 50-75%
    - >75%

Fish Habitat

This section looks at the presence of habitats for aquatic species. Information can be sourced using field observation or desktop review. There are four dropdown menu questions.

43. **Does the AA have a permanent, semi-permanent, or seasonal surface water connection to a lake or perennial stream reach?** User selects either "Yes" or "No" from the dropdown menu provided.

44. **For all areas of permanently, semi-permanently, and seasonally flooded water regimes, enter the percent total of those areas that are unvegetated (or open water lacking emergent/submergent vegetation).** See Appendix F. Graphic for Estimating Percentage Cover. Select the appropriate response from the following drop-down menu options:

    - <20%
    - 20-50%
    - >50%

45. **Estimate the percent of permanently, semi-permanently, or seasonally flooded water regimes that have live or dead woody debris:** See Appendix F. Graphic for Estimating Percentage Cover. Select the appropriate response from the following drop-down menu options:

    - <20%
    - 20-50%
    - >50%

46. **Estimate the level of aquatic barriers to fish movement:** See Appendix C. Types of Aquatic Barriers to Fish Movement (adapted from The Wildlife Migration Initiative) for reference. Select the appropriate response from the following drop-down menu options:

    - No barriers
    - Some barriers but movement possible
    - Significant barriers

Cultural, Historic, Commercial, Recreational Values

This section looks at the anthropogenic functions and values of the AA. Information should be sourced from field observation and desktop review. There are twelve dropdown entry questions. All questions require responding either "Yes" or "No" from the dropdown menus provided.

47. **Is any portion of the AA part of an identified historic, archaeological or culturally important resource or property?** Cultural values relate to whether the assessment area is or contains an archaeological, historically significant resource or culturally valuable/significant resource. A wetland is considered to have cultural value if it is, or abuts, a historic, archaeological, or culturally important resource to a certain cultural group or groups. The assessment area's importance to indigenous people is a consideration of this function. Due to limited access to cultural, historic, and archaeological information, this functional category's rating is subject to change based upon a state, tribal, or federal historic/archaeological review. Reviewers should use the best available information that allows them to complete this portion of the assessment in a reasonable amount of time. If the reviewer does not have access to archaeological, historic, or tribal records, they may rate this function based upon the best, readily

available information. User selects either “Yes” or “No” from the dropdown menu provided.

48. **Is any portion of the AA part of an identified public recreational/use area (e.g., park, wildlife management area, public access land, state forest land, etc.)?** Public recreation relates to whether the public is able to use the wetland for wetland dependent recreation opportunities such as hunting, trapping, fishing, bird watching, boating, or general wildlife/nature viewing. This assessment assumes that wetlands under private ownership are not accessible for general public recreational uses unless public access has overtly been provided. Access to the general public means that a person does not need to ask permission of a landowner for access. User selects either “Yes” or “No” from the dropdown menu provided.

49. **Is any portion of the AA part of an identified educational or scientific research property (e.g., school property, college campus, nature center, research station, scientific natural area, etc.)?** Designated for education means that infrastructure is present that allows users of all abilities to access and learn about the assessment area (e.g., safe access points, ADA compatible trails, interpretive signage, etc.). Designated for scientific use means that infrastructure is present that indicates the assessment area is currently being used for scientific purposes (e.g., signage, monitoring wells, etc.). User selects either “Yes” or “No” from the dropdown menu provided.

50. **Is the wetland located in a disadvantaged community as mapped by the Climate and Environmental Justice Environmental Screening Tool?** The Climate & Economic Justice Screening Tool (geoplatform.gov) highlights census tracts indicated as disadvantaged for being either overburdened and underserved in relation to the community’s relation to others in instances of climate change, health, energy, housing, legacy pollution, transportation, water, wastewater, and workforce development factors. See Appendix D. CEJST Instructions. User selects either “Yes” or “No” from the dropdown menu provided.

    For Questions 51 and 52, public recreation relates to whether the public is able to use the wetland for wetland dependent recreation opportunities such as hunting, trapping, fishing, bird watching, boating or general wildlife/nature viewing. A wetland rated as “high public recreation value” is assumed to be specifically managed for wetland dependent recreation, have infrastructure that supports wetland dependent public recreation, and/or is located within a typical travel distance for the casual recreation user. This assessment assumes that wetlands under private ownership are not accessible for general public recreational uses unless public access has specifically been provided.

51. **Does any portion of the AA contain or is a part of an area that contains public recreation-oriented infrastructure such as designated parking lot/area, signage (interpretative, trail map, etc.), constructed trails, boardwalks, or other infrastructure that supports and facilitates public recreation use?** User selects either “Yes” or “No” from the dropdown menu provided.

52. **Is a significant portion of the AA viewable by the public from a public road, trail, stream, lake, etc.?** User selects either “Yes” or “No” from the dropdown menu provided.

    For Questions 53 and 54, Natural and scenic beauty relates to whether the assessment area can be practically viewed from publicly accessible areas, and the condition of its viewshed. A wetland rated as “good” for natural and scenic beauty can be viewed from areas accessible to the general public, offers a viewshed that is free from visual/olfactory/auditory pollution, and that is designated as a viewing area via signage and or infrastructure. Accessible to the general public means that a person does not need to ask permission of a landowner to view the wetland. Designated as a public viewing area means viewing infrastructure, such as signage, viewing platforms, or similar structures have been established to promote a wetland’s viewing opportunities.

53. **Is the public viewable portion of the AA free of structures, trash, debris, and other materials that detract from the natural character of the wetland?** User selects either “Yes” or “No” from the dropdown menu provided.

54. **Are there viewing platforms, benches, and/or other infrastructure accessible to the public that promote viewing some or all of the AA?** User selects either “Yes” or “No” from the dropdown menu provided.

    For Questions 55 through 58, a “wetland-dependent commercial use” refers to whether a wetland or a portion of a wetland is used for the production of wetland dependent products. Wetland dependent means that the location of the activity in a wetland is essential to producing the commercial product. Examples of wetland dependent commercial uses include but are not limited to wild rice production, horticultural peat mining, and certain types of aquaculture. Wetland dependent commercial uses do not include uses that require the conversion to non-wetland or uses that can and are preferably conducted in non-wetlands (e.g., row crop corn and soybean production).

55. **Is any portion of the AA used for a wetland-dependent commercial activity?** User selects either “Yes” or “No” from the dropdown menu provided.

56. **Is the AA within one mile of a wetland-dependent commercial activity?** User selects either “Yes” or “No” from the dropdown menu provided.

57. **Is any portion of the AA owned by an entity that operates a wetland-dependent commercial activity in the area?** User selects either “Yes” or “No” from the dropdown menu provided.

58. **Does the AA have similar characteristics (landscape setting, hydrology, vegetative structure, soils, etc.) as other wetlands being used for wetland-dependent commercial activities in the immediate area?** See commercial use description and rationale provided prior to question 55 above. User selects either “Yes” or “No” from the dropdown menu provided.

Works Cited

TBD – see draft Science Support document.

Appendices

A. Wetland Hydrogeomorphic (HGM) Determination Key

Wetland hydrogeomorphic (HGM) classification incorporates geomorphic setting, predominant water source, and hydrodynamics into a single system to provide a framework to assess wetland hydrology and water quality functions.

Use the following HGM key to determine the appropriate HGM class for the sample-site. Start with couplet #1 and choose the option which best applies to the sample-site and proceed through subsequent couplets until a HGM class is identified.

The key was adapted from the original HGM class definitions (Smith et al. 1995) and the US EPA NWCA key (2021) with refinements from MN wetland hydrology classes (Novitzki 1998). It incorporates the following wetland features that were not specifically addressed in previous keys:

- Floating mat wetlands
- Wetlands within depressional basins where vertical peat accumulation is a predominant process (i.e., Organic Soil Flat)
- Topographically flat wetlands where groundwater is the predominant source (i.e., Slope – Groundwater)
- Topographically sloped wetlands where surface water is the predominant source (i.e., Slope – Surface Water)
- Saturated soil wetland that is contiguous with streams or lakes that are not floating and are largely above bi-directional flow influence from the stream or lake (i.e., flat or slope)

The HGM classes (all capitals) and sub-classes recognized here are as follows:

- RIVERINE – Upper Perennial
- RIVERINE – Lower Perennial
- LACUSTRINE FRINGE
- DEPRESSIONAL
- DEPRESSIONAL – Floodplain
- ORGANIC SOIL FLAT
- MINERAL SOIL FLAT
- SLOPE – Groundwater
- SLOPE – Surface Water

Key to the Hydrogeomorphic (HGM) Classes

1. Wetland is associated with a perennially flowing stream, floodplain, OR fringing a lake or reservoir. **2**

    2. Wetland is associated with a perennially flowing stream or floodplain..... **3**

        3. Stream is designated 1st or 2nd order in the National Hydrography Dataset (NHD).. **4**

            4. Regular overbank flooding occurs (e.g., there is an apparent change in water regime or vegetation close to the channel compared to broader contiguous wetland).....**RIVERINE – Upper Perennial**

4. Regular overbank flooding typically *does not* occur (e.g., no apparent change in water regime or vegetation in broader contiguous wetland). **7**

3. Stream is designated 3rd order or higher in NHD and regular overbank flooding occurs. **5**

5. Wetland lacks a closed topographic contour to retain water following overbank flooding conditions (i.e., the wetland is the floodplain) ..... **RIVERINE – Lower Perennial**

5. Wetland has a closed topographic contour such that floodwater is retained relative to the adjacent floodplain wetland following overbank flooding conditions (i.e., a depression within a broader floodplain) ..**DEPRESSIONAL – Floodplain**

