BOARD OF WATER AND SOIL RESOURCES

Prioritize, Target, Measure Application (PTMApp)

Web User's Guide

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Proud Partners

HOUSTON
engineering, inc.

International Water Institute
Supporting Flood Research and Watershed Education

CLEAN WATER LAND & LEGACY AMENDMENT

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1 Introduction

The Prioritize, Target, and Measure Application (PTMApp) is a vision for state-wide desktop and web applications. These applications can be used by water quality practitioners to provide the technical bridge between the general description of the types of strategies in a local water plan and the identification of implementable on-the-ground Best Management Practices (BMPs) and Conservation Practices (CPs).

PTMApp can be used by Soil and Water Conservation Districts (SWCD), watershed districts, county local water planners, agency staff, and decision-makers to interactively and in real-time prioritize resources and the issues impacting them, target specific fields to place CPs and BMPs, and measure water quality improvement by tracking the expected nutrient and sediment load reductions delivered to priority resources. These applications enable practitioners to develop water quality improvement scenarios and prioritized and targeted water quality implementation plans, estimate the cost effectiveness of the scenario for improving water quality, and report the results to pursue funds for project implementation. The primary user of the application is envisioned as water quality practitioners employed by a local government. The intent is to develop and provide access to water quality information to address the common business needs of SWCDs, watershed districts, watershed management organizations and counties with limited technical support.

PTMApp–Web provides access to the various products created using PTMApp–Desktop. The PTMApp–Desktop products are uploaded to the web server by the individual creating the products. Placement of the PTMApp-Desktop products into the web environment requires authorization by the PTMApp–Web Administrator. To use PTMApp–Web you MUST create a user account which requires approval by the web administrator. Once access is granted by the web administrator, the user will be able to view all watersheds on PTMApp-Web.

The PTMApp products (see **Figure 1**) are created using PTMApp–Desktop and can be accessed using PTMApp–Web. These products can be used to complete a pollutant source assessment, evaluate the feasibility of BMPs, estimate the water quality benefits of one or more practices, and assess the ability to achieve measurable goals. The sequential use of the products allows the user to create a targeted implementation strategy to improve water quality, whether within a local drainage area or a large watershed. The products are also useful for developing targeted grant applications for improving water quality, and further refining implementation strategies described in Watershed Restoration and Protection Strategies (WRAPS).
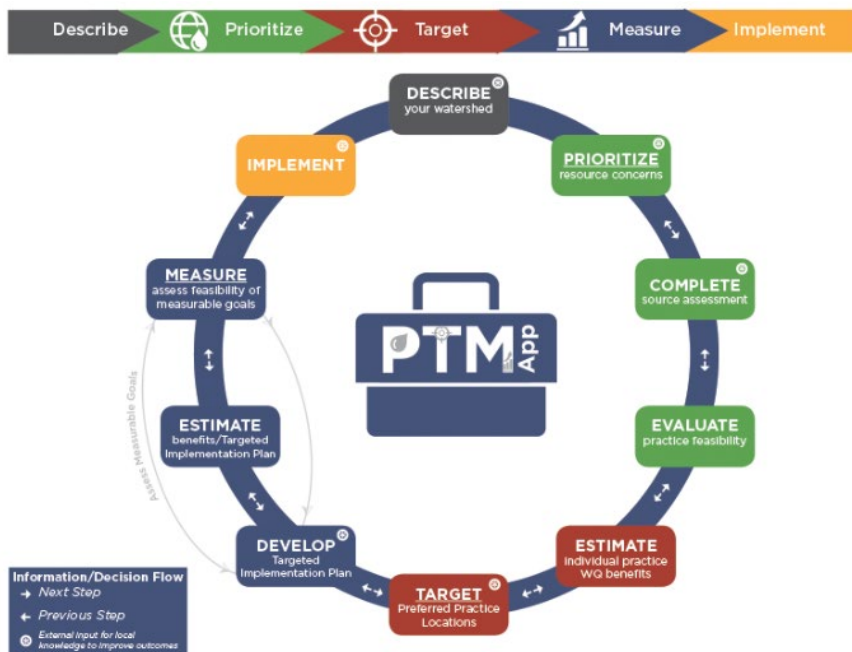
Figure 1 Prioritize, Target, and Measure Application (PTMApp) Products

After setting up your account, you have access to four tools. These tools are: 'Interactive Map', 'Table Generator', 'Action Report', and 'Scenario Builder'. These tools can be used to view data uploaded from PTMApp-Desktop, interact with data on the web, create scenario reports where you can select BMPs based on filters and sorting criteria, and output maps to display your completed scenario. Commonly used PTMApp products can be viewed and printed using the interactive map. A summary of the products and their uses can be found on the PTMApp Website (https://ptmapp.bwsr.state.mn.us/). The Table Generator allows the user to download the tabular PTMApp data in a .csv to their desktop, for additional analysis and the creation of secondary products. The Targeted BMP Action Report allows the user to create individualized bmp reports based on various user specified parameters which provides flexibility and ease-of-use for the user. Scenario Builder can be used to go one step further than the Action Report and allows you to filter practices out based on default filtering criteria that the user can adjust to fine-tune what practices end up in the report.

2 Uploading Data to the PTMApp-Web Server

The data products are created using PTMApp-Desktop and must be uploaded to the web server before they can be accessed through PTMApp-Web at https://ptmapp.bwsr.state.mn.us/ Only a portion of the data created by PTMApp-Desktop are uploaded to the web server. The geodatabase with the geospatial data needed to create PTMApp output products can approach ~ 100 GB for a large watershed (~ 1,500 square miles). PTMApp-Web performance diminishes for large watersheds because of the volume of data.

The instructions and the ESRI ArcGIS license requirements needed to upload the data generated using PTMApp-Desktop is provided elsewhere (https://ptmapp.bwsr.state.mn.us/files/PTMApp_User_Guide.pdf). Directions on

how to access PTMApp data on the web once your data has been uploaded can be found in the next section. ***Once you have completed the tasks in Section 3, you will receive an email from the web administrator letting you know you have gained access to use PTMApp-Web.***

3 Gaining Access to PTMApp-Web Data

Access to the PTMApp products through PTMApp-Web is restricted[1] to those given explicit access by the PTMApp-Web Administrator. PTMApp products are typically created for Clean Water Fund Accelerated Implementation Grants, development of a One Watershed One Plan or Watershed Management Plan, completion of a water quality targeted implementation strategy, refining of a WRAPS implementation strategy, and/or other planning/implementation of local water management efforts. A user account is provided only to individuals that can demonstrate involvement in one of these efforts.

Once access has been granted by the PTMApp-Web Administrator, the user can login and has full access to all data/watersheds on the PTMApp Web site.

3.1 Creating a User Account

Access to the data and tools within PTMApp-Web is gained only after a user account is created and approved by the PTMApp-Web administrator. To obtain a user account go to https://ptmapp.bwsr.state.mn.us/ and click on 'Create PTMApp Account' link on the bottom of the page:

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[1] Access is limited because the application contains information about possible practice locations for improving water quality, which require additional field verification to ensure feasibility.

Web Application Sign In

Sign in using your registered account:

NOTE: This application is currently in testing and therefore access is restricted those involved in select One Watershed One Plan Pilots or application development.

Username [ ]

Password [ ]

☐ Remember me?

[Sign In]

Forgot your password?

New User?

Create PTMApp Account

The Prioritize, Target, and Measure Application (PTMApp) is a vision for a state-wide desktop and web application which be used by practitioners to provide the technical bridge between the general description of the types of strategies in a local water plan and the identification of implementable on-the-ground Best Management Practices (BMPs) and Conservation Practices (CPs).

PTMApp can be used in a workshop environment by Soil and Water Conservation Districts (SWCD), watershed districts, county local water planning, agency staff and decision-makers to interactively and in real-time, PRIORITIZE resources and the issues impacting them, TARGET specific fields to place CPs and BMPs, and MEASURE water quality improvement by tracking the expected nutrient and sediment load reductions delivered to priority resources.

The tool enables practitioners to build prioritized and targeted implementation scenarios, measure the cost-effectiveness of the scenario for improving water quality, and report the results to pursue funds for project implementation.

An innovation solution from:

[PTMApp - Desktop]   [PTMApp - Web]   [Documentation]   [Collaborators]

Complete the information on the registration form and hit 'Register':

You should be diligent and deliberate when completing the access justification line of the registration form. The web administrator will use this information to reach a decision about whether your request for access should be granted. Reasons for access include identifying your role as a local government water quality practitioner and *your participation in a project utilizing PTMApp, including Accelerated Implementation Grants, the development of a One Watershed One Plan or Watershed Management Plan, a water quality targeted implementation strategy, refinement of a WRAPS implementation strategy or involvement in local water management efforts. Be sure to include your telephone number so you can be contacted if the web administrator has any questions concerning your request.* Press the "register" button when the form is complete.

You will receive an email from the web administrator confirming or denying access generally within 4 hours if requested during normal business hours. You may receive a telephone call seeking additional information about the need for access, should it appear that access may be denied.

Once you have been provided access to PTMApp-Web, you will have access to all public datasets which have been previously uploaded by the web administrator to the web application.

4 Using PTMApp-Web

The ultimate vision of PTMApp-Web is the ability to develop, assess, and evaluate the benefits of targeted implementation plans on the fly. PTMApp-Web presently includes four tools for using the enhanced geospatial water quality data created using PTMApp-Desktop. These tools are the 'Interactive Map', 'Table Generator', 'Targeted BMP Action Report', and 'Scenario Builder'.

Using the data within PTMApp-Web requires a working knowledge of the enhanced geospatial water quality data products. Resources to help you understand the products are provided on the 'Theory and Documentation' page of the PTMApp website: https://ptmapp.bwsr.state.mn.us/. This can be accessed by selecting the "Theory & Documentation" tab located on the bottom ribbon when logged into PTMApp Web.
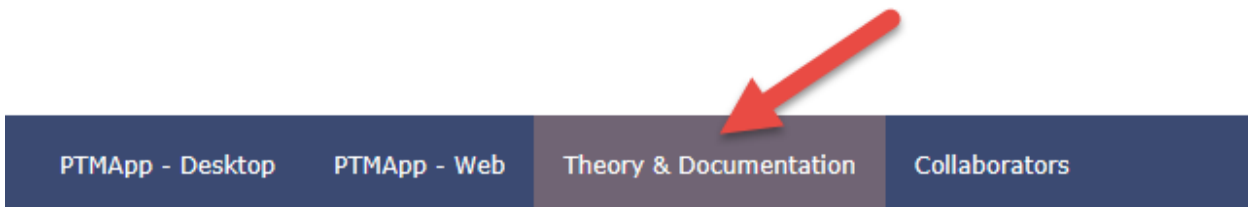
Descriptions of the data tables can be found by downloading the Data Catalog. Descriptions of the attributes for fields within the data tables can be found by downloading the Attribute Catalog. Links to each of these are highlighted below:
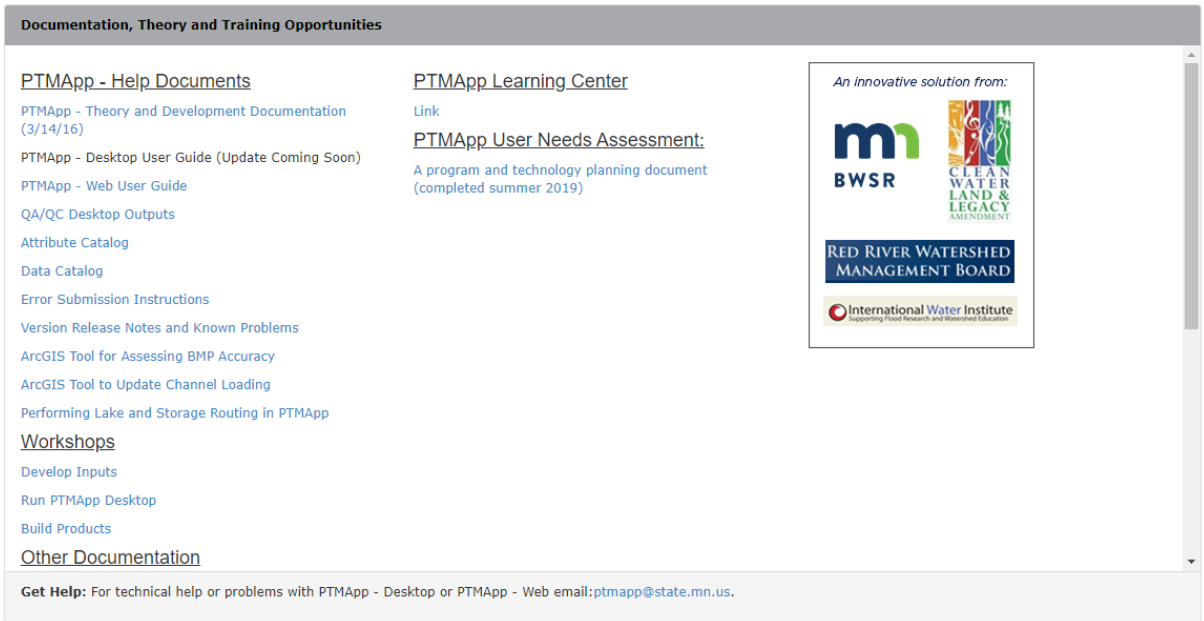
This webpage includes other resources for learning more about PTMApp input and output products. The user of PTMApp-Web is responsible for becoming familiar with the enhanced water quality geospatial products within PTMApp-Desktop which is the basis of data displayed in PTMApp-Web.

4.1 Technical Settings

Tip: Before you begin working in PTMApp-Web, here are three very important item you should consider and/or complete:

1. To print from the Interactive Map feature in PTMApp-Web, you MUST TURN POPUP BLOCKERS OFF. Maps will not print unless this feature is disengaged. Guidance on turning this feature off in Internet Explorer and Google Chrome browsers can be found in sections 4.1.3 How to Turn Off Your Google Chrome Popup Blocker and 4.1.4 How to Turn Off Your Microsoft Edge Popup Blocker respectively.

2. PRINTING LARGE AREAS WITH IMAGES AS A BACKGROUND REQUIRES CONSIDERABLE COMPUTER RESOURCES AND MAY TAKE LONG PERIODS OF TIME. Please consider zooming in and printing smaller areas if working with large datasets.

3. Recent updates to PTMApp-Web may not be realized on your machine if you do not clear your web browser's cache. We strongly recommend CLEARING YOUR BROWSER CACHE prior to printing maps or using the Action Report in PTMApp-Web. You only need to clear your browser's cache if that browser had previously been used to access PTMApp-Web. Guidance on how to clear your cache in Google Chrome and Microsoft Edge can be found in sections 4.1.1 How to Clear Your Google Chrome Browser Cache and 4.1.2 How to Clear Your Microsoft Edge Browser Cache respectively. ***Note: PTMApp Web was tested for use on Google Chrome. This is the best web browser to use. Microsoft Edge may work fine, but it is not the preferred browser.***

4.1.1 How to Clear Your Google Chrome Browser Cache

To clear your browser cache in Chrome, click the tools button (⋮) in the top right of the screen, then click 'More tools' and 'Clear browsing data':
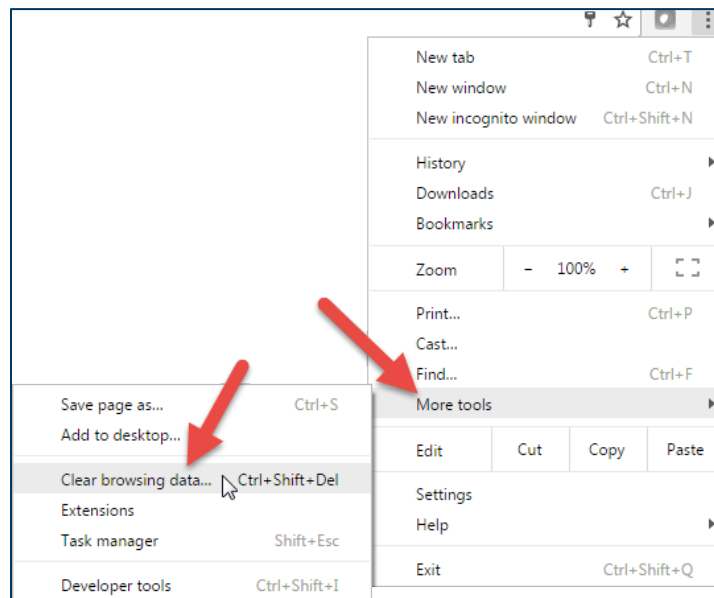
In the dialog box that appears, select the "advanced" tab (button 1) then choose "All Time" (button 2) for your time range to delete previous cache, cookies, and browsing history. After these items are selected, click the 'Clear data' button (button 3).
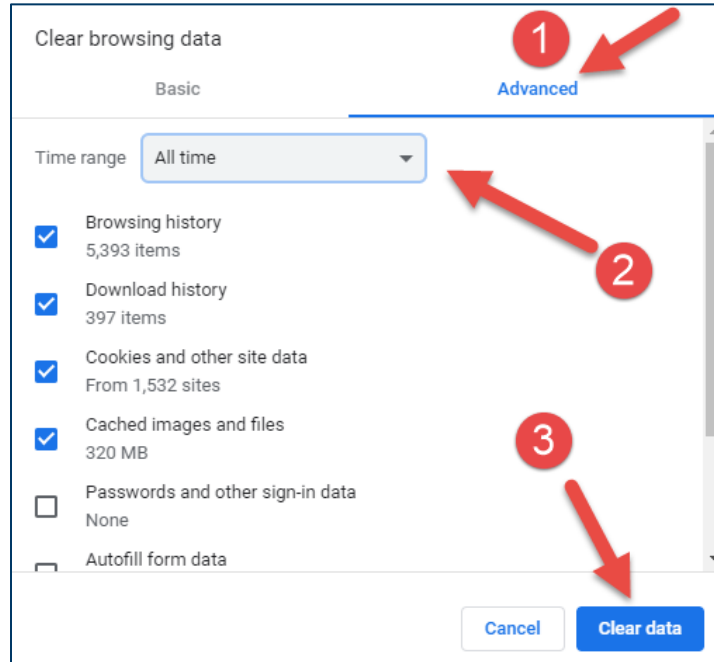
4.1.2 How to Clear Your Microsoft Edge Browser Cache

This is for guidance on how to clear your browsing history and cookies in Microsoft Edge.
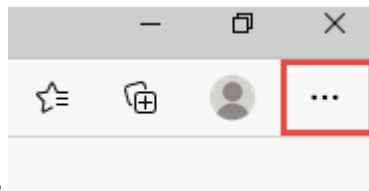
In Microsoft Edge, locate the three dots in the upper right-hand corner of the browser. The three dots will be directly below the 'Close Application' 'X' button. Click on the three dots.
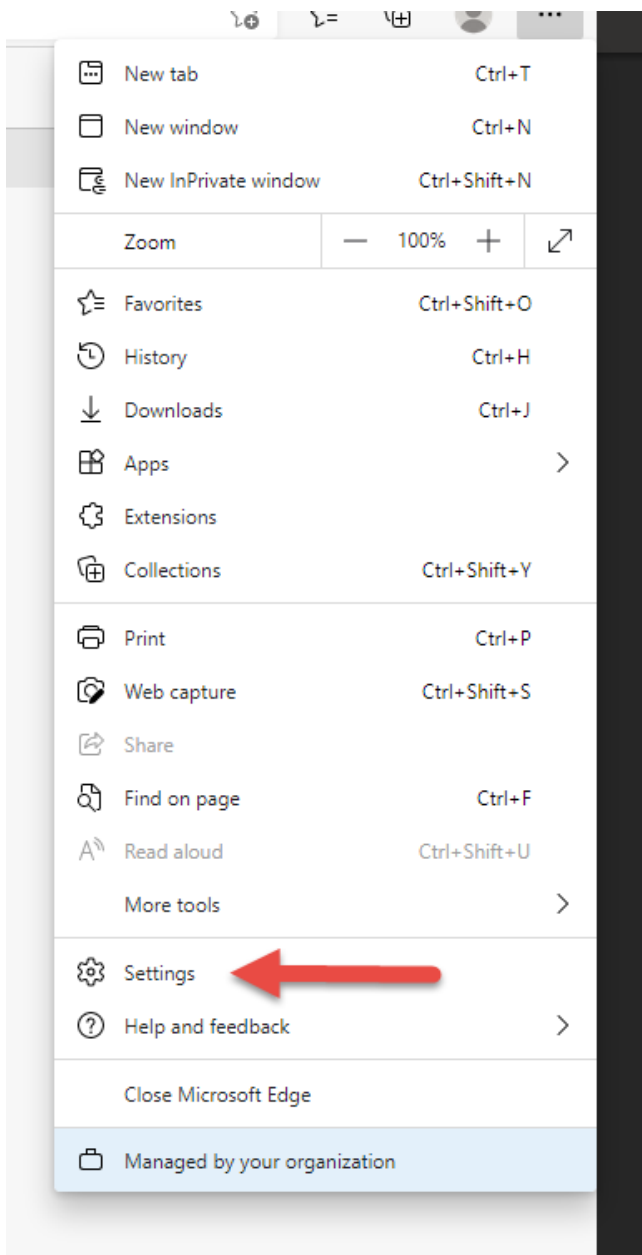
Settings

Search settings

- Profiles
- **Privacy, search, and services**
- Appearance
- On startup
- New tab page
- Share, copy, and paste
- Cookies and site permissions
- Default browser
- Downloads
- Family safety
- Languages
- Printers
- System
- Reset settings
- Phone and other devices
- About Microsoft Edge

We value your privacy.

We will always protect and respect your privacy, while giving you the transparency and control you deserve. Learn about our privacy efforts

Tracking prevention ⓘ

Websites use trackers to collect info about your browsing. Websites may use this info to improve sites and show you content like personalized ads. Some trackers collect and send your info to sites you haven't visited.

Tracking prevention

Basic	Balanced (Recommended)	Strict
• Allows most trackers across all sites	• Blocks trackers from sites you haven't visited	• Blocks a majority of trackers from all sites
• Content and ads will likely be personalized	• Content and ads will likely be less personalized	• Content and ads will likely have minimal personalization
• Sites will work as expected	• Sites will work as expected	• Parts of sites might not work
• Blocks known harmful trackers	• Blocks known harmful trackers	• Blocks known harmful trackers

Blocked trackers   ＞
View the sites that we've blocked from tracking you

Exceptions   ＞
Allow all trackers on sites you choose

Always use "Strict" tracking prevention when browsing InPrivate

Clear browsing data

This includes history, passwords, cookies, and more. Only data from this profile will be deleted. Manage your data

Clear browsing data now   **Choose what to clear**

Choose what to clear every time you close the browser   ＞
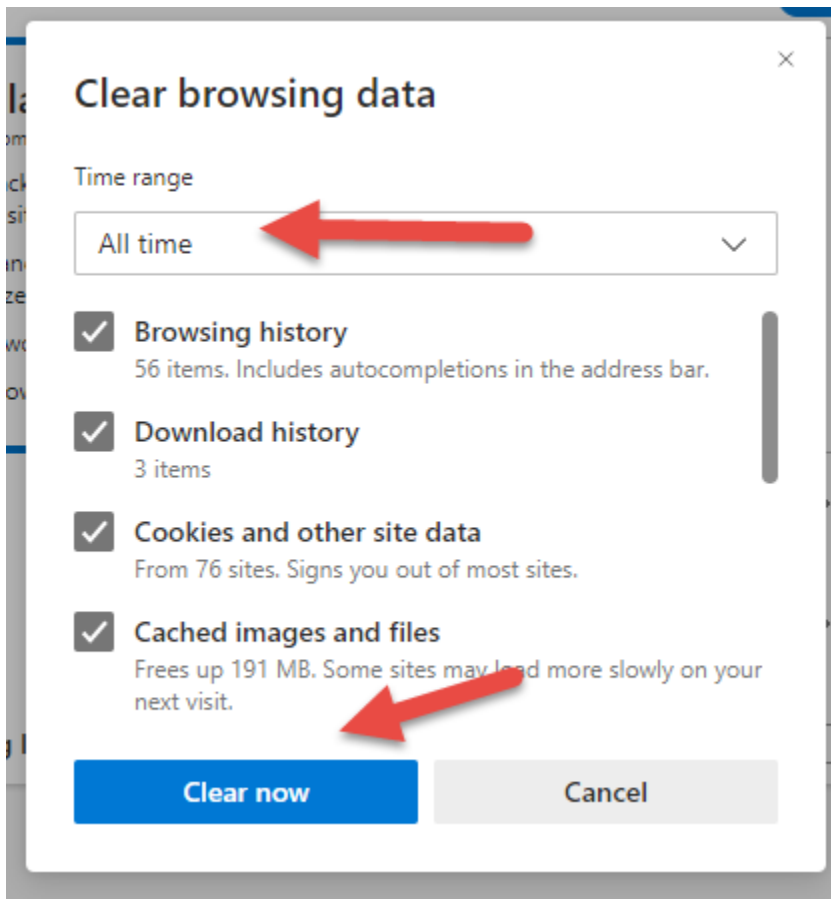
4.1.3 How to Turn Off Your Google Chrome Popup Blocker

The popup blocker on your internet browser MUST be turned off or otherwise disengaged for the PTMApp website to print maps from PTMApp-Web. Google Chrome users can follow the instructions below to turn off their popup blocker. Other internet browsers (e.g., Mozilla Firefox) follow similar methods, with the Popup Blocker being deactivated within the browser's settings. Instructions for allowing printing within IE are found in the previous section.

1. Click on the 'Customize and Control Google Chrome' icon (three vertical dots in figure below) in the upper-right of the Chrome window and navigate to 'Settings'.
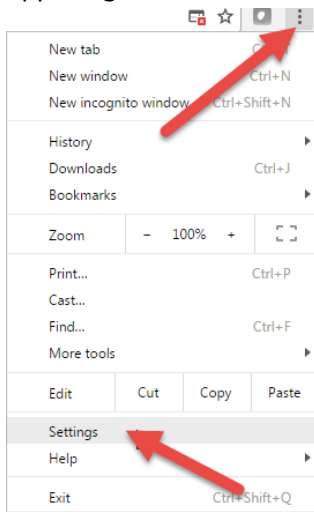
2. In Settings, click 'Show Advanced Settings'
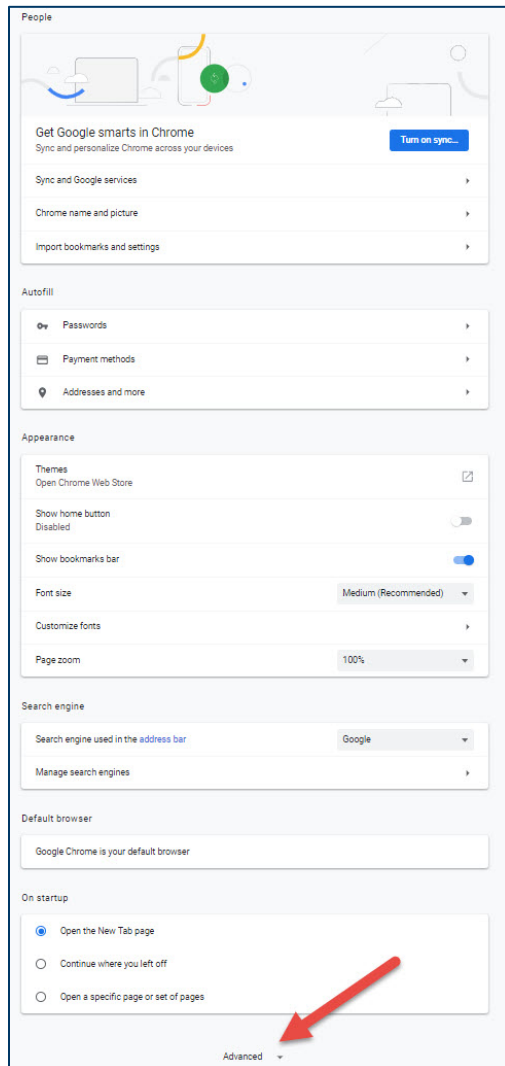
3. Once the Advance Settings are available, click 'Site Settings' under the 'Privacy and Security' header
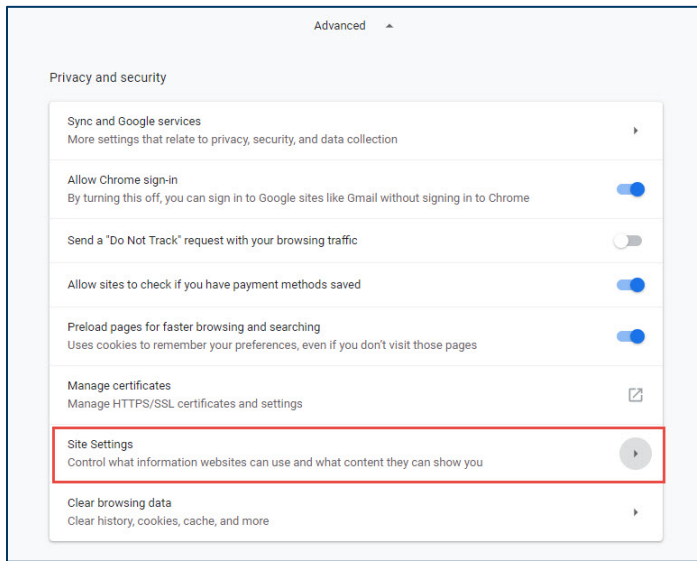
4. In the Site Settings window, scroll down to the 'Pop-ups and redirects' Section and select it.
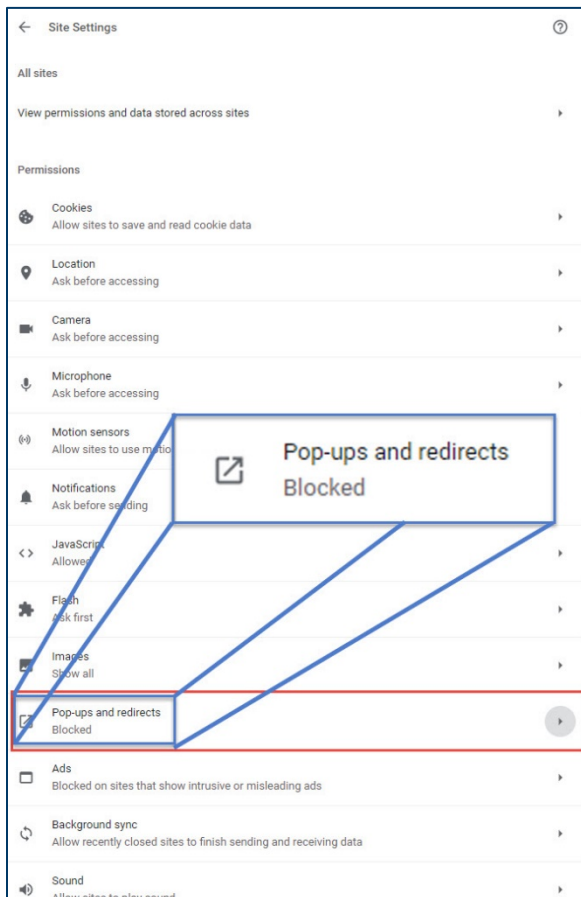
5. In the 'Pop-ups and redirects' window select 'Add' next to the 'Allow' option.