2. Wetland is fringing a lake or reservoir (e.g., named lake in Public Water Inventory, has Limnetic NWI subsystem polygons in the continuous basin) **..... 6**

6. Lake water elevation maintains wetland hydrology – surface water flows bi-directionally between the wetland and lake (wetlands with A, C, or F water regimes[1]) AND/OR the wetland consists of a floating mat (with a C or D water regime). ..... **LACUSTRINE FRINGE**

6. Wetland elevation above typical high water lake elevation and not consisting of a floating mat (typically wetlands with a D water regime that are not floating) **..... 7**

1. Wetland is not associated with a perennially flowing stream channel, floodplain, or fringing a designated lake. **7**

7. Wetland is within a closed elevation contour that allows for water accumulation (i.e., a depressional basin, includes beaver and manmade impoundments and excavations) **. 8**

8. Wetland has a predominantly D water regime, is not floating, AND vertical accretion of peat has produced a flat surface. .....**ORGANIC SOIL FLAT**

8. Wetland has any other predominant water regime or has a D water regime, consists of a floating mat, and does not have significant vertical accretion of peat. ..... **DEPRESSIONAL**

7. Wetland is not within a closed elevation contour. **9**

9. Wetland is on a topographic slope (e.g., > 1% percent slope)..... **10**

10. Groundwater is the primary water source (e.g., histic epipedon/histosol, groundwater indicator species). ..... **SLOPE – Groundwater**

10. Precipitation is the primary water source (e.g., groundwater indicator species not prevalent)..... **SLOPE – Surface Water**

9. Wetland is topographically flat (e.g., < 1% slope).....**11**

11. Wetland has predominantly mineral soil (if organic surface layer present, < 20 cm in depth)..... **MINERAL SOIL FLAT**

11. Wetland has predominantly organic soil (an organic surface layer ≥ 20 cm present[2]). **12**

12. Precipitation is the primary water source. .....**ORGANIC SOIL FLAT**

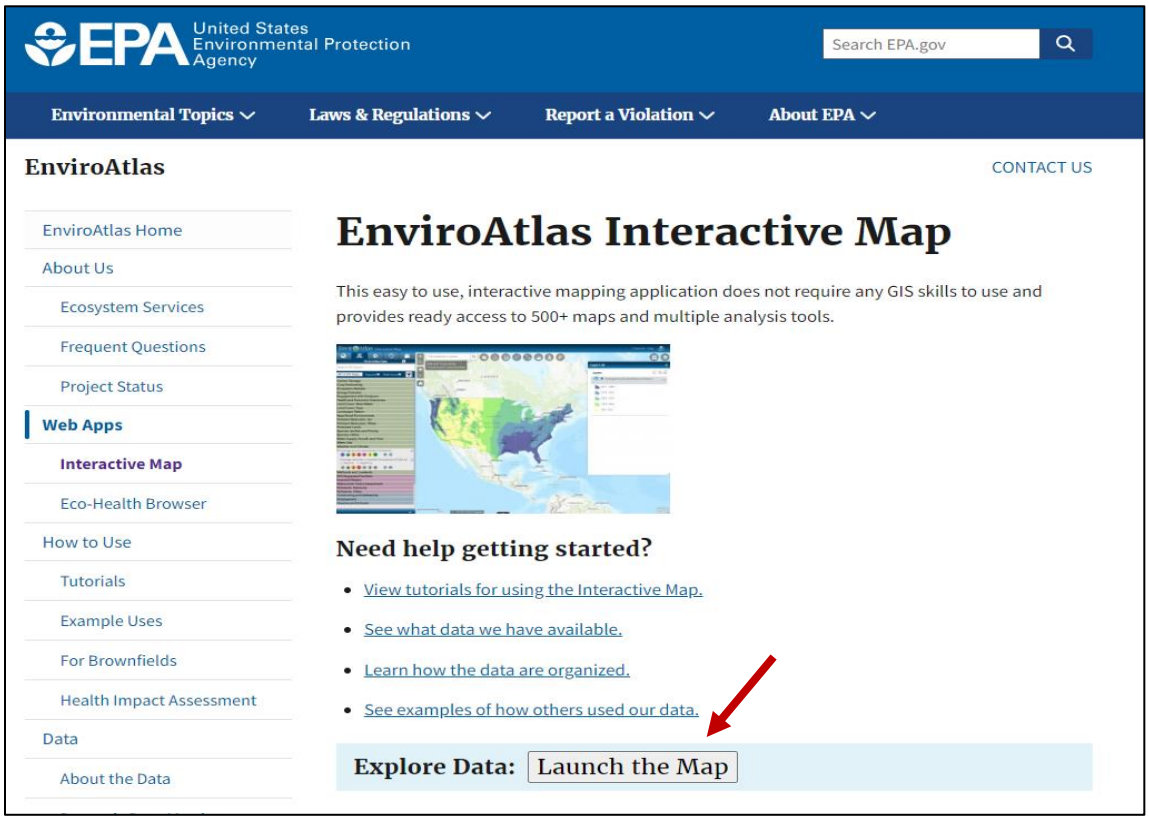
12. Groundwater is the primary water source (e.g., groundwater indicator spp. present)..... **SLOPE – Groundwater**

B. EnviroAtlas Instructions

B1. Determining the Catchment Area

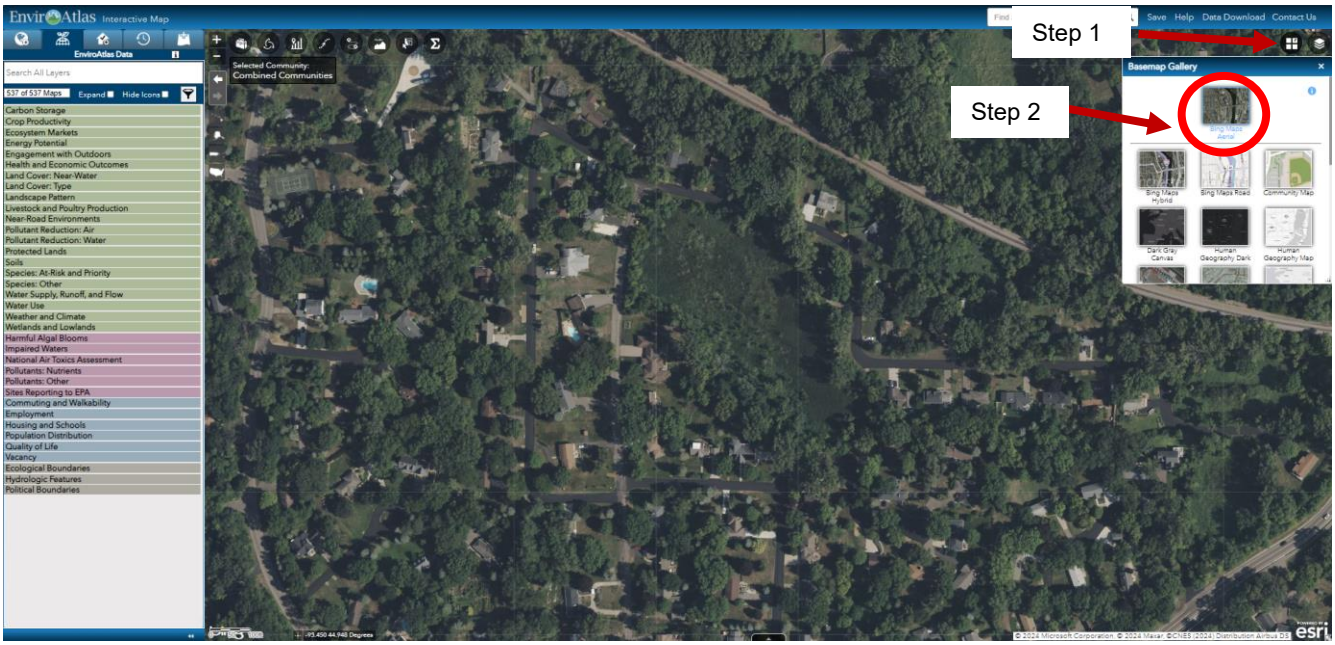
Launch *EnviroAtlas Map* (Figure A).

FIGURE A



Zoom to AA, select the *Basemap Gallery* icon (step 1) and then select an appropriate basemap (e.g., aerial imagery) (step 2) (Figure B).

FIGURE B

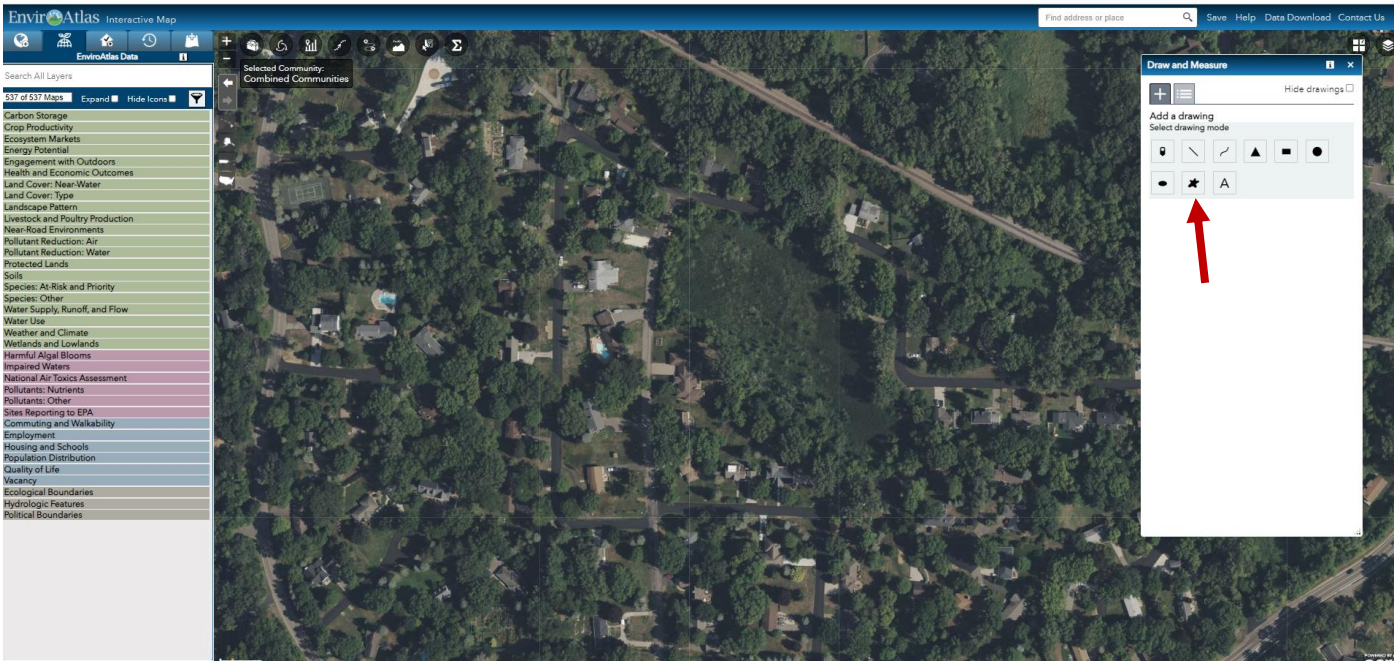


Create polygon around the AA by selecting *Mapping Tools* icon (step 1) and then selecting *Draw and Measure* (step 2) (Figure C).

FIGURE C

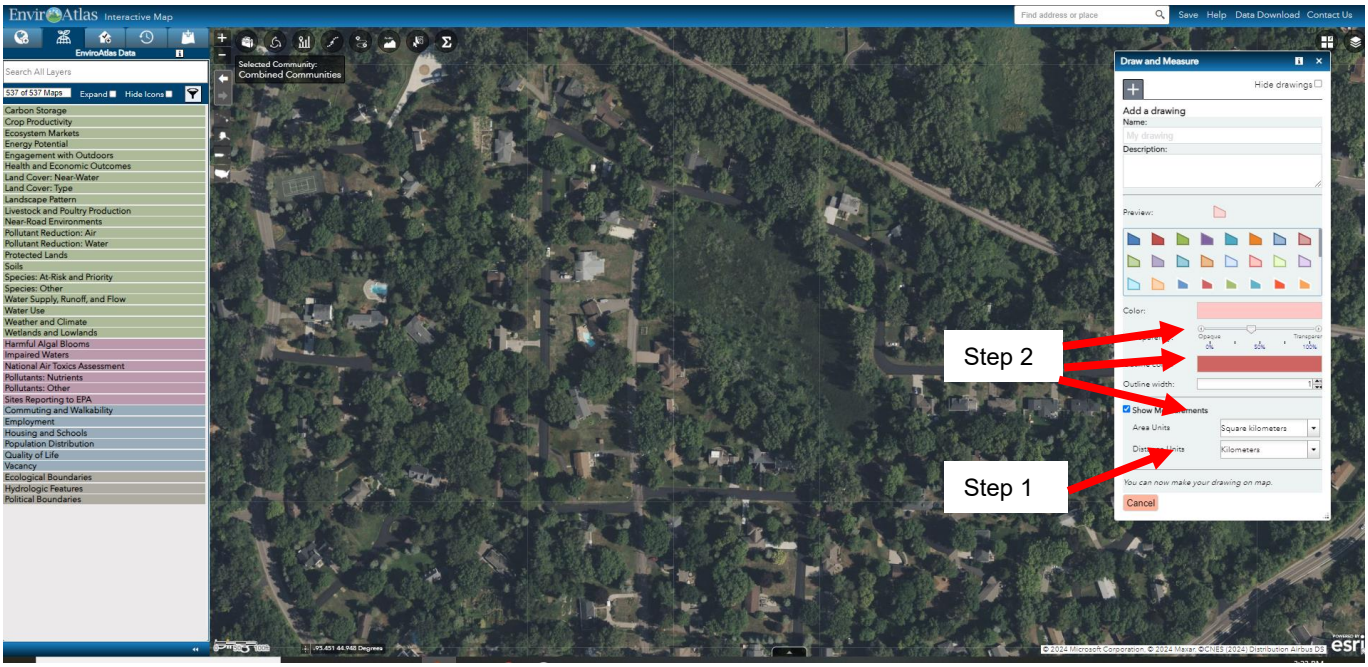
In *Add a drawing* select the *Freehand Polygon* icon (Figure D).

FIGURE D



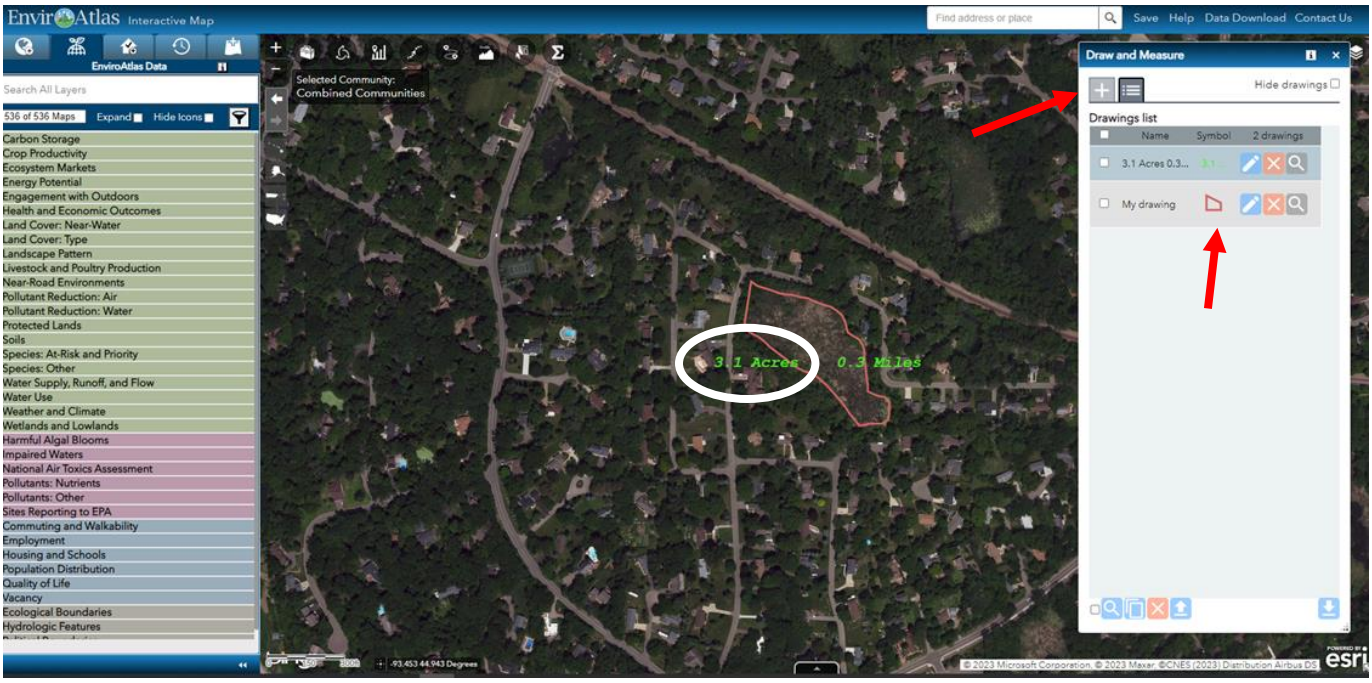
On the popup screen make sure the *Show Measurements* box is checked and select Acres for *Area Units* (step 1). Adjust the *Transparency* bar, *Outline width*, and *Outline color* as necessary (step 2) (Figure E).

FIGURE E



Draw the boundary of the AA with your mouse. Note that you may have to make several attempts to get used to using the freeform drawing tool. Simply delete failed attempts by clicking on the X beside the drawing and then clicking the + to start over. Enter the resulting AA acreage in Q12 (Figure F).