6. Copy and paste PTMApp-Web's URL into the open dialog box.
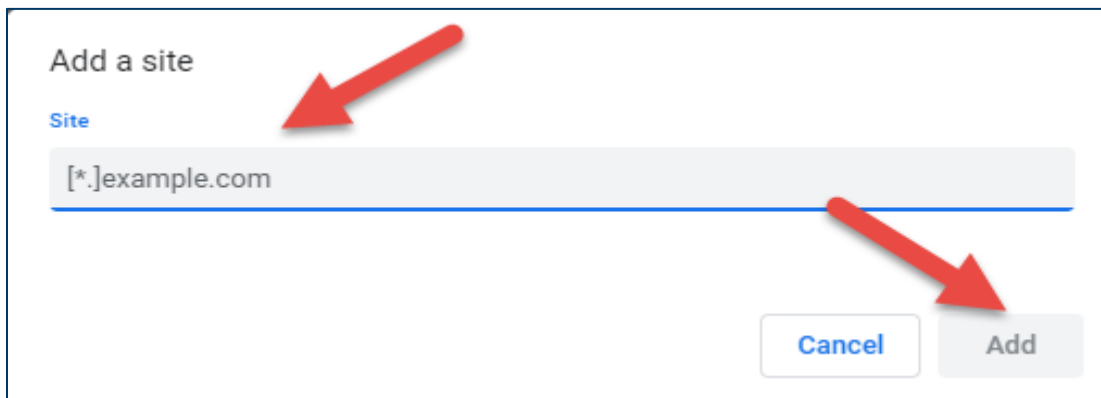
Once complete, hit the 'Done' button. The PTMApp website should now appear in the Pop-up exceptions list.

4.1.4 How to Turn Off Your Microsoft Edge Popup Blocker

In Microsoft Edge, locate the three dots in the upper right-hand corner of the browser. The three dots will be directly below the 'Close Application' 'X' button. Click on the three dots.
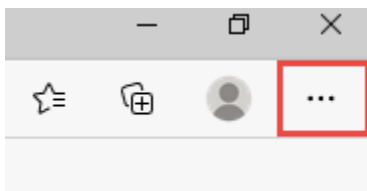
Click on 'Settings'
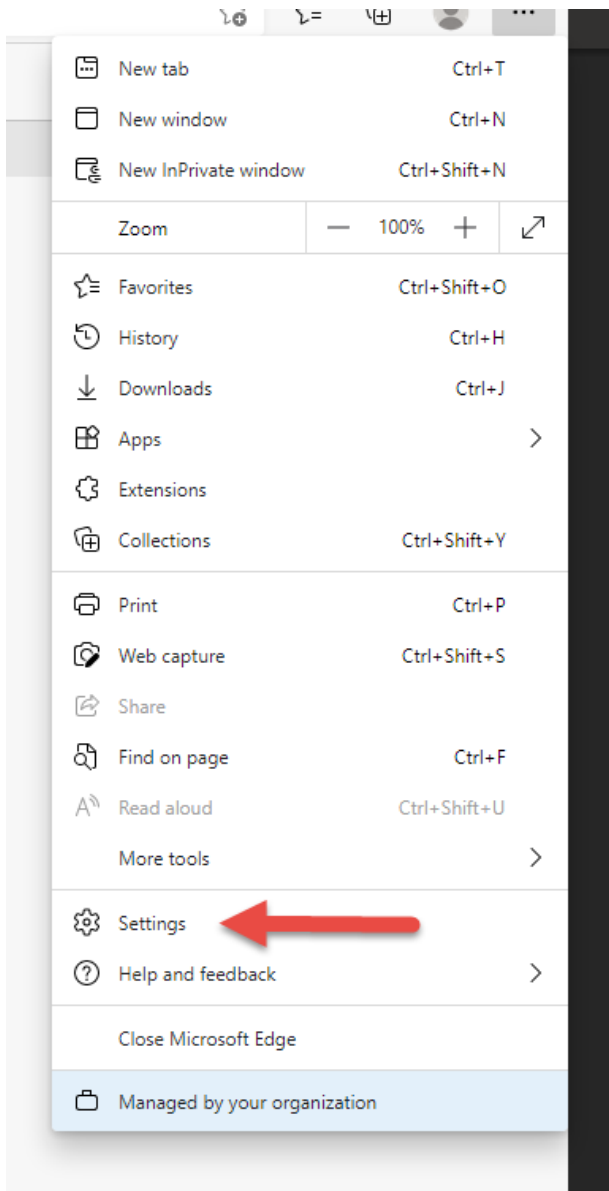
Click 'Cookies and site permissions' followed by 'Popup and redirects'.
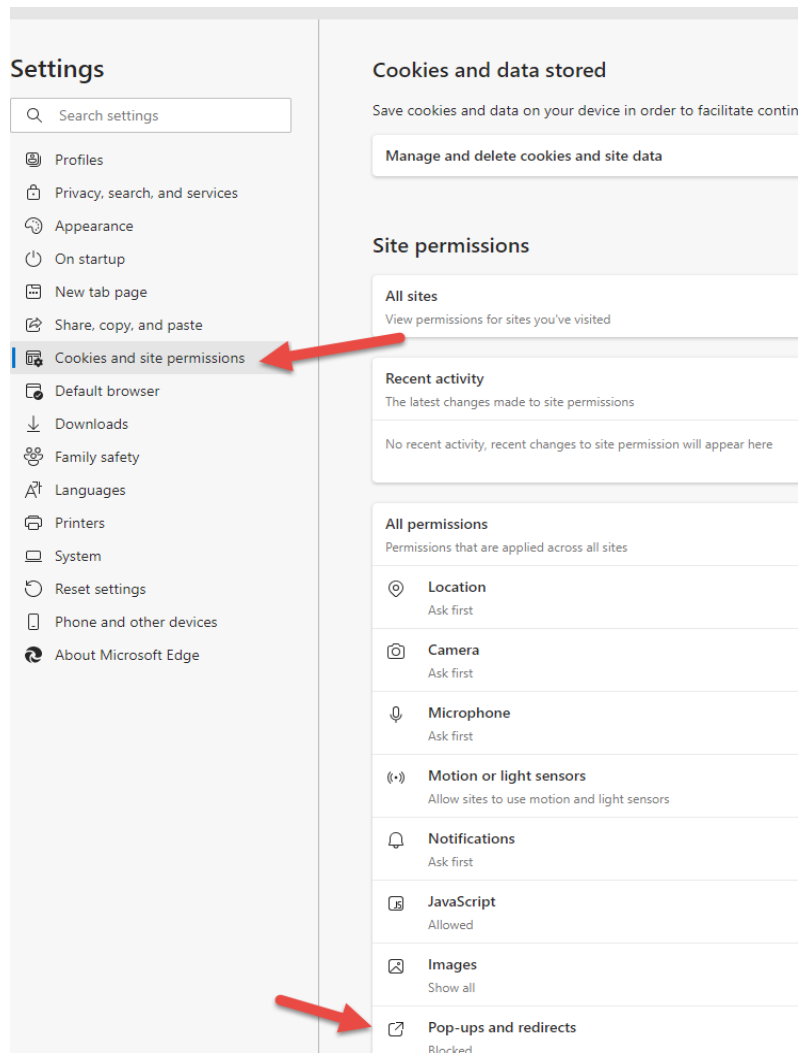
Click 'Add' in the 'Allow' section of the 'Pop-ups and redirects'
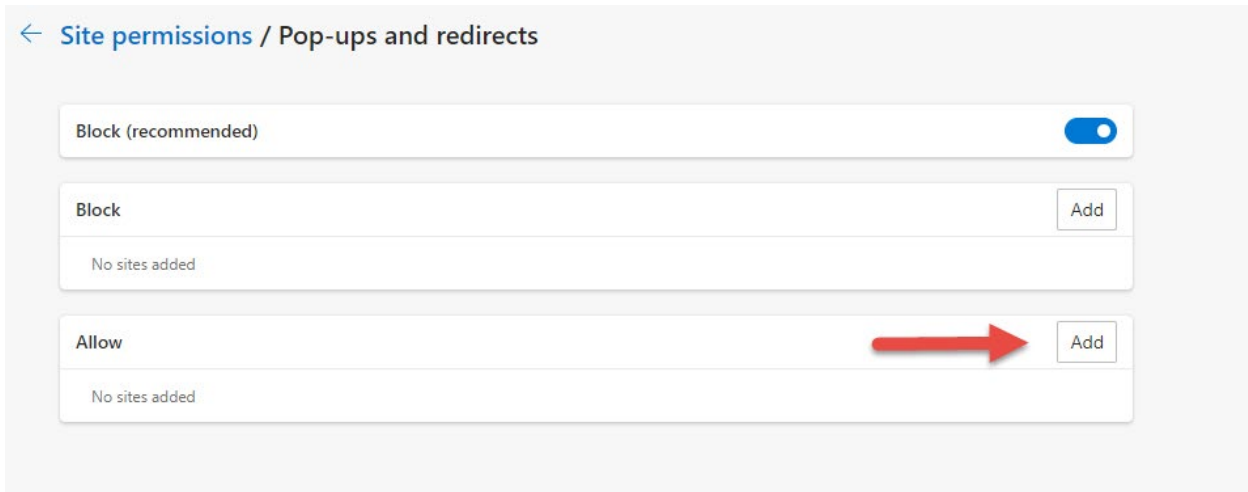
Add the PTMApp BWSR URL to the 'Allow' section of Pop-ups and redirects.
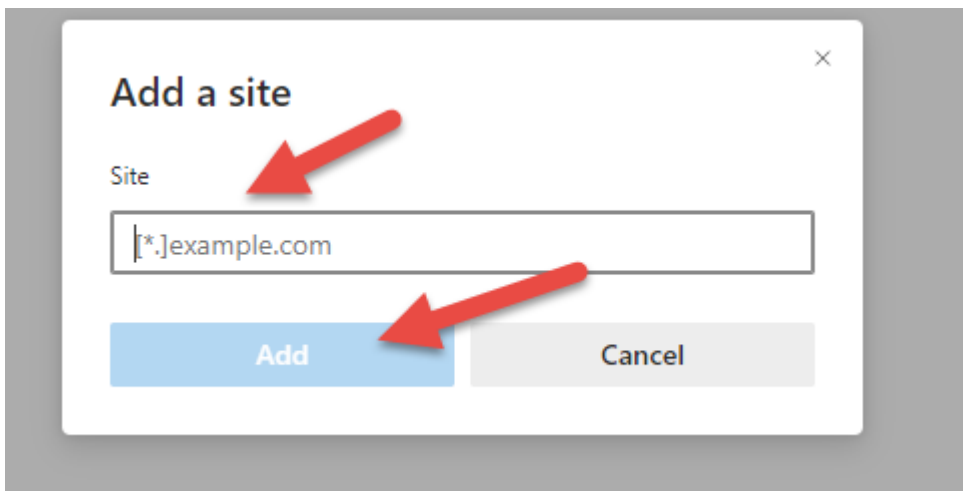
4.2 The Dashboard to Display Status

When you sign in, you will automatically be returned to the PTMApp-Web dashboard page (shown below). The dashboard provides information about the data you are viewing. These include information about when the data was created and summary statistics about pollutant loads at the most downstream location of the watershed area.

You may change the watershed being viewed by using the "select watershed" pull down menu, automatically updating the "Data Status" and "Summary Statistics" information.
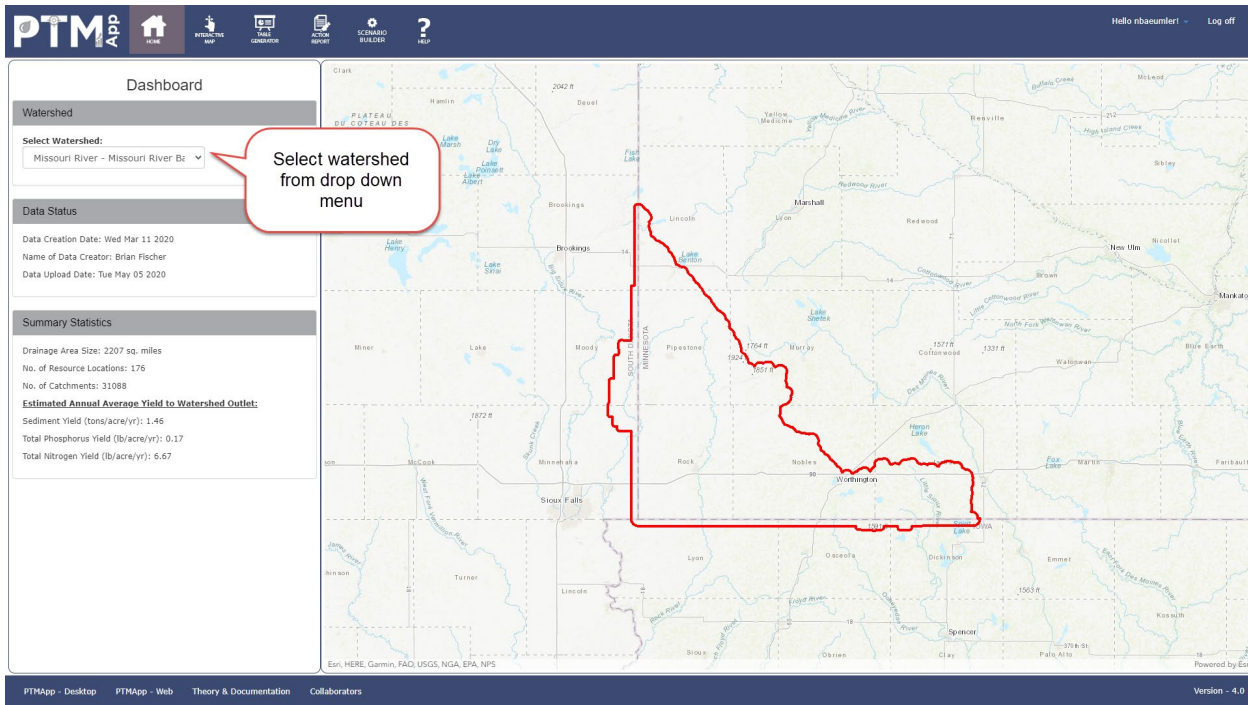
4.3 Interactive Map

The Interactive Map is accessed from any page by pressing the button located with the web page header.