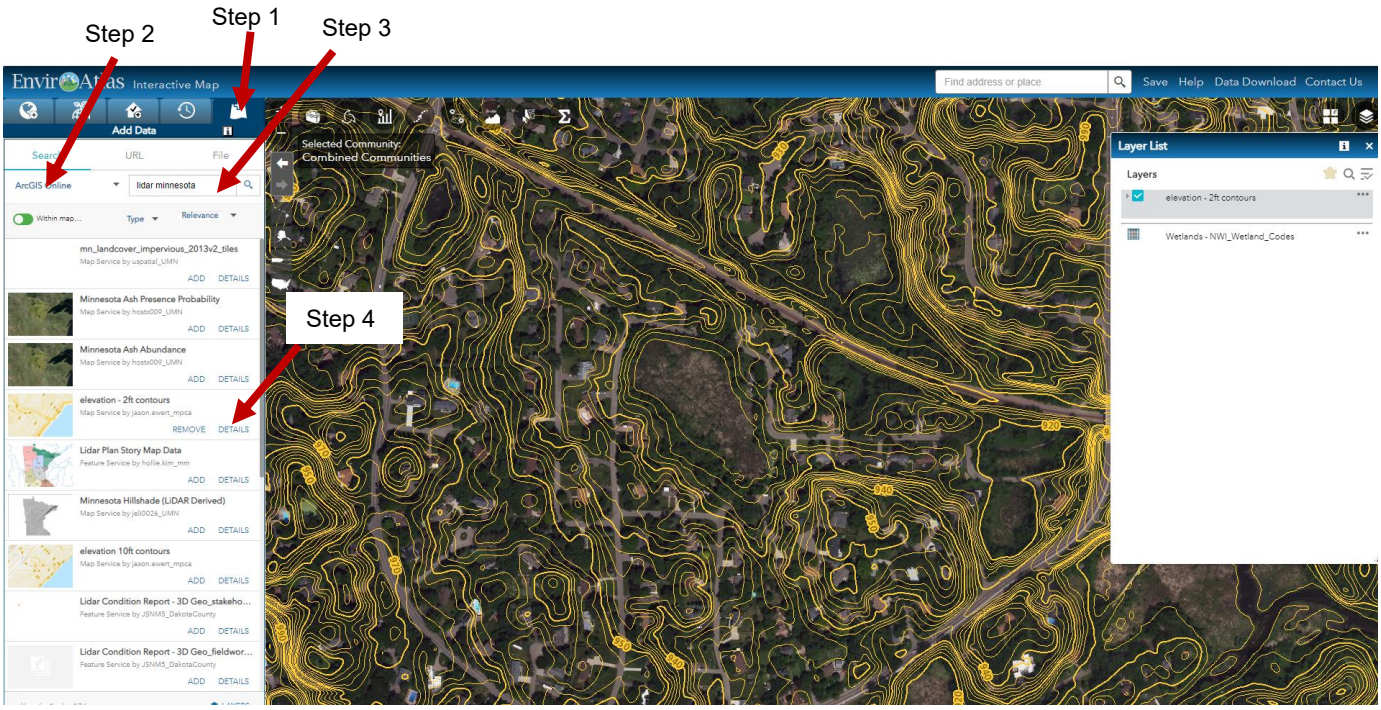
FIGURE F



B2. Delineate and determine the size of the catchment area

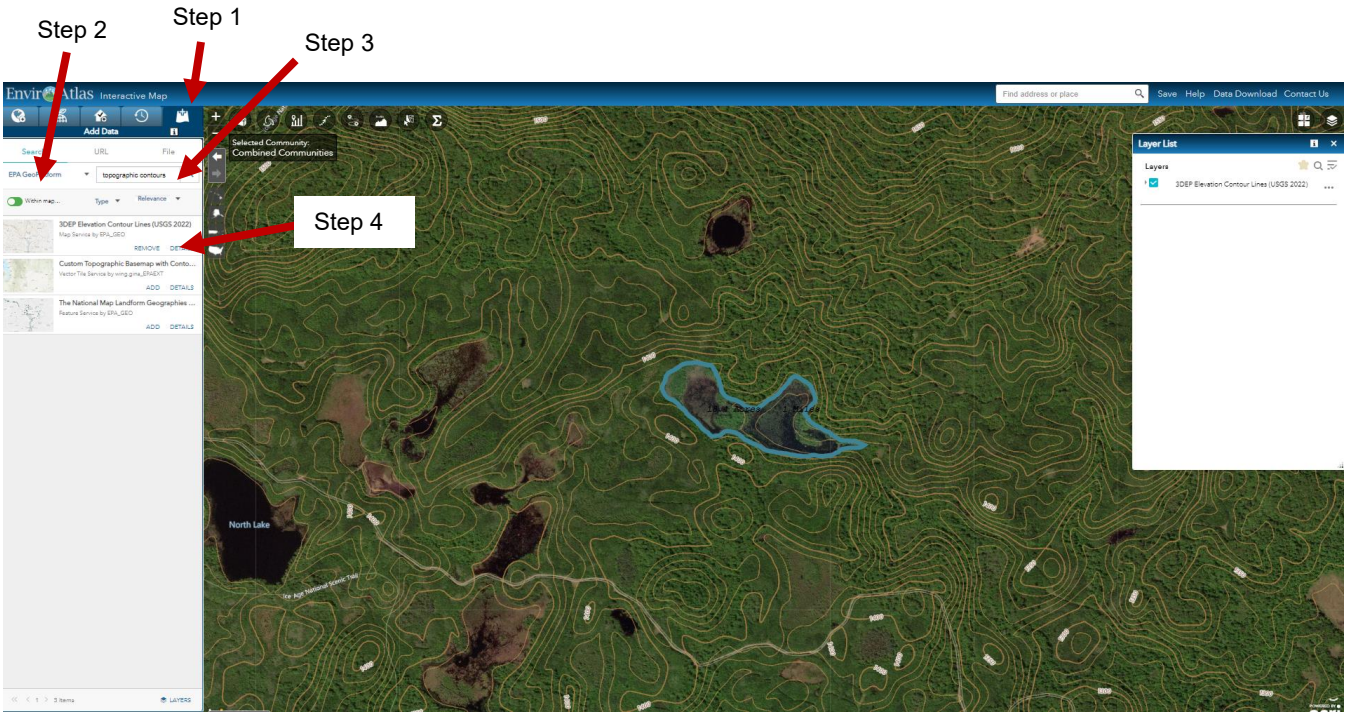
Select an appropriate basemap (e.g., aerial imagery) and zoom to AA. Select *Add Data* (step 1), then select *ArcGIS Online* from the dropdown menu (step 2), search for *lidar minnesota* (step 3), and then add *elevation - 2ft contours* (step 4) (Figure G). This lidar coverage is only available for some portions of Minnesota. For areas where it is not available, See Figure H and follow the associated steps below.

FIGURE G (Minnesota 2-foot Lidar available)



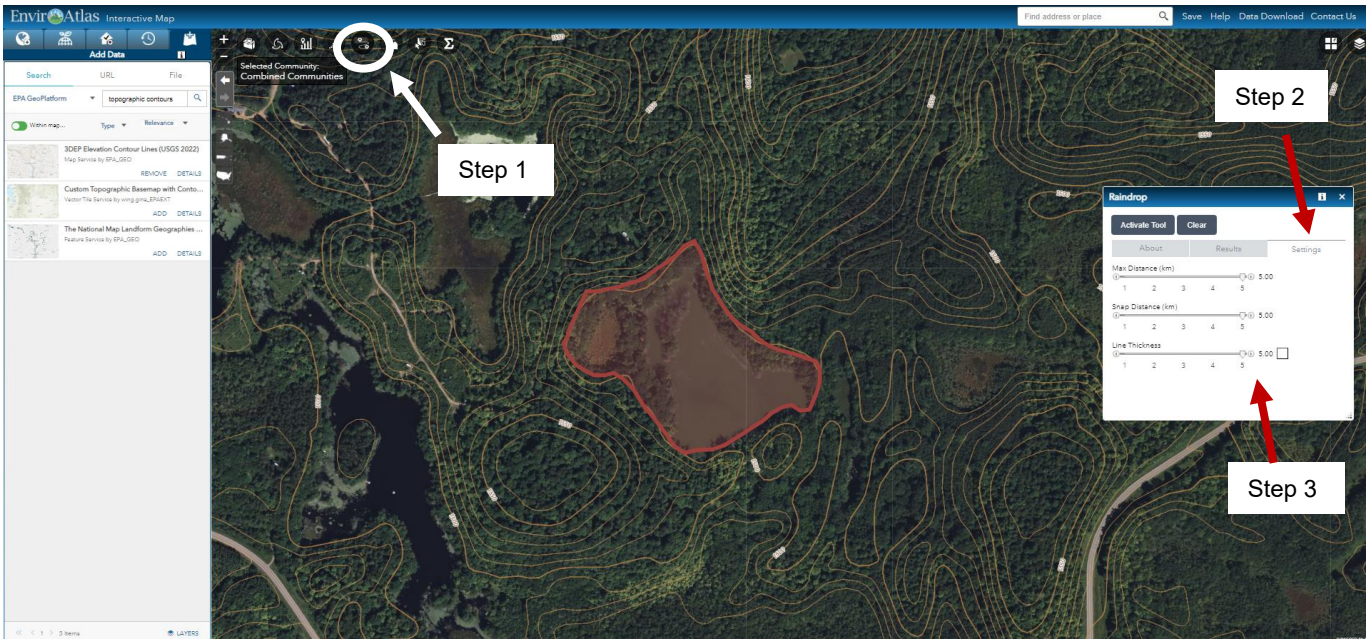
Select *Add Data* (step 1), then select *EPA GepPlatform* from the dropdown menu (step 2), search for *topographic contours* (step 3), and then add *3DEP Elevation Contour Lines (USGS 2022)* (step 4) (Figure H).

FIGURE H (Minnesota 2-foot Lidar not available)



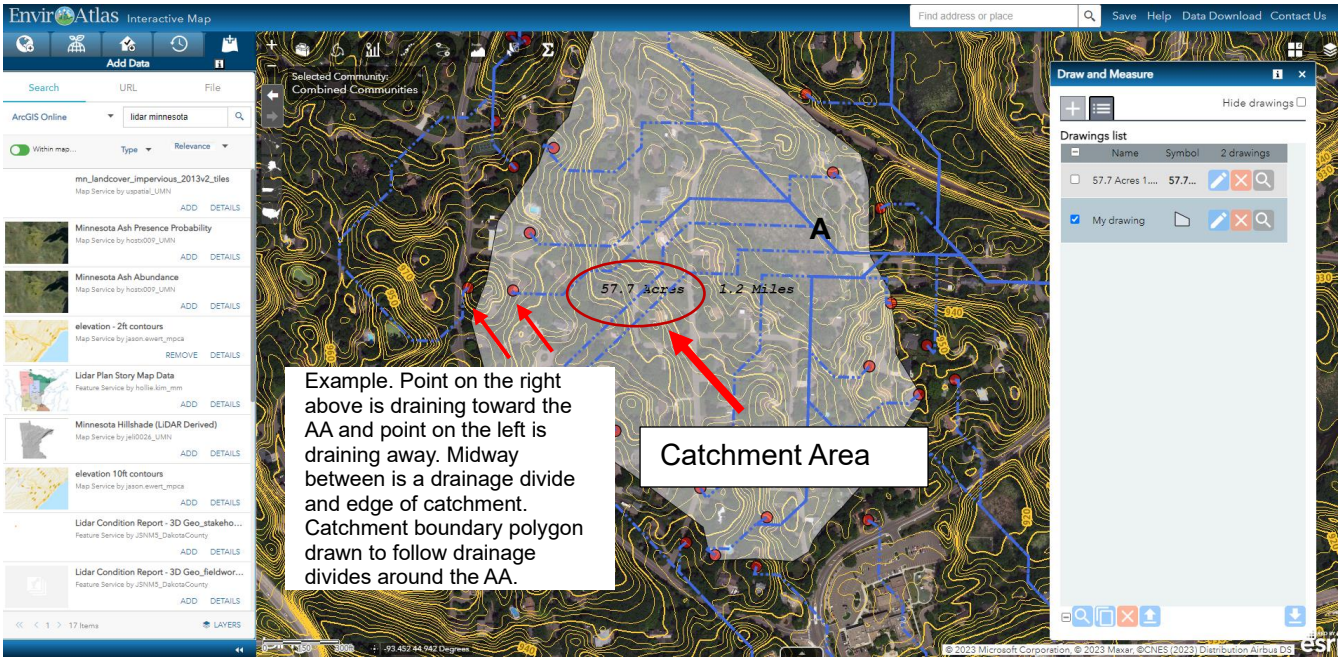
After establishing the basemap with elevation contours per either Figure A or B above, select the *Raindrop Tool* (step 1). On the pop-up window select *Settings* (step 2) and increase line thickness to maximum and adjust color for best visibility on basemap (step 3). Then select Activate Tool (step 4) (Figure I).

FIGURE I



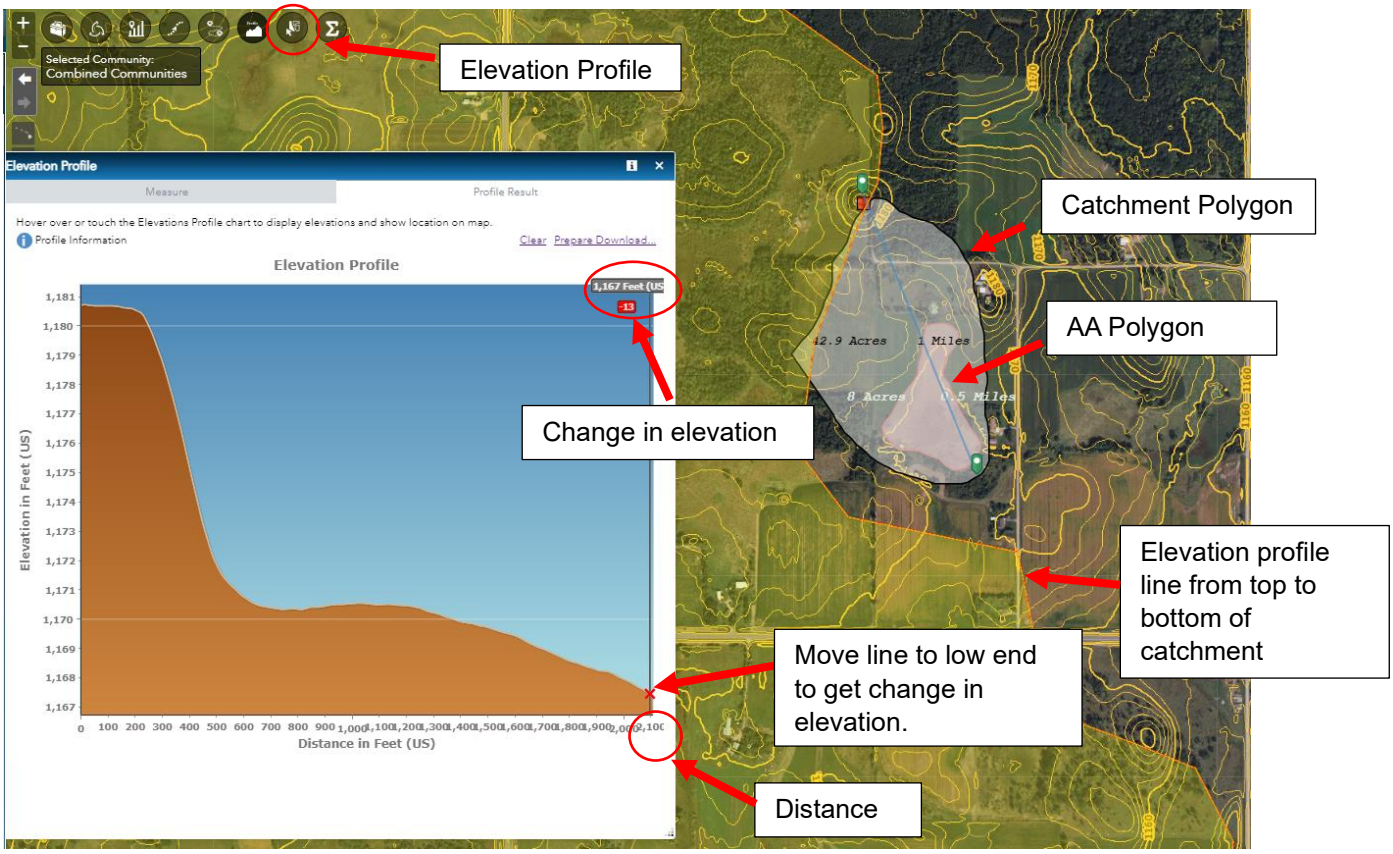
Using elevation contours as a guide, select points of higher elevation around AA to determine which areas drain into or through the AA. Use contours and drainage direction indicators from Raindrop Tool to roughly determine catchment area of AA. Create polygon around catchment area of AA by following the same steps illustrated in Figures C, D, E, and F. Enter the catchment area acreage in Q13 (Figure J).

FIGURE J



B3. Obtaining Catchment Area Characteristics in EnviroAtlas

After defining catchment area using raindrop tool and 2-foot lidar contours (see defining catchment guidance), use the *Elevation Profile* tool to determine the slope of the catchment.



Catchment Slope

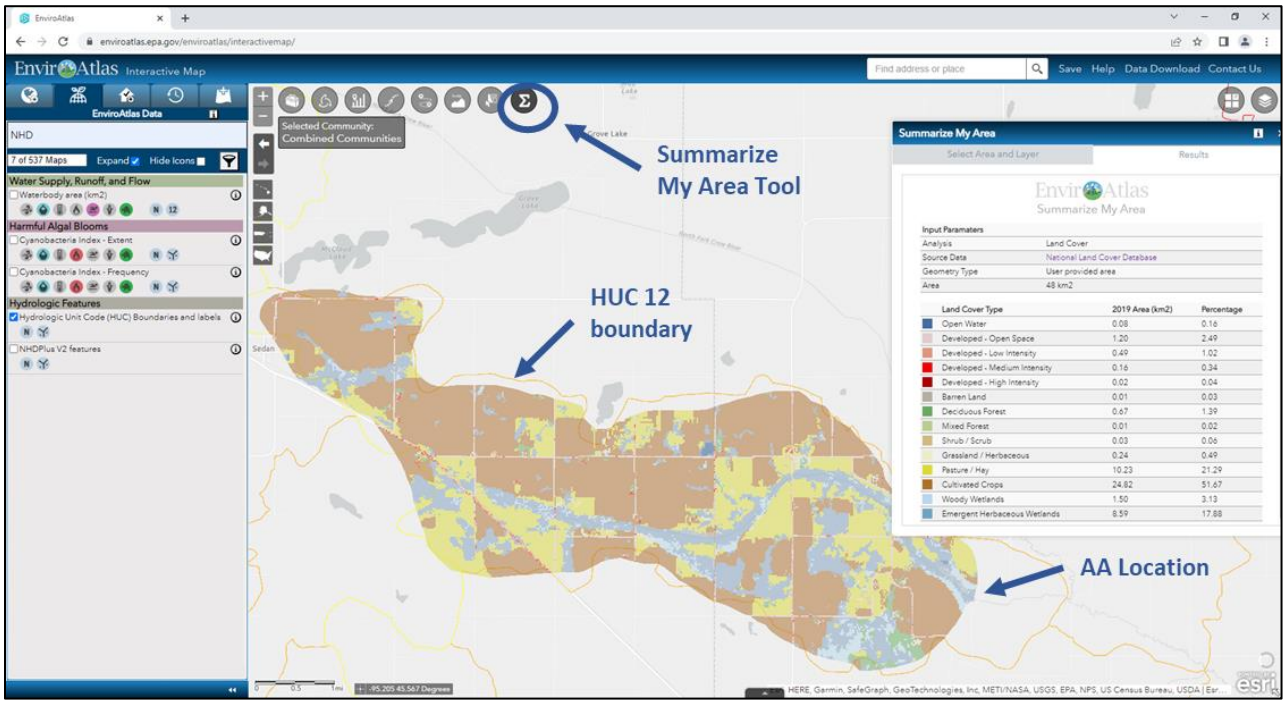
From elevation profile, enter the following:

Change in elevation (feet) - _____

Distance in Feet (Y axis) - _____

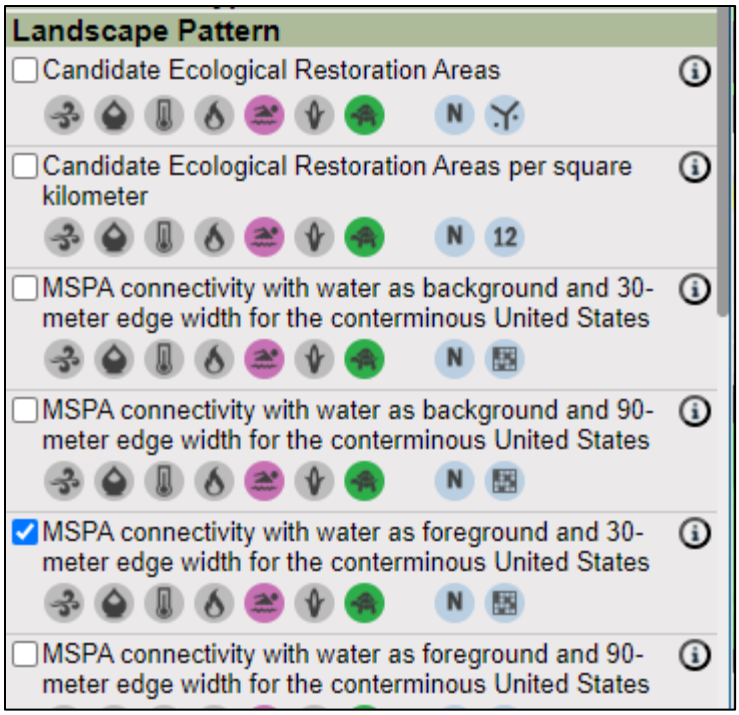
Percent slope of catchment - Change in elevation/Distance x 100 = % Slope

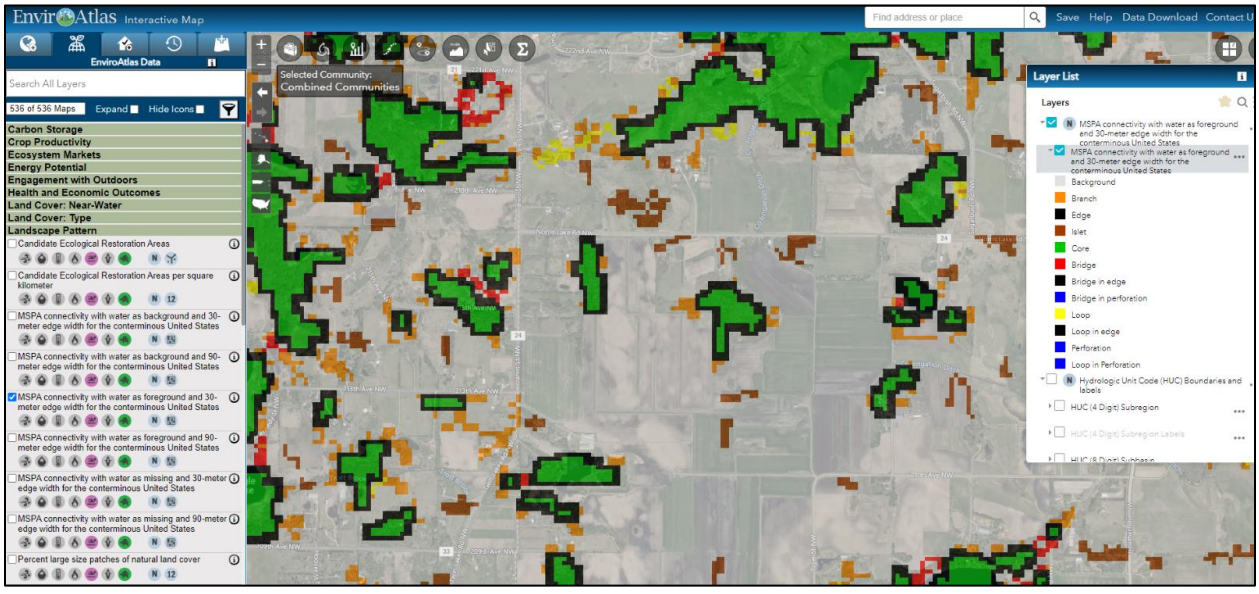
B4. Summarize My Area Tool in EnviroAtlas



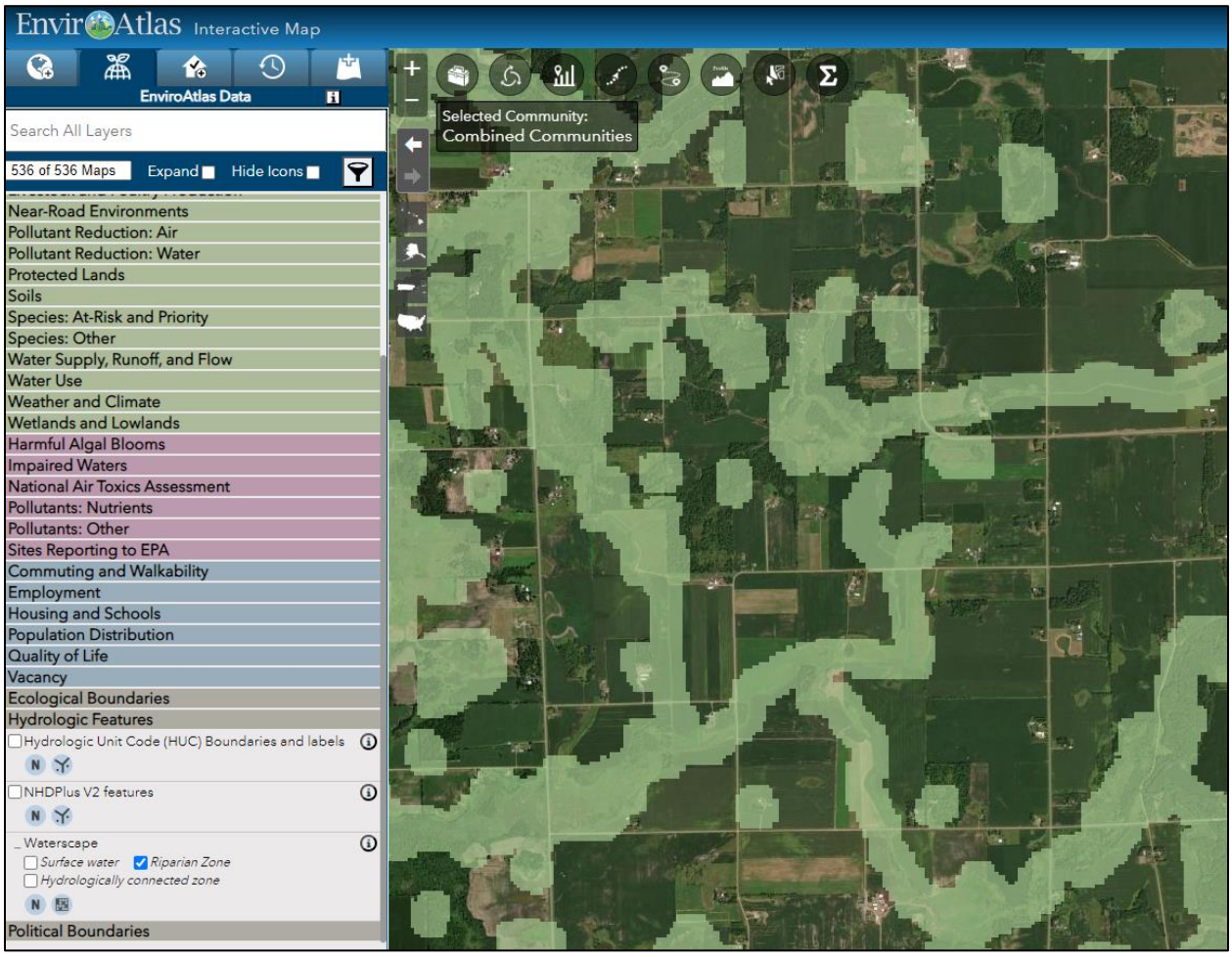
B5. Habitat Core Area in EnviroAtlas

In EnviroAtlas use the MSPA connectivity with water as foreground and 30-meter edge width for the conterminous United States map (found in the Landscape Pattern Data Layers).