Pressing the Interactive Map button opens the Interactive Map. The Interactive Map page includes several features (in red square below) which modify the information displayed on the screen and allows printing of the map on the screen. The user can manipulate this information on the Interactive Map using the features on the left-hand-side of the page to create, print, and save the various maps needed for water quality plans and reports.
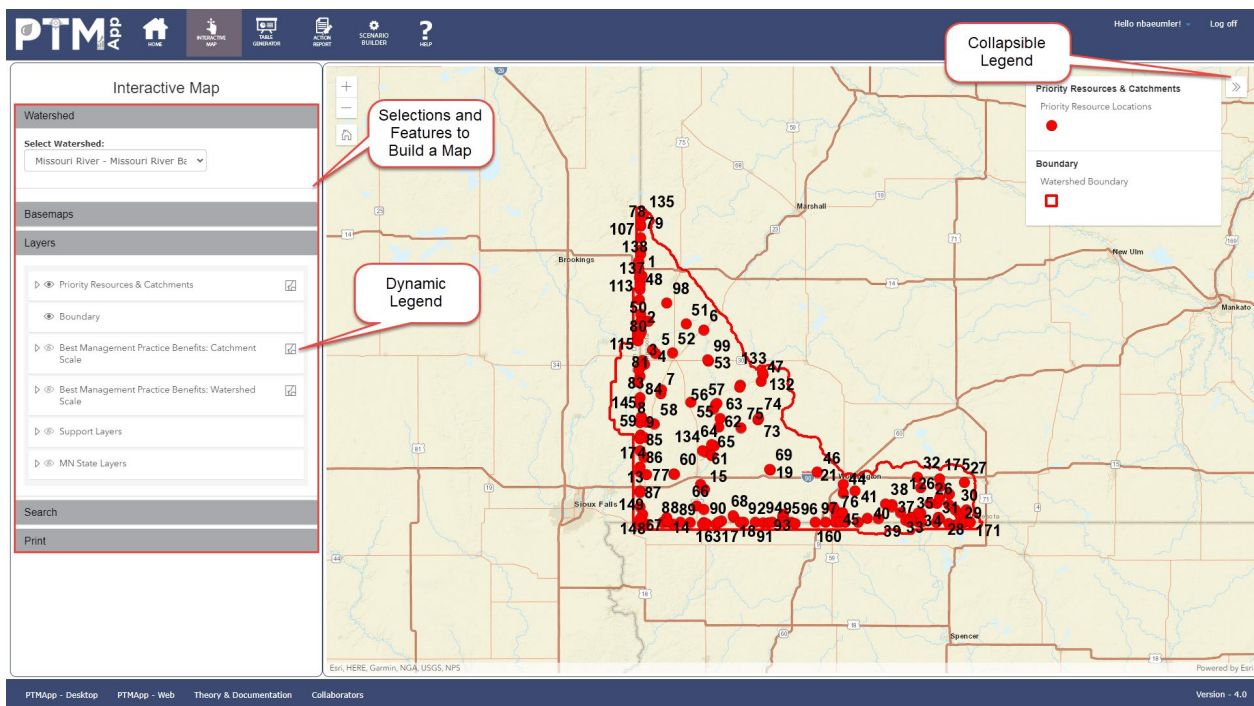
The features on the left-hand-side of the Interactive Map page allow the user to select the watershed to be displayed on the screen, the type of background used as the base map, the geospatial layers displayed, and the legend which controls how the data are displayed. A search feature and a button to print the map on the screen is also included. Support Layers and Minnesota State Layers include various data to provide more background information for the user. Layers include Minnesota counties, township, range, section, roads, wetlands, lakes, rivers, streams, subwatersheds, watersheds, subbains, Minnesota impaired waters (303d listing), and conservation practices currently on eLINK. These layer summaries and data locations are in appendix 6 Appendix A: PTMApp-Web Attribute Catalog.

The general process to create and print an interactive map is as follows:

1. Use the "select watershed" pull down menu to display the watershed of interest. You will have access to all watersheds loaded on PTMApp-Web.

2. Press "basemap" on the collapsible menu and select the desired basemap to be displayed on the map. Please be advised that basemap options are limited to those provided through ESRI web services.
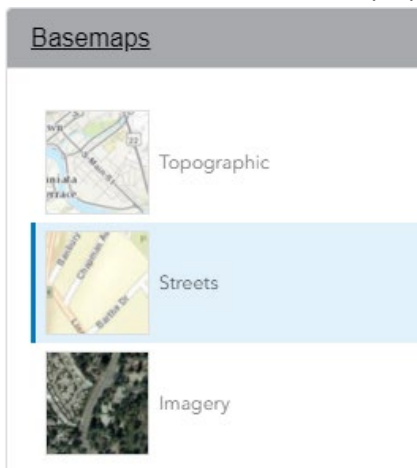
3. Press the "Layers" tab on the collapsible menu. Several different types of layers are provided within PTMApp-Web. The layer titles describe the type of geospatial data available for display on the map, i.e., the locations of the priority resource concerns and catchments, watershed boundary, benefits of BMPs at both the catchment and watershed scale and the potential BMP locations, support layers, and state layers. *A priority resource concern is the location where load reduction information is available within PTMApp-Web and the locations MUST be determined during the creation of the data in PTMApp-Desktop. Catchment boundaries and loads to the catchment are also under the priority resources and catchments tab.*
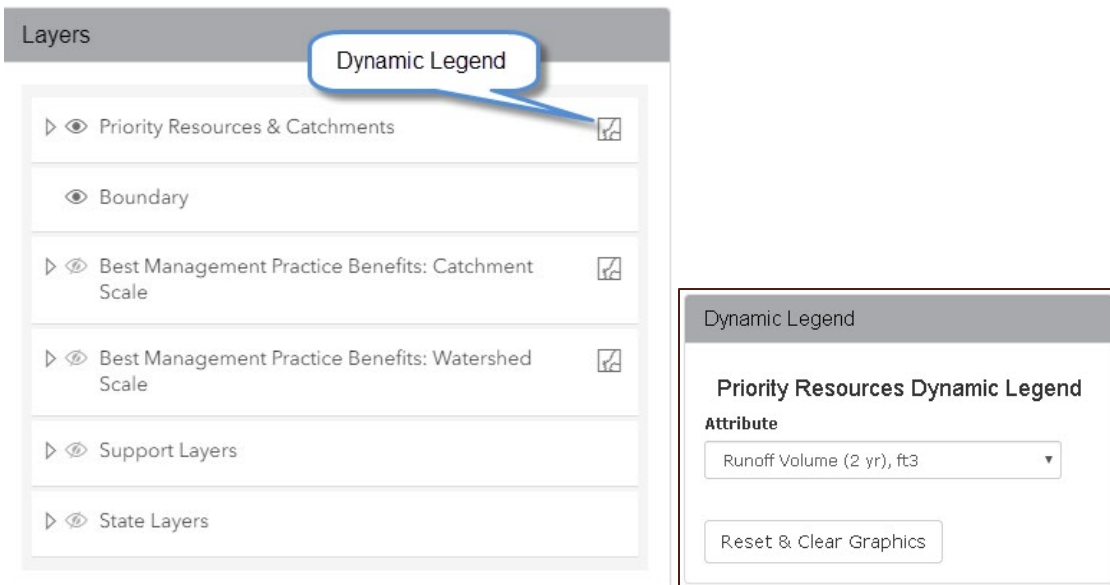
A layer may be displayed or hidden on the Interactive Map by clicking on the "eye" symbol. The 👁 symbol means a layer is being displayed, while the 👁 symbol means it is hidden. These selections will automatically update the data shown on the screen and the map legend. It is important to note that

some layer elements are nested and will not display unless the main layer is selected to be visible. Some layers show a "dynamic legend" symbol on the right-hand-side. The dynamic legend can be accessed by clicking on the dynamic legend symbol. Once the dynamic legend is accessed, an attribute can be selected for display on the Interactive Maps. When an attribute is selected it appears as a layer where transparency can be increased and decreased. The dynamic legend will go away when Reset & Clear Graphics is clicked.
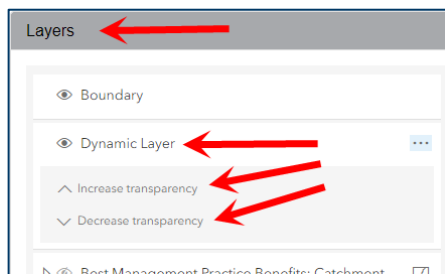
Some processing time is needed once the attribute is selected before the interactive map is updated.

The "Reset & Clear Graphics" button is used to clear the Interactive Map display. The button is normally used prior to beginning the process of displaying new information on the Interactive Map.

4. The "Search" tab could be used to search address, location, or another geographic feature on the map. This may be useful if you wish to show catchments and catchment-specific sediment, TN, or TP loading or hydrology information overlying important bodies of water or certain addresses.
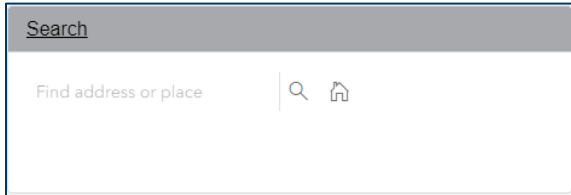
4.4 Printing Your Map

Once your map has been created with the Interactive Map tool, it can be formatted and printed to be used in water quality planning documents or grant applications. This feature is the fifth and final feature layer on the left-hand-side of the Interactive Map:

The 'Print' feature has the option to print in a layout format or map only format. The layout format includes map elements in the exported graphic (title, scalebar, legend, etc.) while the map only format consists of only visual data displayed along with the basemap. In the Layout tab the options are to add a title, page setup, file format. The Advanced options are optional and include: scale, author, copyright and DPI (dots per inch). The map only tab has the options for a file name, file format, and the width and height of the map. Width and Height are in pixels. The conversion from inches to pixels is 1 inch = 96 pixels. An 8.5"x11" = 2550x3300+ pixels. The advanced options are to set the scale and DPI of the file.
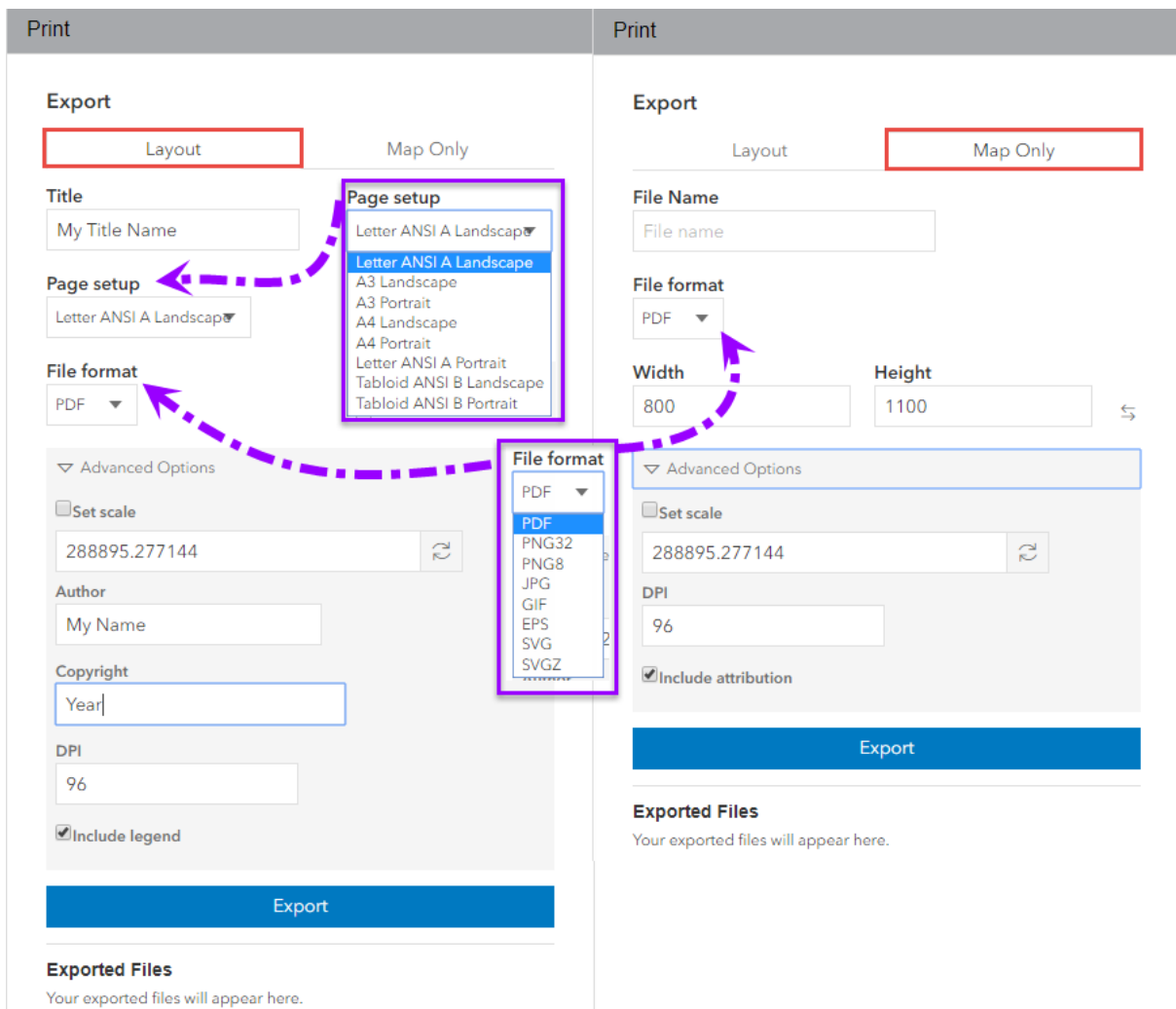
TIP: If your map is not printing both the map and legend, try using different 'Page Setup' options. The 'A3 Landscape' option will fit most legend items onto a typical page size.

Each exported map will appear as a download cloud button ⬇ located at the bottom under "Exported Files". When selected, a new tab will open up and display the exported map.

TIP: If downloading to a PDF format the user must have a PDF reader on the computer being used. All other formats will work as normal.

You should also set your Map Extent to fully contain the area you wish to print. You can use the plus/minus

buttons (shown to the right) to zoom in and out.

You can also use the default extent (⌂) to revert to the original map layout, which is typically the watershed boundary.