B6. Riparian Zone Layer in EnviroAtlas



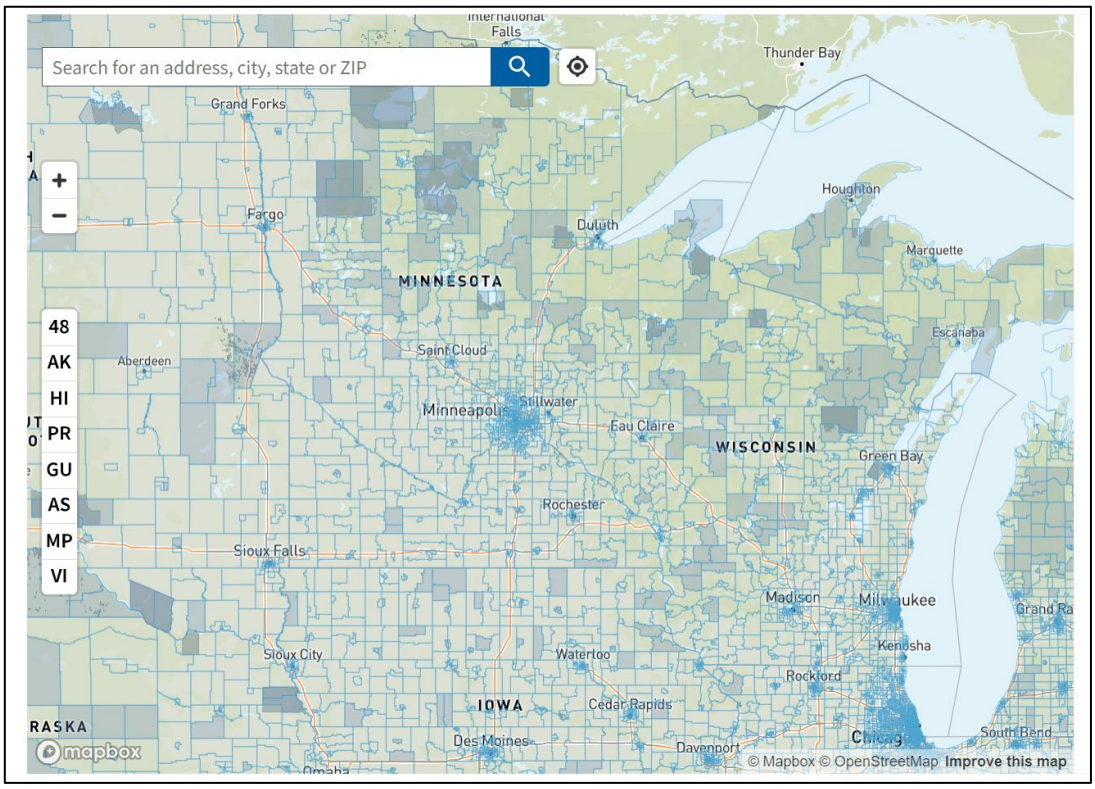
C. Types of Aquatic Barriers to Fish Movement

Adapted from The Wildlife Migration Initiative:

Type of Barrier	**Description**
Velocity Barriers	Undersized culverts that constrict water flow and create velocities that are too high, making it difficult for fish to move upstream.
Low Flow Barriers	Area where water becomes too shallow and spread out, making passage harmful or impassible to fish.
High Culvert Barriers	Culvert pipes perched above water connection point preventing fish from going upstream.
Exhaustion Barriers	Very long and/or steep culverts that inhibit fish passage due to lack of resting areas needed to traverse long distances when traveling upstream.
Dams	Obvious barrier to fish passage.
Vertical Barriers	Waterfalls and other vertical structures that impede upstream fish movement.
Constructed Fish Barriers	Man made fish barriers that prevent the movement of native fishes.

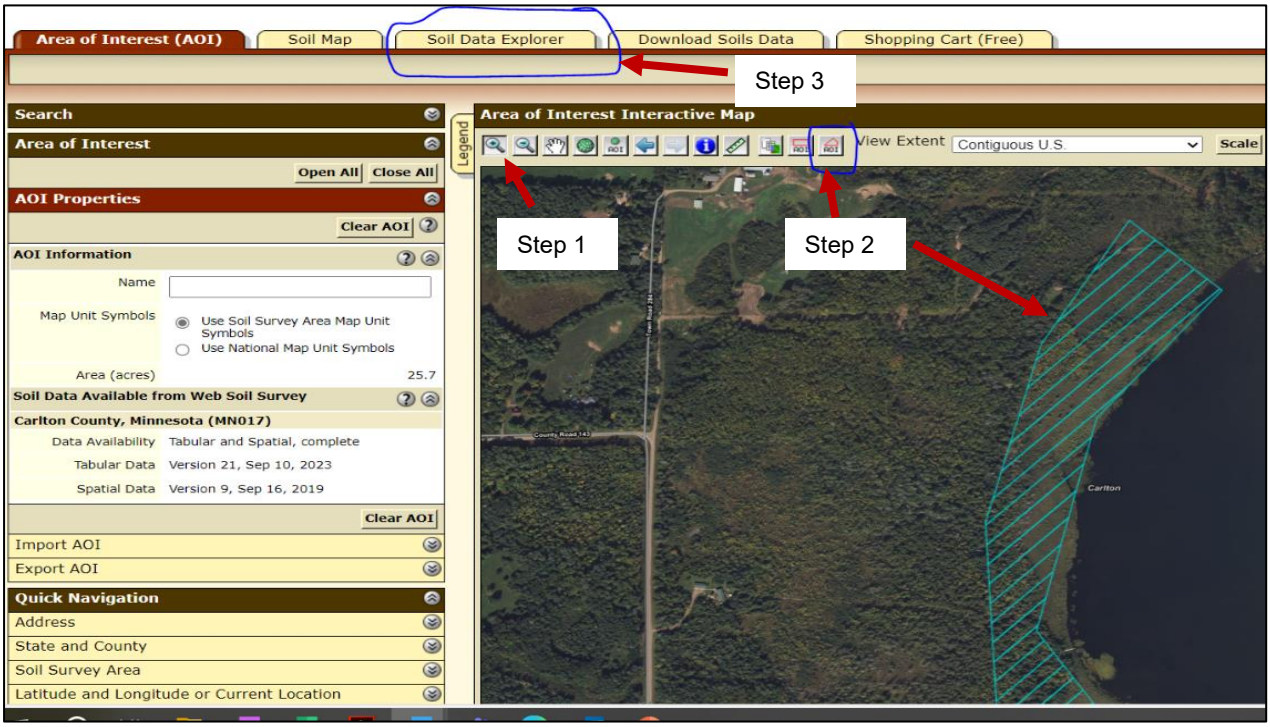
D. CEJST Instructions

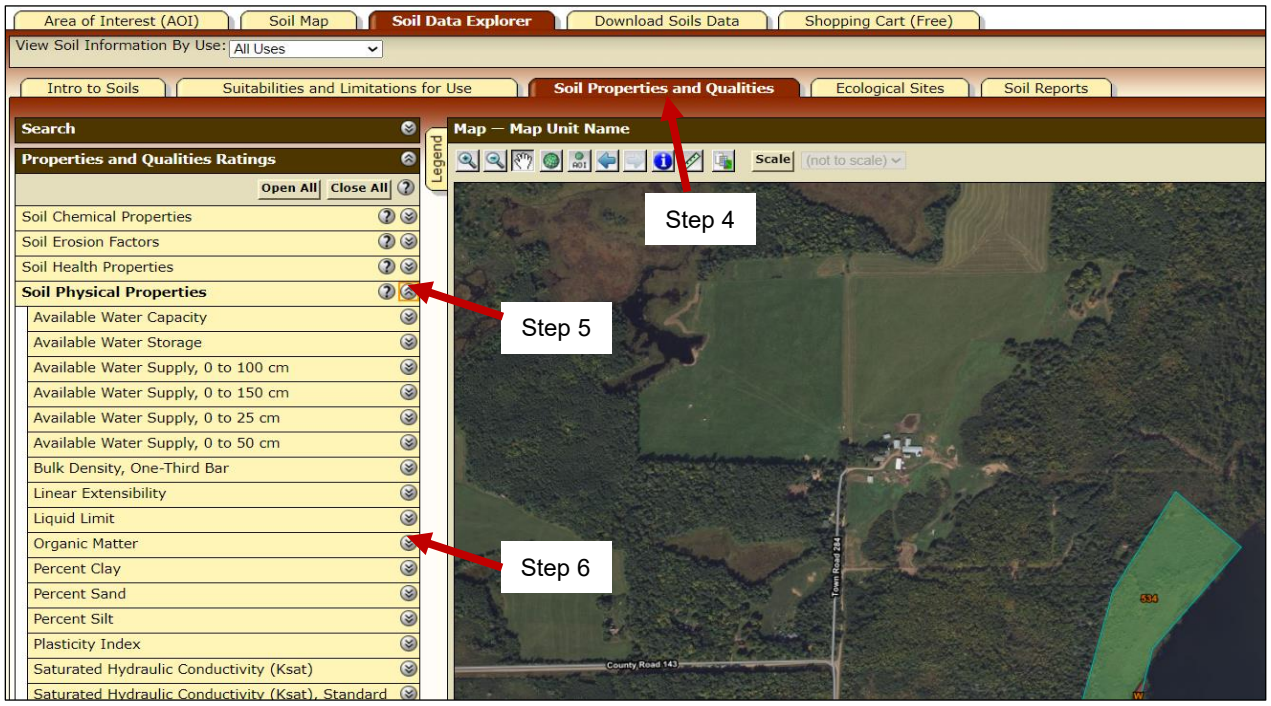
1. Navigate to the AA using the search bar in the top left corner. Search results may be entered as an address, city, state, zip, or GPS point.
2. Alternatively, the +/- symbols may be used to zoom to the AA.
3. Assessment areas in greyed out census tracts are disadvantaged communities.

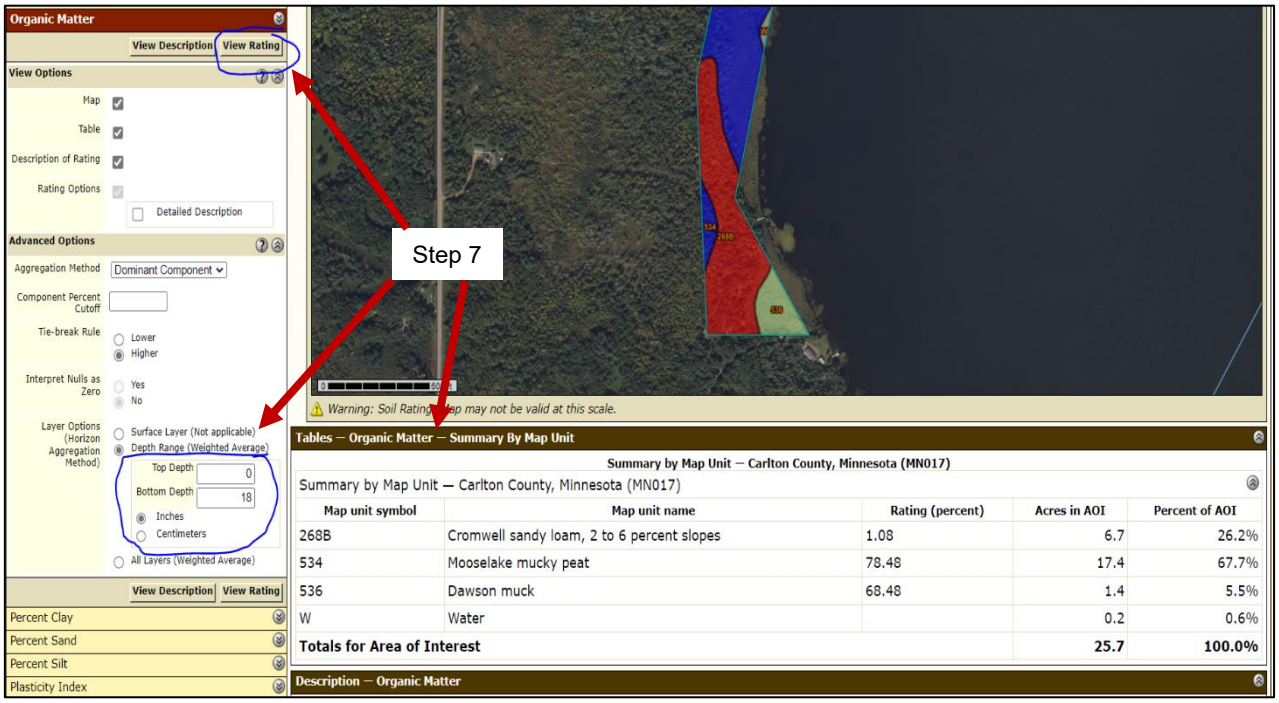


E. NRCS Web Soil Survey Instructions

1. Go to https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx
2. Zoom in to your AA using the Map controls and select “Define AOI” by polygon
3. Click “Soil Data Explorer” on the tab menu.
4. Click “Soil Properties and Qualities” on the tab menu that pops up below Soil Data Explorer.
5. Click “Soil Physical Properties”
6. Click “Organic Matter” and set Top Depth at 0, Bottom Depth at 18, and click “Inches”.
7. Click “View Rating to see Map Unit Summary by Organic Matter and a table below the map. This information can be used to answer Questions 36 and 37.




Area of Interest (AOI)
Soil Map
Soil Data Explorer
Download Soils Data
Shopping Cart (Free)
View Soil Information By Use: All Uses
Intro to Soils
Suitabilities and Limitations for Use
Soil Properties and Qualities
Ecological Sites
Soil Reports
Search
Properties and Qualities Ratings
Open All
Close All
Soil Chemical Properties
Soil Erosion Factors
Soil Health Properties
Soil Physical Properties
Available Water Capacity
Available Water Storage
Available Water Supply, 0 to 100 cm
Available Water Supply, 0 to 150 cm
Available Water Supply, 0 to 25 cm
Available Water Supply, 0 to 50 cm
Bulk Density, One-Third Bar
Linear Extensibility
Liquid Limit
Organic Matter
Percent Clay
Percent Sand
Percent Silt
Plasticity Index
Saturated Hydraulic Conductivity (Ksat)
Saturated Hydraulic Conductivity (Ksat), Standard
Legend
Map — Map Unit Name
Scale
(not to scale)
Step 4
Step 5
Step 6
County Road 143
Town Road 284


Organic Matter
View Description
View Rating
View Options
Map
Table
Description of Rating
Rating Options
Detailed Description
Advanced Options
Aggregation Method
Dominant Component
Component Percent Cutoff
Tie-break Rule
Lower
Higher
Interpret Nulls as Zero
Yes
No
Layer Options (Horizon Aggregation Method)
Surface Layer (Not applicable)
Depth Range (Weighted Average)
Top Depth
0
Bottom Depth
18
Inches
Centimeters
All Layers (Weighted Average)
Percent Clay
Percent Sand
Percent Silt
Plasticity Index
Step 7
Warning: Soil Rating
may not be valid at this scale.
Tables — Organic Matter — Summary By Map Unit
Summary by Map Unit — Carlton County, Minnesota (MN017)
Summary by Map Unit — Carlton County, Minnesota (MN017)
Map unit symbol
Map unit name
Rating (percent)
Acres in AOI
Percent of AOI
268B
Cromwell sandy loam, 2 to 6 percent slopes
1.08
6.7
26.2%
534
Mooselake mucky peat
78.48
17.4
67.7%
536
Dawson muck
68.48
1.4
5.5%
W
Water
0.2
0.6%
Totals for Area of Interest
25.7
100.0%
Description — Organic Matter

F. Graphic for Estimating Percentage Cover

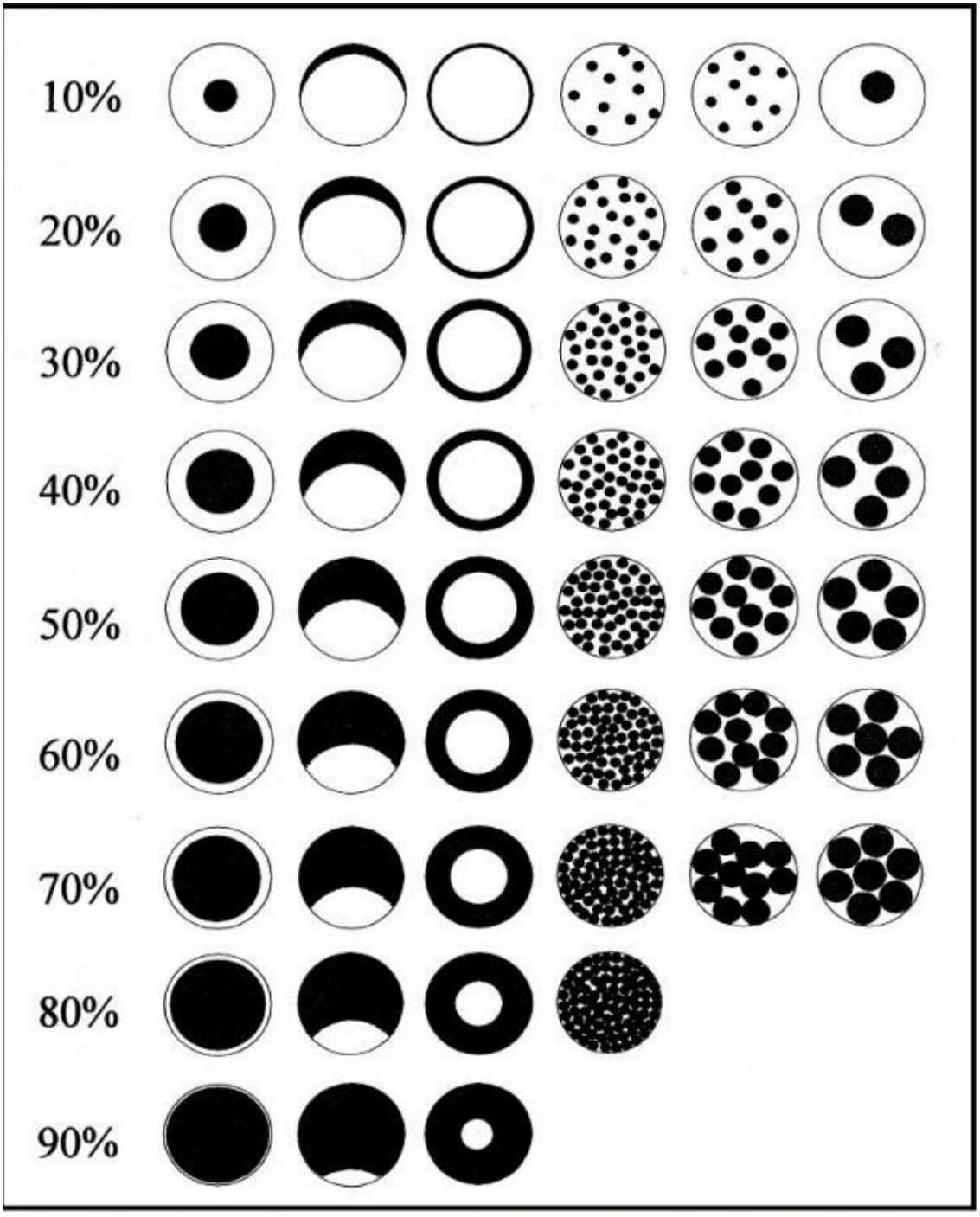


Figure citation: Oldham R.S., Keeble J., Swan M.J.S. & Jeffcote M. (2000). Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus). Herpetological Journal 10(4), 143-155.

G. Graphic for Angle Estimation