4.5 Table Generator

The Table Generator is accessed from any page by pressing the 'Table Generator' button located on the web page header.
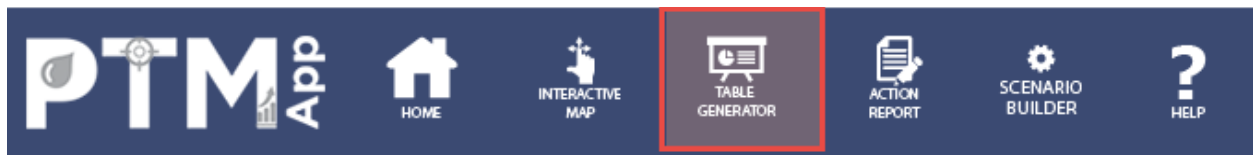
The Table Generator allows the user to download all the tabular data from PTMApp-Web for a selected watershed. The data is stored in a .csv format. When the watershed of interest is selected and the "Download All Data" is selected the CSV file will appear in the bottom left corner of the web browser. The user can then save this to a specified location. Please note: the download setting may vary by browser and personal settings.
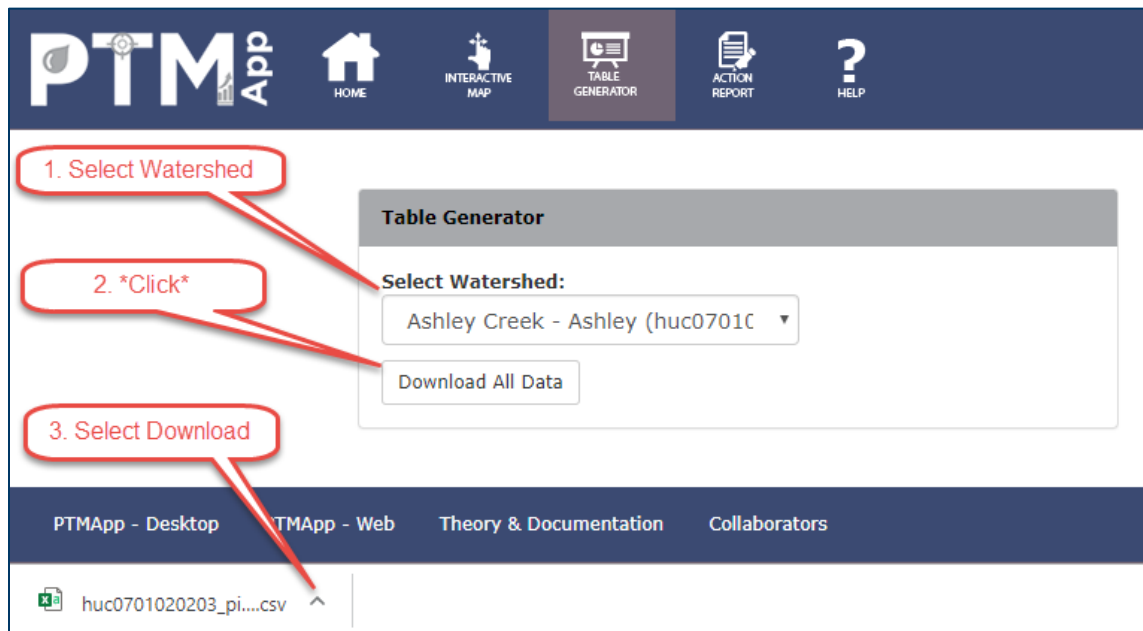
4.6 Action Report – Treatment Groups

TIP: Use this section for directions on Action Report if the data on the web are using Treatment Groups to show BMP locations. You know if the data contains Treatment Groups by scrolling to Step 3: Type of Practice on the Action Report page on the web. Alternatively, you can find out if the data is Treatment Group or NRCS practice on Step 3 of Action Report, or by using the Interactive Map Best Management Practice Benefits layers within the "Layers" menu dropdown.

If the data is NRCS practices, see section 4.7 Action Report – NRCS Practices of this guide for instructions.

The Targeted BMP Action Report (or simply: Action Report) is accessed from any page by pressing the 'Action Report' button located on the web page header.

This tool allows the user to develop a targeted BMP action plan from PTMApp-Web for a selected watershed based on resource location points. The final product is a report up to 4 full pages, including one page for the report details and map and up to 3 additional pages with a table showing the BMPs resulting from the selection. Due to the page limit, a maximum 40 BMPs will be printed in any given report. Please note: if you would like additional BMPs exported, please use Scenario Builder, which has no limit on BMP export.

To tailor the targeted BMP action plan, various user selected criteria are laid out in a 4-step process and are as follows:

Step 1: From the dropdown menus, the user selects the watershed of interest along with the specific Location Point Number (numbered red points) in the watershed for generating the report. Once a Location Point Number is selected, the watershed boundary defined by the point will appear on the map in a thin purple line. It should be noted the Location Point Numbers were predefined when the data was created.

Step 2: Next, the user must select one water quality parameter to use to select the BMPs for the Action Report.

Step 3: Third, the user must select the type of practices/treatment groups which are to be considered in the report analysis. The BMP information, including the estimated load reduction and cost, is summarized by treatment group. PTMApp's 'Theory and Documentation' page defines which BMPs are included in each group. It should be noted that available option(s) for BMPs to be considered are given bold text while unavailable option(s) have plain font (e.g., biofiltration below). When hovering over the unavailable options check box, a 🚫 symbol will also appear indicating the absence of this treatment group. The absence of practice types is likely due to the decision made to exclude practices when PTMApp-Desktop was run. When types of practices are

selected, they can be spatially seen on the map located in the "Step 1" box after pushing "Update Map" under Step 4 of Action Report.

Step 4: Lastly, the user must review and select from 5 different options relating to the basis for the practice selection and finish by clicking on the "Generate Report" button.

The breakdown of these selections is as follows:

A. **Method to Rank BMPs**: This selection method chooses BMPs from most to least preferred or the probable implementation order.
   a. Option: *Cost-Effectiveness* – ranks the BMPs from lowest to highest cost-effectiveness based on the $/mass reduced by the practice. This is the default and most common choice.
   b. Option: *Load Reduction* – ranks the BMPs based on the treatment magnitude of the parameter selected in "Step 2" (Sediment, Phosphorus, or Nitrogen).
   c. Option: *Cost* – rank BMPs based on the lowest BMP cost.

B. **Method Used to Select BMPs**: This is a method of selecting which BMPs should be included in the report and works in combination with the prior "Method to Rank BMPs" selection. **It is important to note that the maximum number of BMPs that will be printed in the report is 40.** Examples below are for Sediment so the reporting unit for mass is in tons but will be pounds if Phosphorus or Nitrogen is selected for the water quality parameter.

a. Option: *Number of Highest Ranked BMPs* – This option simply ranks the data based on the prior ranking selection (i.e., 'Method to Rank BMPs') with no filters. Additionally, the user can input the number of BMPs to print in the report. The default is 40 which is also the maximum number that can be printed.

b. Option: *Less than Maximum Cost-Effectiveness* – This option allows the user to screen and not consider any BMPs exceeding a user-defined cost-effectiveness threshold ($/mass).

c. Option: *Range of Cost-Effectiveness* – This option allows the user to define both the lower and upper cost-effectiveness thresholds ($/mass) for BMPs printed in the report.

d. Option: *Minimum Load Reduction* – This option allows the user to screen any BMPs that have load reduction below a user-defined minimum (mass).

e. Option: *Range of Load Reduction* – This option allows the user to define both the lower and upper load reduction thresholds (mass) for BMPs printed in the report.

f. Option: *Maximum Cost* – This option allows the user to screen and not consider any BMPs exceeding a user-defined BMP maximum cost threshold ($).

g. Option: *Cost Range* – This option allows the user to define both the lower and upper BMP cost thresholds ($) for BMPs printed in the report.

C. **Outlet Location**: In this parameter, the user chooses whether the load reductions, cost-effectiveness, and ranks are based on load reduction benefits to the edge of field (i.e. catchment outlet) or based on load reduction benefits to the downstream outlet point defined by the Location Point Number selected in Step 1 (i.e. watershed outlet – this is the default option).

Outlet Location ❷

Watershed Outlet ▾
Watershed Outlet
Catchment Outlet

D. **Storm Event**: In this parameter, the user chooses whether BMP benefits are estimated from the 2-year 24-hour (default) or 10-yr 24-hour storm event.

Storm Event ❷

2 - Year ▾
2 - Year
10 - Year

E. **Anticipated Practice Performance**: Based on the user selected 'type of practice' in step 3, options for the respective anticipated practice performance become enabled in this parameter. By default, they are populated with the 'Median for Q2 (expected)' option. This represents the 50th percentile. The other two options for any given 'type of practice' are 25th percentile (Q1, Low) or 75th percentile (Q3, High). These performance estimates are calculated in PTMApp-Desktop based on a reduction ratio derived from the empirical statistical distribution of BMP effectiveness specific to each 'type of practice'.

Anticipated Practice Performance ❷	25th percentile for Q1 (low)	Median for Q2 (expected)	75th percentile for Q3 (high)
Source Reduction	○	⦿	○
Biofiltration	○	○	○
Filtration	○	⦿	○
Infiltration	○	⦿	○
Storage	○	⦿	○
Protection	○	⦿	○

4.7 Action Report – NRCS Practices

TIP: Use this section for directions on Action Report if the data on the web are using NRCS practices to show BMP locations. You know if the data contains NRCS practices by scrolling to Step 3: Type of Practice on the Action Report page on the web. Alternatively, you can find out if

the data is Treatment Group or NRCS practice on Step 3 of Action Report, or by using the Interactive Map Best Management Practice Benefits layers within the "Layers" menu dropdown.

If the data is Treatment Groups, see section 4.6 Action Report – Treatment Groups **of this guide for instructions.**
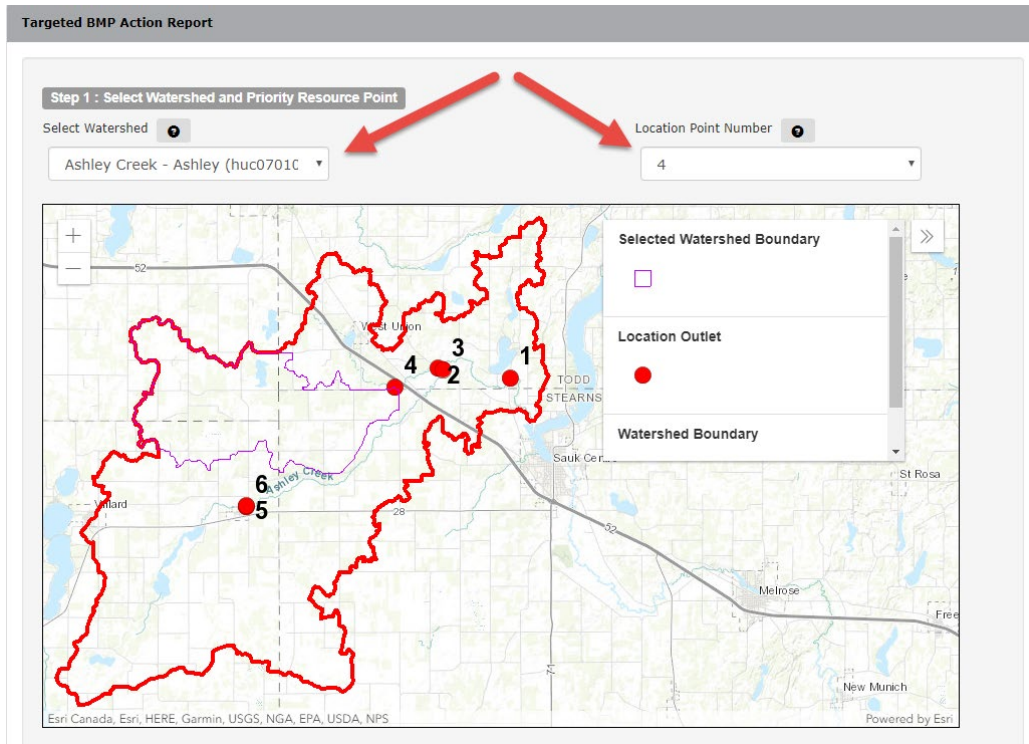
The Targeted BMP Action Report (or simply: Action Report) is accessed from any page by pressing the 'Action Report' button located on the web page header.
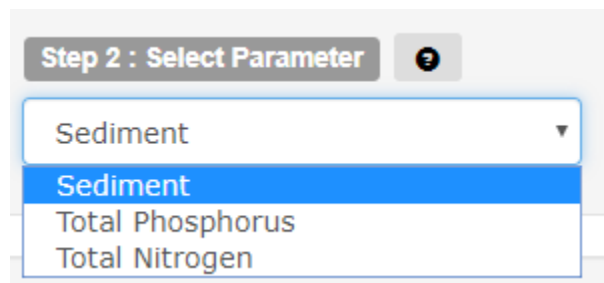

This tool allows the user to develop a targeted BMP action plan from PTMApp-Web for a selected watershed based on resource location points. The final product is a report up to 4 full pages, including one page for the report details and map and up to 3 additional pages with a table showing the BMPs resulting from the selection. Due to the page limit, a maximum 40 BMPs will be printed in any given report. Please note: if you would like additional BMPs exported, please use Scenario Builder, which has no limit on BMP export.

To tailor the targeted BMP action plan, various user selected criteria are laid out in a 4-step process and are as follows:

Step 1. From the dropdown menus, the user selects the watershed of interest along with the specific Location Point Number (numbered red points) in the watershed for generating the report. Once a Location Point Number is selected, the watershed boundary defined by the point will appear on the map in a thin purple line. It should be noted the Location Point Numbers were predefined when the data was created.

Step 2: Next, the user must select one water quality parameter to use to select the BMPs for the Action Report.

Step 3: Third, the user must select the type of practices/treatment groups which are to be considered in the report analysis. The BMP information, including the estimated load reduction and cost, is summarized by NRCS practice. It should be noted that available option(s) for BMPs to be considered are given bold text while unavailable option(s) have plain font (e.g., Regional Wetland/Pond - 656 below). When hovering over the unavailable options check box, a ⊘ symbol will also appear indicating the absence of this NRCS practice. The absence of practice types is likely due to either that the practice was not run through PTMApp Desktop, or there are no suitable locations within the watershed boundary area selected in Step 1. When types of practices are

selected, they can be spatially seen on the map located in the "Step 1" box after pushing "Update Map" under Step 4 of Action Report.

Step 3 : Select Type of Practice (NRCS Practice) ◉

☐ Conservation Cover - 327

☐ Cover Crop - 340

☐ Critical Area Planting - 342

☐ Denitrifying Bioreactor - 605

☐ Drainage Water Management - 554

☐ Farm Pond - 378

☐ Filter Strip - 393

☐ Forage and Biomass Planting - 512

☐ Grade Stabilization - 410

☐ Grassed Waterway - 412

☐ Infiltration Trench/Small Infiltration Basin - 350 ◉

☐ Large Wetland Restoration - 656

☐ Multi-stage Ditch (open channel) - 582

☐ No Till - 329

☐ Nutrient Management (Nitrogen) - 590

☐ Nutrient Management (Phosphorus) - 590

☐ Nutrient Management of Groundwater - 590

☐ Prescribed Grazing - 528

☐ Reduced Till - 345

☐ Regional Wetland/Pond - 656

☐ Riparian Herbaceous Cover - 390

☐ Saturated Buffer - 604

☐ WASCOB - 638

☐ Wetland Shoreline Restoration - 580

Step 4: Lastly, the user must review and select from 5 different options relating to the basis for the practice selection and finish by clicking on the "Generate Report" button.

The breakdown of these selections is as follows:

A. **Method to Rank BMPs**: This selection method chooses BMPs from most to least preferred or the probable implementation order.
    a. Option: *Cost-Effectiveness* – ranks the BMPs from lowest to highest cost-effectiveness based on the $/mass reduced by the practice. This is the default and most common choice.

b. Option: *Load Reduction* – ranks the BMPs based on the treatment magnitude of the parameter selected in "Step 2" (Sediment, Phosphorus, or Nitrogen).

c. Option: *Cost* – rank BMPs based on the lowest BMP cost.

B. **Method Used to Select BMPs**: This is a method of selecting which BMPs should be included in the report and works in combination with the prior "Method to Rank BMPs" selection. It is important to note that the maximum number of BMPs that will be printed in the report is 40. Examples below are for Sediment so the reporting unit for mass is in tons but will be pounds if Phosphorus or Nitrogen is selected for the water quality parameter.

a. Option: *Number of Highest Ranked BMPs* – This option simply ranks the data based on the prior ranking selection (i.e., 'Method to Rank BMPs') with no filters. Additionally, the user can input the number of BMPs to print in the report. The default is 40 which is also the maximum number that can be printed.

b. Option: *Less than Maximum Cost-Effectiveness* – This option allows the user to screen and not consider any BMPs exceeding a user-defined cost-effectiveness threshold ($/mass).

c. Option: *Range of Cost-Effectiveness* – This option allows the user to define both the lower and upper cost-effectiveness thresholds ($/mass) for BMPs printed in the report.

d. Option: *Minimum Load Reduction* – This option allows the user to screen any BMPs that have load reduction below a user-defined minimum (mass).

e. Option: *Range of Load Reduction* – This option allows the user to define both the lower and upper load reduction thresholds (mass) for BMPs printed in the report.

f. Option: *Maximum Cost* – This option allows the user to screen and not consider any BMPs exceeding a user-defined BMP maximum cost threshold ($).

Maximum Cost	▾	1000000	($)

g. Option: *Cost Range* – This option allows the user to define both the lower and upper BMP cost thresholds ($) for BMPs printed in the report.

		Min	Max	
Cost Range	▾	0	1000000	($)

C. **Outlet Location**: In this parameter, the user chooses whether the load reductions, cost-effectiveness, and ranks are based on load reduction benefits to the edge of field (i.e. catchment outlet) or based on load reduction benefits to the downstream outlet point defined by the Location Point Number selected in Step 1 (i.e. watershed outlet – this is the default option).

Outlet Location ❷

Watershed Outlet	▾
Watershed Outlet	
Catchment Outlet	

D. **Storm Event**: In this parameter, the user chooses whether BMP benefits are estimated from the 2-year 24-hour (default) or 10-yr 24-hour storm event.

Storm Event ❷

2 - Year	▾
2 - Year	
10 - Year	

E. **Anticipated Practice Performance**: Based on the user selected 'type of practice' in step 3, options for the respective anticipated practice performance become enabled in this parameter. By default, they are populated with the 'Median for Q2 (expected)' option. This represents the 50th percentile. The other two options for any given 'type of practice' are 25th percentile (Q1, Low) or 75th percentile (Q3, High). These performance estimates are calculated in PTMApp-Desktop based on a reduction ratio derived from the empirical statistical distribution of BMP effectiveness specific to each 'type of practice.'

OPTIONAL: Adjust Anticipated Practice Performance ❷

	Low (25th percentile)	Moderate (50th percentile)	High (75th percentile)
Conservation Cover	○	○	○
Cover Crop	○	○	○
Critical Area Planting	○	○	○
Denitrifying Bioreactor	○	○	○
Drainage Water Management	○	○	○
Farm Pond	○	○	○

4.8 Scenario Builder – Treatment Groups

TIP: Use this section for directions on Scenario Builder if the data on the web are using Treatment Groups to show BMP locations. Determine if data contains Treatment Groups in Step 3 of the Scenario Builder. Alternatively, determine if data is Treatment Group or NRCS practice on Step 3 of Action Report, or by using the Interactive Map Best Management Practice Benefits layers within the "Layers" menu dropdown.

If the data is NRCS practices, see section 4.9 Scenario Builder – NRCS Practices of this guide for instructions.

Scenario Builder is accessed from any page by pressing the 'Scenario Builder' button located on the web page header.

Scenario Builder allows the user to develop a more in-depth targeted plan than the Action Report. The user selects a watershed and priority resource point, goes through a set of questions, and is provided with all the available options of BMPs. The user can fine tune the selection based on filters and selection criteria if they choose to do so. At the end of the Scenario Builder tool, the user can download the practices, priority resource point, and watershed boundary in shapefile format which can then be used on a computer in a geospatial information system program like ESRI ArcMap / ArcGIS Pro or QGIS.

Scenario Builder goes through 8 steps where the user can define what kinds of practices will be output in their scenario. Throughout Scenario Builder, there are help buttons that the user can click on to gain more information about what the selection does. Additionally, hovering over selection options within the program will provide additional information. These steps are outlined below.

4.8.1 Step 1: Select an Existing Scenario or Select Watershed and Priority Resource Location

Step 1: By default, the drop-down menu 'Select Scenario Builder' will have 'New' displayed. When starting the first scenario, the only option will be 'New'. At the end of Scenario Builder, the user will have the option to save the created scenario and associated choices. Upon saving the scenario in Step 8, the drop-down menu in Step 1 will show 'New' or the saved name of the scenario.

'Select Watershed' is where the user will choose the watershed where the scenario is to be run. An autofill drop-down menu will appear with all the watersheds that match the text you are inputting. HUC ID can be used to search for the watershed as well. To view all the watersheds available, simply push the spacebar without any additional letters or numbers in the text box.

After selecting the watershed (A), the map in the background will zoom in on that watershed. This enables the user to determine if the correct watershed was selected. Additionally, all priority resource locations within the watershed will populate on the map to help identify which priority resource location should be used. The map is interactive and can zoom in and out.

Priority Resource Points are also interactive. Clicking on the priority resource point on the screen will provide additional useful information about that location.

Table 1 The information that pops up when clicking on a priority resource location. Data comes from PTMApp Desktop.

Web Attribute Name	Description	Units	Desktop Attribute Name	Desktop Attribute Table
Watershed Area	The drainage area to that priority resource location	Acres	Acres	Table_p_res_catchment
Est. Sediment Load (t/yr)	The estimated sediment load delivered to priority resource location	Tons/year	Sed_sum	Table_p_res_catchment
Est. Total P Load (lb/yr)	The estimated total phosphorus load delivered to the priority resource location	Lb/year	TP_sum	Table_p_res_catchment
Est. Total N Load (lb/yr)	The estimated total nitrogen load delivered to the priority resource location	Lb/year	TN_sum	Table_p_res_catchment
Min. Travel Time (hours)	Priority resource catchment minimum travel time in hours	Hours	Wshed_min_tt	Table_p_res_catchment

After locating the priority resource location on the map, use the drop-down menu under priority resource location (B) to select that priority resource location. After making the priority resource location selection in the drop-down menu, the map will automatically update and zoom into that priority resource boundary location.
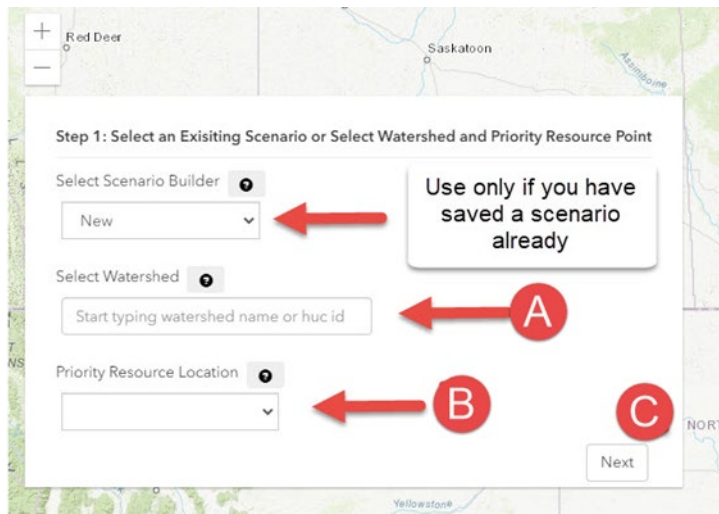
When you have selected both your watershed and priority resource location, push the 'Next' button (C) in the bottom right-hand corner of the Step 1 screen. You will be directed to Step 2.

4.8.2 Step 2: Select Water Quality Parameters

Step 2: The user will select water quality parameter(s) that are to be addressed in the scenario report. At least one parameter must be selected. This step tells the Scenario Builder which types of filters to apply to the best management practices being targeted, which are chosen in Step 3.

In the image below on the left-hand side, the user can select what water quality parameters to use. By default, none are selected.

On the right-hand side of the image, two additional buttons in the lower right-hand portion of the tool. The 'Start Over' button will take the user back to the Welcome screen of Scenario Builder and will not remember any of the selections made. If the 'Back' button is clicked, the user will go back one step and all data will be remembered.

TIP: Use the 'Start Over' button to clear all choices made and to restart the Scenario Builder from the beginning. Use the 'Back' and 'Next' buttons to move between steps without losing data selections on different steps. Once you have gotten to Step 8, you can save your report and access it from Step 1.

4.8.3 Step 3: Select Treatment Groups

Step 3: In this step, the user can select what treatment groups will be used within Scenario Builder. You must select at minimum, one treatment group. The help icon can be used to identify what best management practices are grouped within each treatment group.

Treatment groups selected on this screen will be used in the Scenario Builder report if they fall within the screening criteria of future steps. After pushing 'Next', the map will update with all potential treatment group locations within the priority resource location selected in Step 1.

4.8.4 Step 4: Select Summary Location

Step 4: Summary location selection determines at what scale water quality benefits are calculated. If 'At Field Edge' is chosen, the reduction potential of the treatment group practice is at field edge. If 'At Watershed Outlet, Lake, or Stream Reach' is chosen, the reduction potential of the treatment group practice will be at the priority resource location. A selection must be made at this step-in order to move to Step 5.

When you push 'Next', the map will not change.

If additional information is sought regarding what selection should be made, make sure to click on the help button next to the Step 4 title. Additionally, the user can hover over the radial button and additional

information will pop up. As an example, the image below is hovering over (not clicking) the 'At Field Edge' text. Additional information pops up next to it to provide information related to 'At Field Edge' and how that will impact BMP reduction potential. Note: the hover over help information is different than the help button information.

4.8.5 Step 5: Select Practice Cost

Step 5: Selecting Practice Costs is a multi-step process comprised of the cost method and the cost type.
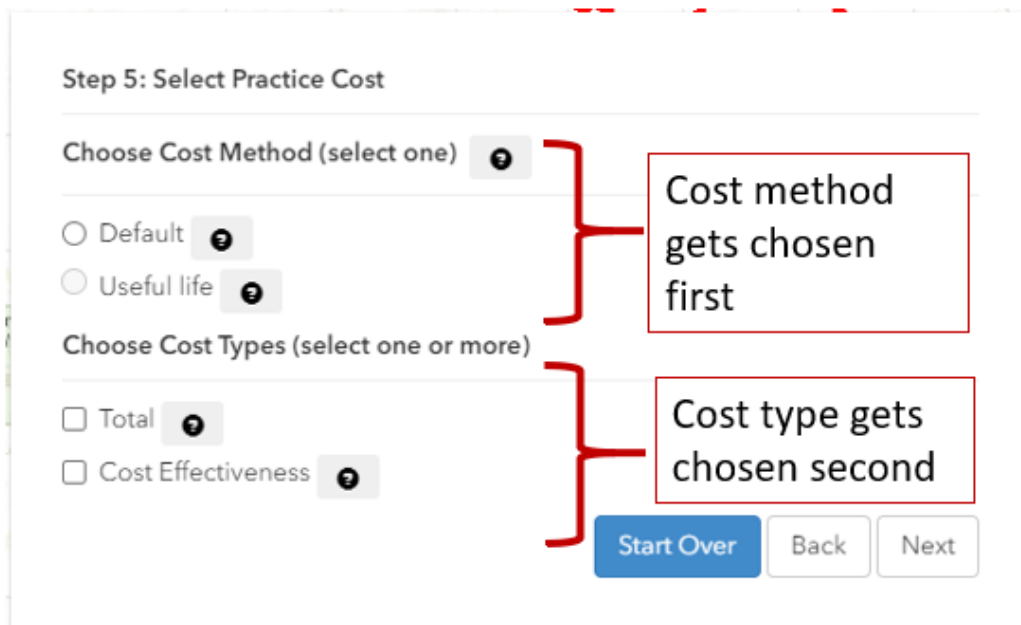
4.*8.5.1 Cost Method*

Treatment Group data does not have Useful Life costs calculated for them. This option is greyed out. For Treatment Groups, the only cost method available is the "Default" cost method button. See Step 5 Cost Method in section 4.9 to learn more about Useful Life Cost Method and options.

Default Costs: are based off the 2019 NRCS Environmental Quality Incentives Program schedule. Some costs (operation and maintenance) are not always part of the default cost calculation. Default costs do not consider the useful life costs of the BMP.

After selecting 'Default Cost' the user will be required to select the cost type associated with the cost method. The table below outlines the differences between the cost types. The user may select multiple cost types.

Table 2 Scenario Builder - Treatment Groups - Cost Method Explanation

Cost Type	Default Cost Method
Total	The total cost of the best management practice based off 2019 EQIP costs.
Cost Effectiveness	Total cost divided by the estimated annual median load reduction the practice provides.

After completing the selections for cost method and cost type, push the 'Next' button to go to Step 6. Going from Step 5 to Step 6 will refresh the map on the screen. This update will reflect the choices made in Step 5 regarding cost methods and cost types. **Note**: the map may not update if the BMPs fall within the filter range values.

4.*8.6 Step 6: Select Additional Filters*

Step 6 is an optional step where the user can further refine what BMPs end up in the Scenario Builder report. There are two additional criterion the user can filter by: size of practice, and practice performance.

These filter criteria can be used to remove the extremes of the lower and upper bounds of the PTMApp BMP data for size of practice and to set a lower bound for practice performance. These filters are pre-determined bounds based on each specific treatment group.

TIP: You can view/change the lower and upper bounds of these practices in Step 8.

If selections for additional filters in Step 6 were made, pushing the 'Next' button will update the map to reflect the BMPs that are within the filtering criteria bounds.

4.*8.7 Step 7: Sort Practices for Report*

Step 7: Sorting practices for the report will not impact any of the BMPs that end up in the report. At this step, practice selection has been finalized. The final report and the shapefiles that will be available to download will reflect what practices are on the map.

There are 5 different ways to sort practices within the PDF report. Hovering over each sorting preference will provide information on how the sorting feature will work (low to high, high to low).

Table 3 Scenario Builder - Treatment Group - Practice Report Available Sorting Criteria

Sorting Option	Unit	Sorted By
Total Cost	Dollars	Lowest to Highest BMP cost
Cost Effectiveness	Dollar per unit load reduction	Least to greatest default cost effectiveness
Practice Size	Acres	Smallest to largest surface area
Performance	Decimal percent load reduction	Greatest to least percentage of annual load reduction at the practice
Annual load reduction	Mass per year	Greatest to least estimated annual load reduction
**Useful Life Annualized is not available for treatment group data.		

Sorting by Cost Effectiveness, Performance, and Annual Load Reduction require a 2-step process. After pushing the radial button for the sorting selection, a drop-down menu will appear at the bottom of the tool and additional information regarding which water quality parameter to rank by will be required. In the image below, the two-step process is shown.

After making the selections in Step 7, push the 'Next' button to proceed to Step 8. There will be no updates to the map because no filters were applied in Step 7.

4.8.8 Step 8: View, Adjust, Save, or Download Data

Step 8: There are no additional filters or sorting criteria that are applied in this step. This step is where the user can save the choices from the previous 7 steps. When clicking 'Save Scenario Builder', the user will get the screen below 'Save Selections'. Here the user can add a name to saved scenario so that it can be accessed on Step 1 of the Scenario Builder.

The 'Description' box is used to add comments regarding scenario choices. This is not yet functional.

After saving Scenario Builder, the user is immediately redirected to Step 1 of the tool. To go back to Step 8 after saving, from Step 1, use the 'Select Scenario Builder' drop down menu and locate the saved Scenario Builder. At this time, there is not limit on how many saved scenarios a user can have. The user will be redirected back to Step 8 to proceed to use the 'Generate Report' and 'Export to Shapefile' features.

Scenario Builder has been completed at this step. The user can download the PDF report, export shapefiles of the BMPs, watershed boundary, and priority location point.

4.8.8.1 Generate Reports

The 'Generate Reports' section allows the user to download the scenario build report. The report will have a header showing the report details of who made the report, what watershed the report was made for, what priority resource location is being used, and when the report was generated.

Selection Criteria is also present in the header, providing information on what water quality parameter(s) were used in the creation of the report, what treatment groups were used, how the treatment groups are ranked, and what storm event (2 year or 10 year) was used to estimate median benefits of each treatment practice. The default storm event is always a 2 year-24-hour storm event. To change this event, use 'Modify Report Default Inputs', which is addressed later in this section.

There is a map showing the current extent of the zoom of the map on the website. To zoom in and print a map that shows a more specific area, use the +/- icon just above the tool and below the PTMApp icon in the upper right-hand corner of the screen. Re-generate the report with the map zoomed to the extent you want.

Table 4 Scenario Builder PDF Output Header and Definitions

Header	Definition	Units	Web Shapefile Output Attribute Relationship
Practice Type	The NRCS practice or treatment group.		Grp_code
Catch ID	The catchment ID number associated with where the BMP is located		N/A
Drainage Area Treated	The upstream drainage area to the BMP	Square feet	Wtsarea_
Practice Size	The surface area of the practice rounded to the nearest whole number	Acres	N/A
Township	Township number of where BMP is based on PLSS		township

Header	Definition	Units	Web Shapefile Output Attribute Relationship
Range	Range number of where BMP is based on PLSS		range
Section	Section number of where BMP is based on PLSS		section
PTMApp Cost	The cost of the BMP either in default total cost or useful life total cost depending on what the user inputted in Step 5.	Dollars	Bmp_tot
Annualized Useful Life Cost	The useful life of the BMP divided by the expected life expectancy of the BMP type	Dollars/Year	N/A
Estimated Annual Sediment Reduction	The annual sediment reduction by the BMP at either field edge or priority resource location depending on what the user inputted in Step 4.	Ton	Est_s_re
Cost Effectiveness to Treat Sediment	The dollar per ton to reduce sediment using this specific BMP. Cost effectiveness is based on default cost or annualized useful life cost depending on what the user chose in Step 5.	Dollars/Ton	Est_s_re_1
Estimated Annual Total Phosphorus Reduction	The annual total phosphorus reduction by the BMP at either field edge or priority resource location depending on what the user inputted in Step 4.	Lb.	Est_p_re
Cost Effectiveness to Treat Total Phosphorus	The dollar per lb to reduce TP using this specific BMP. Cost effectiveness is based on default cost or annualized useful life cost	Dollars/Lb.	Est_p_re_1

Header	Definition	Units	Web Shapefile Output Attribute Relationship
	depending on what the user chose in Step 5.		
Estimated Annual Total Nitrogen Reduction	The annual total nitrogen reduction by the BMP at either field edge or priority resource location depending on what the user inputted in Step 4.	Lb.	Est_n_re
Cost Effectiveness to Treat Total Nitrogen	The dollar per lb to reduce TN using this specific BMP. Cost effectiveness is based on default cost or annualized useful life cost depending on what the user chose in Step 5	Dollars/Lb.	Est_n_re_1

4.*8.8.2 Export to Shapefile*

In the next section of Step 8, Export to Shapefile, the user can export the treatment group practices (polygon shapefile), selected watershed boundary (priority resource boundary, polygon shapefile), and the priority resource location (point shapefile). Pushing these buttons will start an automatic download to a downloads folder on the user's computer. The files will be in a zipped file format. To access the information within the folder, the user will need to unzip the folder and then load the shapefiles into a geospatial information system program (like ArcMap, ArcGIS Pro, or QGIS).

After the files have been unzipped, they will appear in this format:

After loading the location outlet, selected practices, and selected watershed boundary into the desired geospatial information system program, attributes for the shapefiles can be accessed.

4.8.8.2.1 Location Point

The 'Location Point' attributes are listed in Table 5

Table 5 Location Point - Point File Output Attribute Table

Attribute Title	Name	Definition	Units
P_res_ca	Priority Resource Catchment ID	The priority resource location that was chosen in Step 1 of the Scenario Builder	
Acres	Acres	Watershed area in aces. The drainage area to the priority resource location chosen.	Acres
Wshed_mi	Watershed Minimum Travel Time	Minimum travel time for water to reach priority resource point	Hours
Sediment	Sediment lost at priority resource location	The amount of sediment passing through the priority resource location per year	Tons
tp_sum	Total Phosphorus lost at priority resource location	The amount of total phosphorus passing through the priority resource location per year	Lbs

tn_sum	Total nitrogen lost at priority resource location	The amount of total nitrogen passing through the priority resource location per year	lbs

4.8.8.2.2 Practices

The practice attributes are listed in Table 6.

Table 6 Practices Shapefile - Attribute Table

Attribute Title	Name	Definition	Units
Grp_code	Group Code	Treatment Group Number	N/A
Unq_bmp_	Unique BMP ID	The unique BMP ID number associated with this one polygon	N/A
Wtsarea_	Watershed Area	The drainage area to the BMP	Acres
Bmp_tot_	BMP Total Cost	The BMP Total Cost is either the Default Total Cost OR the Useful Life Total Cost that was selected in Step 5 of Scenario Builder	Dollars
Est_s_re	Estimated Sediment Reduction	The total estimated sediment reduction potential of the BMP at either the priority resource location OR field edge depending on what you chose in Step 4 of the Scenario Builder	Tons / year

Attribute Title	Name	Definition	Units
Est_s_re_1	Estimated cost effectiveness of sediment reduction	Cost effectiveness of sediment at either the priority resource location or at field edge AND based on default total cost OR total useful life cost depending on your choices in Scenario Builder	Total Cost / Tons
Est_p_re	Estimated Total Phosphorus Reduction	The total estimated phosphorus reduction potential of the BMP at either the priority resource location OR field edge depending on what you chose in Step 4 of the Scenario Builder	Lbs / year
Est_p_re_1	Estimated cost effectiveness of total phosphorus reduction	Cost effectiveness of total phosphorus at either that priority resource location or at field edge AND based on default total cost OR total useful life cost depending on your choices in Scenario Builder	Total Cost / lbs
Est_n_re	Estimated Total Nitrogen Reduction	The total estimated total nitrogen reduction potential of the BMP at either the priority resource location OR field edge depending on what you chose in Step 4 of the Scenario Builder	lbs / year
Est_n_re_1	Estimated cost effectiveness of total nitrogen reduction	Estimated cost effectiveness of total nitrogen at either that priority resource location or at field edge AND based on default total cost OR total useful life cost depending on your choices in Scenario Builder	Total Cost / lbs
Township	Township	The township number of the BMP location based on the Public Land Survey System	N/A
Range	Range	The range number of the BMP location based on the Public Land Survey System	N/A
Section	Section	The section number of the BMP location based on the Public Land Survey System	N/A

Attribute Title	Name	Definition	Units
Catch_id	Catchment ID	The catchment number associated with the catchment on PTMApp Desktop of where the BMP is located	N/A

4.8.8.2.3 Selected Boundary

Select Boundary attributes are in Table 7.

Table 7 Selected Boundary - Attribute Table

Attribute Title	Name	Definition	Units
P_res_ca	Priority Resource Catchment ID	Priority Resource Catchment ID	

4.8.8.3 Modifying Default Filters Within PTMApp Web Scenario Builder

Within Step 8, there is an additional dropdown menu labeled 'Modify Report Default Inputs'. Clicking this button will prompt a warning and require an acknowledgement that modifying default inputs is not recommended unless the user has a strong understanding of how and why adjustments to the default settings should be made.
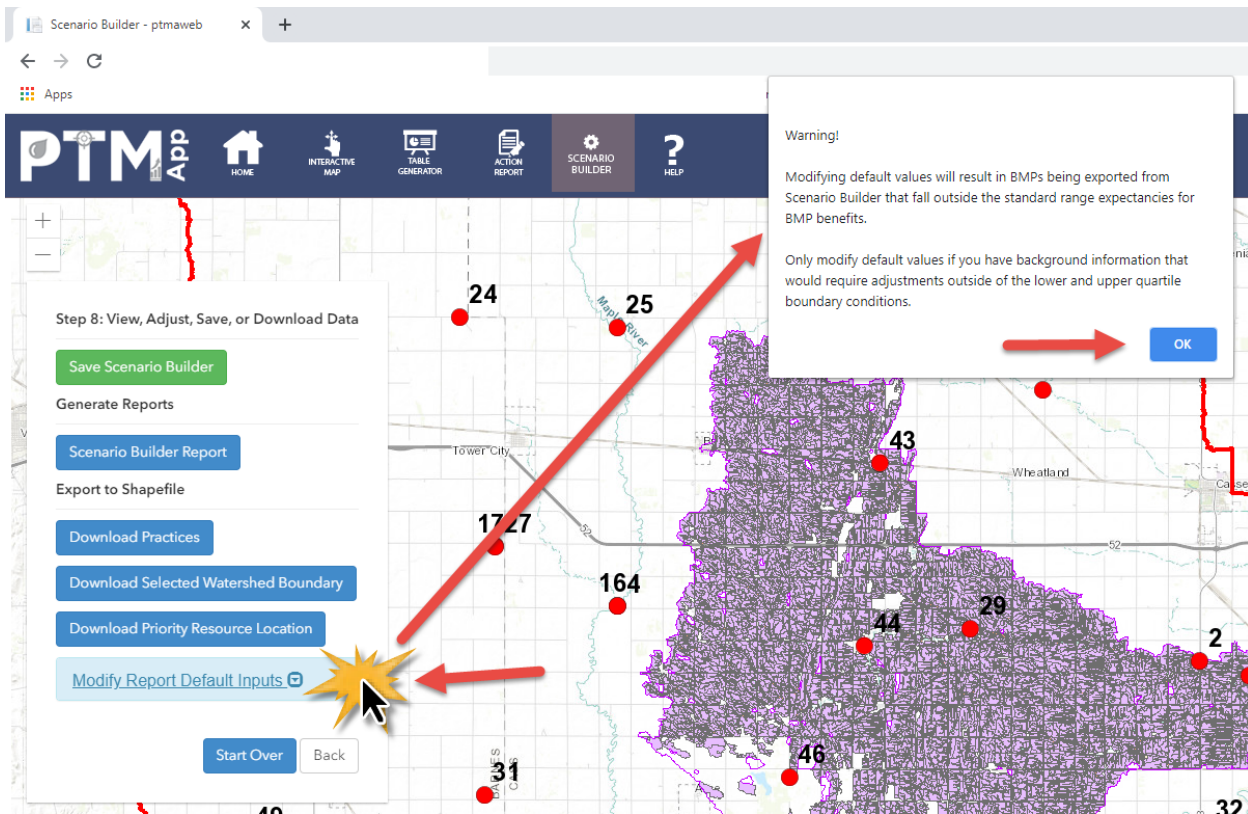
After accepting the warning pop-up by pushing 'OK', additional buttons populate in the dropdown area of the 'Modify Report Default Inputs'.

There are many things to adjust within the 'Modify Report Default Inputs' that can affect what practices end up in the Scenario Builder report. The user can adjust all the filter values for load reduction, practice costs, cost

effectiveness, size of practice, storm condition, and whether the data is summarized at the field edge or at the watershed outlet location. In short, these buttons allow you to go in and change all information that you have selected in the previous 7 steps all in one location.

4.8.8.3.1 Load Reduction - 1

Pushing 'Load Reduction (1) opens the following screen: The buttons and their functions are described in Table 8 that follows the figure.
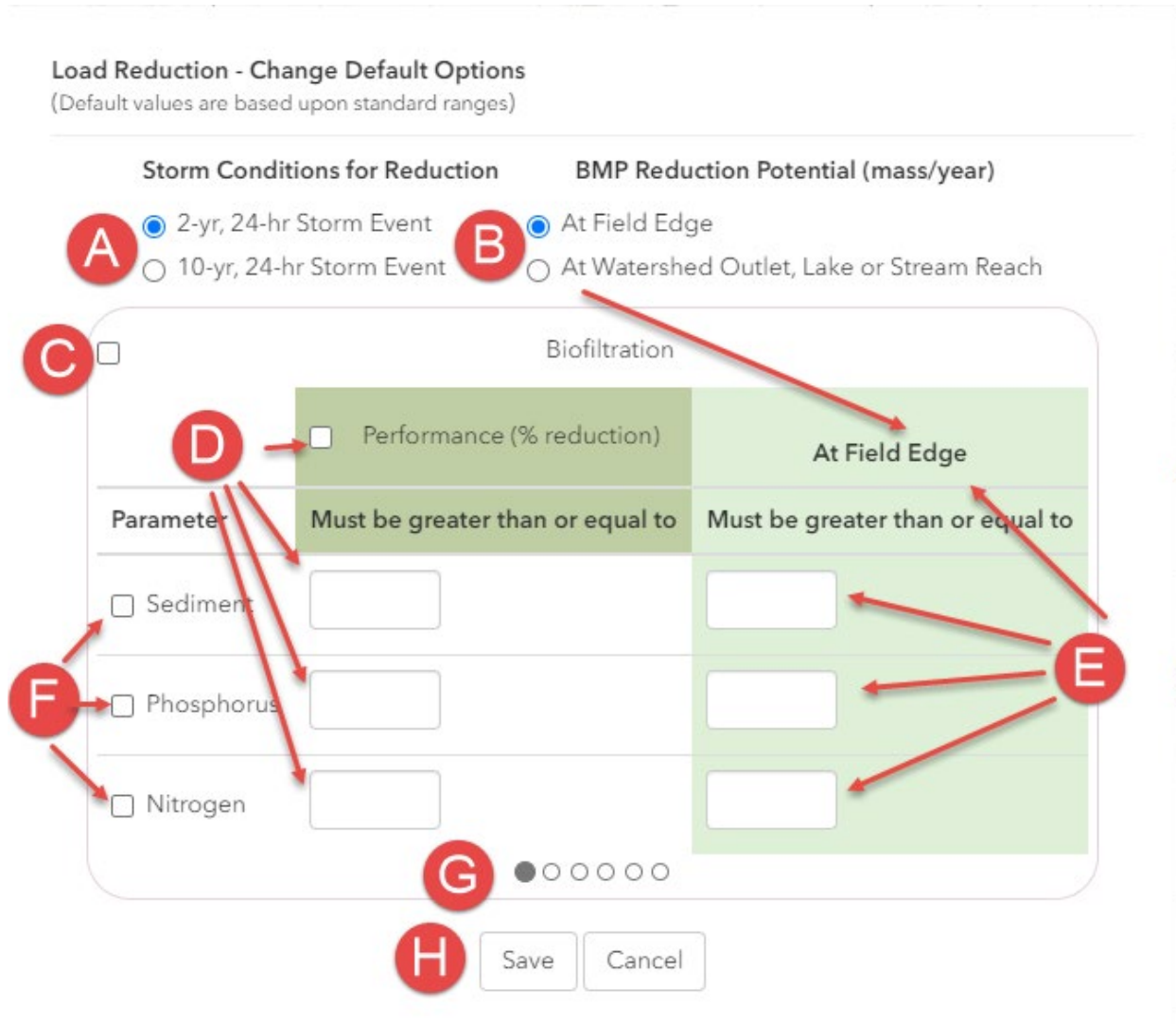
Table 8 Scenario Builder - Treatment Group - Load Reduction Modify Default Inputs

Button	Description	Impact	Unit Where Applicable
A	User to change the BMP reduction potential from the default 2-year, 24-hour storm event to a 10-year, 24-hour storm event.		
B	User can change the BMP reduction potential between 'At Field Edge' and 'At Watershed Outlet, Lake or Stream Reach'. If user changes the location where BMP reduction is calculated, the light green box where the arrow next to 'B' is pointing will change to reflect the changes made in the radial button.	This will overwrite the decision made in Step 4 of Scenario Builder.	Mass/year
C	User can add or remove treatment groups from the final Scenario Builder report and map by checking this box.	This will overwrite the decision made in Step 3 of Scenario Builder	
D	Checking or unchecking this box will add or remove the filter for BMP performance. If the check box next to button C is selected AND a check box next to button F is checked AND Performance % Reduction next to button D is checked, values will populate in the boxes in the Performance (% reduction) column. The values are decimal percent. If a BMP to be used in the report must have at least 50% reduction potential, the number to be input into the cell should be 0.5. If a BMP is to reduce 100% of the parameter, a value of 1 should be in the cell.	This will overwrite your decision made in Step 6. It can also affect the decisions made in Step 2 and Step 3 if the user adds additional check boxes next to button C and F.	Decimal percent
E	The cells that button E is pointing to should be populated IF the check box next to button C and F are also checked. These values will reflect the required minimum sediment, total phosphorus, or total	If multiple parameters (sediment, total phosphorus, total nitrogen) are selected at the same time, the BMP must	Mass/year (tons for sediment, lbs for total phosphorus, total nitrogen)

Button	Description	Impact	Unit Where Applicable
	nitrogen then BMP must retain to be in the report	meet ALL those parameters to be included.	
F	The parameters that are being used to filter BMPs. If multiple parameters are selected, the BMP must meet ALL the parameter specifications to be part of the report.	The checkboxes will be filled according to the initial selections made in Step 2. If you change the check boxes here, it will overwrite your decision made it Step 2.	
G	These radial buttons allow the user to toggle between the 6 treatment groups. The user can adjust each of the 6 treatment groups as listed above.	Any changes made to buttons A and B between radial buttons next to button G will be changed for ALL other treatment groups. There cannot be a situation where one treatment group is at a 2-year 24-hour storm event and a different one is at a 10-year 24-hour storm event.	
H	Save your changes. After pushing save, the map will update accordingly.	You will be redirected back to the standards Step 8 viewing page	

4.8.8.3.2 Practice Cost - 2
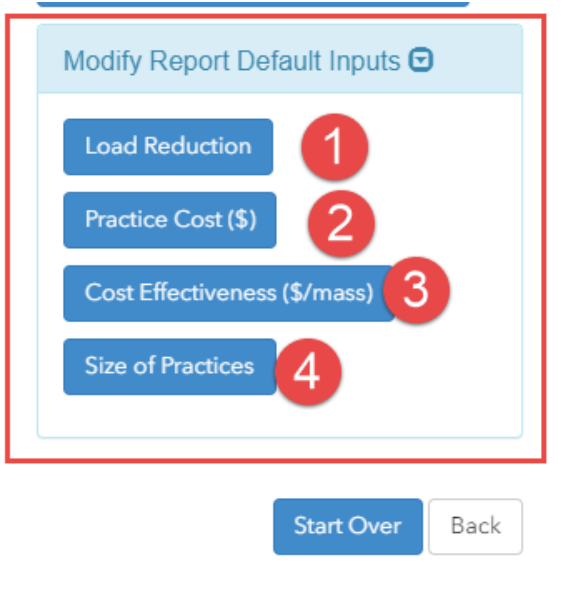
Selecting 'Practice Cost ($)' from the 'Modify Report Default Inputs' (button 2) dropdown will bring up the following screen: The buttons and their functions are described in Table 9 that follows the figure.

Table 9 Scenario Builder - Treatment Groups - Practice Cost Modify Default Input

Button	Description	Impact	Unit
A	Using the radial button, the user can change the way costs are calculated for the Scenario Builder report	Changing this radial button will overwrite your choice made in Step 5 of Scenario Builder	
B	Shows the user they are in 'Practice Cost' tab	N/A	N/A
C	Shows the user they can toggle to 'Cost Effectiveness' tab	N/A	N/A

Button	Description	Impact	Unit
D	Shows that the Storage treatment group is selected and part of the report	N/A	N/A
E	Total Cost has been selected as a filtering criterion. The default filtering criteria is the BMP must be greater than $200 and less than $250,000 to be included in the scenario (for storage practices)	If this checkbox is changed, it will overwrite the choice made in Step 5 of Scenario Builder	Dollars (based on Default Cost because that is what is selected next to button A)
F	Allows the user to switch between treatment groups to adjust the filtering criteria for the other treatment groups if necessary	N/A	N/A
G	Pushing save will update the map and take the user back to Step 8.	User will go back to Step 8.	N/A

4.8.8.3.3 Cost Effectiveness ($/mass) - 3

Selecting 'Cost Effectiveness ($/mass)' (button 3) from the 'Modify Report Default Inputs' dropdown will bring up the following screen: The buttons and their functions are described in Table 10 that follows the figure.

Table 10 Scenario Builder - Treatment Groups - Cost Effectiveness Modify Default Inputs

Button	Description	Impact	Unit
A	Using the radial button, the user can change the way costs are calculated for the Scenario Builder report	Changing this radial button will overwrite your choice made in Step 5 of Scenario Builder	

Button	Description	Impact	Unit
B	Switches back to Practice Cost page		
C	Shows that the current page is showing Cost Effectiveness		
D	Enables changes to the storm condition that BMP reduction potential is based off. If user changes the storm condition here, it will also change it in the 'Modify Report Default Inputs' 'Load Reduction' page.	If user changed this radial button in the 'Load Reduction' 'Modify Report Default Inputs' page, changing the button here will overwrite that decision.	
E	Enables changes to the location at where BMP reductions are being calculated. If user changes the BMP reduction potential here, it will also change it in the 'Modify Report Default Inputs' 'Load Reduction' page	If user changed this radial button in the 'Load Reduction' 'Modify Report Default Inputs' page, changing the button here will overwrite that decision. It will also overwrite the decision made in Step 4 of Scenario Builder.	Mass/ year Sediment would be in tons/year. Total phosphorus and total nitrogen would be in lbs/year
F	The check box will show if the treatment group type is currently active within Scenario Builder. If the box is unchecked, the current treatment group type is not part of Scenario Builder. If the checkbox is checked, the treatment group type is part of the current Scenario Builder. User can turn the treatment group type on or off by using the check box.	By adjusting the check box, the user will be adding or subtracting the treatment group type from their choice made in Step 3 and in any other previous 'Modify Default Report Inputs' screens.	
G	Cost Effectiveness checkbox will show if the user has previously selected to filter by cost effectiveness in Step 5	Adjusting the check box (to the on or off position) will overwrite the cost effectiveness choice in Step 5	$/mass/year
H	Enables the user to add or remove specific parameters from the treatment group	Changing this selection will overwrite the decisions made in Step 3.	

	selection on how to filter the treatment groups		
I	Enables user to toggle between different treatment groups and make changes.		
J	Save your changes and update map	Pushing save will take you back to Step 8.	

4.*8.8.3.4 Size of Practice - 3*

Selecting 'Size of Practice' (button 4) from the 'Modify Report Default Inputs' dropdown will bring up the following screen: The buttons and their functions are described in Table 11 that follows the figure.

Table 11 Scenario Builder - Treatment Groups - Practice Size Adjust Default Inputs

Button	Description	Impact	Unit
A	The checkbox will enable or disable filtering by the size of the practice.	By default, this check box is either on or off depending on user decision made in Step 6 of the Scenario Builder. Changing the check box here will overwrite the decision made in Step 6.	Acres (surface area of the practice)

Button	Description	Impact	Unit
B	This column shows which treatment groups are selected. By default, the checkboxes that are checked are the same ones that the user chose in Step 3 of Scenario Builder.	Adjusting what boxes are checked or unchecked will overwrite the decisions made in Step 3.	
C	Shows the current filtering criteria being used to filter out the BMPs	Changing these will adjust what practices are shown on the map and which ones will end up in the PDF and shapefile.	Acres (surface area of the practice)
D	Use the scroll bar to scroll to the bottom of the screen to push 'Save' where your changes will take effect and the map will update.		

All 'Adjust Default Input' buttons have now been discussed. Save the adjustments and download the report and shapefiles to have on your local computer.

4.9 Scenario Builder – NRCS Practices

TIP: Use this section for directions on Scenario Builder if the data on the web are using Treatment Groups to show BMP locations. You know if the data contains Treatment Groups when you get to Step 3 of the Scenario Builder. Alternatively, you can find out if the data is Treatment Group or NRCS practice on Step 3 of Action Report, or by using the Interactive Map Best Management Practice Benefits layers within the "Layers" menu dropdown.

If the data is Treatment Groups, see section 4.8 Scenario Builder – Treatment Groups of this guide for instructions.

Scenario Builder is accessed from any page by pressing the 'Scenario Builder' button located on the web page header.

Scenario Builder allows the user to develop a more in-depth targeted plan than the Action Report. The user selects a watershed and priority resource point, goes through a set of questions, and is provided with all the available options of BMPs. The user can fine tune the selection based on filters and selection criteria if they

choose to do so. At the end of the Scenario Builder tool, the user can download the practices, priority resource point, and watershed boundary in shapefile format which can then be used on a computer in a geospatial information system program like ESRI ArcMap / ArcGIS Pro or QGIS.

Scenario Builder goes through 8 steps where the user can define what kinds of practices will be outputted in

their scenario. Throughout Scenario Builder, there are help buttons ![help] that the user can click on to gain more information about what the selection does. Additionally, hovering over selection options within the program will provide additional information. These steps are outlined below.

4.9.1 Step 1: Select an Existing Scenario or Select Watershed and Priority Resource Location

Step 1: By default, the drop-down menu 'Select Scenario Builder' will have 'New' displayed. When starting the first scenario, the only option will be 'New'. At the end of Scenario Builder, the user will have the option to save the created scenario and associated choices. Upon saving the scenario in Step 8, the drop-down menu in Step 1 will show 'New' or the saved name of the scenario.

'Select Watershed' is where the user will choose the watershed where the scenario is to be run. An autofill drop-down menu will appear with all the watershed that match the text you are inputting. HUC ID can be used to search for the watershed as well. To view all the watersheds available, simply push the spacebar without any additional letters or numbers in the text box.

After selecting the watershed (A), the map in the background will zoom in on that watershed. This enables the user to determine if the correct watershed was selected. Additionally, all priority resource locations within the watershed will populate on the map to help identify which priority resource location should be used. The map is interactive and can zoom in and out.

Priority Resource Points are also interactive. Clicking on the priority resource point on the screen will provide additional useful information about that location.

Table 12 The information that pops up when clicking on a priority resource location. Data comes from PTMApp Desktop.

Web Attribute Name	Description	Units	Desktop Attribute Name	Desktop Attribute Table
Watershed Area	The drainage area to that priority resource location	Acres	Acres	Table_p_res_catchment
Est. Sediment Load (t/yr)	The estimated sediment load delivered to priority resource location	Tons/year	Sed_sum	Table_p_res_catchment

Web Attribute Name	Description	Units	Desktop Attribute Name	Desktop Attribute Table
Est. Total P Load (lb/yr)	The estimated total phosphorus load delivered to the priority resource location	Lb/year	TP_sum	Table_p_res_catchment
Est. Total N Load (lb/yr)	The estimated total nitrogen load delivered to the priority resource location	Lb/year	TN_sum	Table_p_res_catchment
Min. Travel Time (hours)	Priority resource catchment minimum travel time in hours	Hours	Wshed_min_tt	Table_p_res_catchment

Priority Resource Location

Watershed Area	40729.14
Est. Sediment Load (t/yr)	5732.44
Est. Total P Load (lb/yr)	7099.22
Est. Total N Load (lb/yr)	143188.62
Min. Travel Time (hours)	167.08

Zoom to

Click on a priority resource location to access this information

After locating the priority resource location on the map, use the drop-down menu under priority resource location (B) to select that priority resource location. After making the priority resource location selection in the drop-down menu, the map will automatically update and zoom into that priority resource boundary location.

Step 1: Select an Exisiting Scenario or Select Watershed and Priority Resource Point

Select Scenario Builder

New

Use only if you have saved a scenario already

Select Watershed
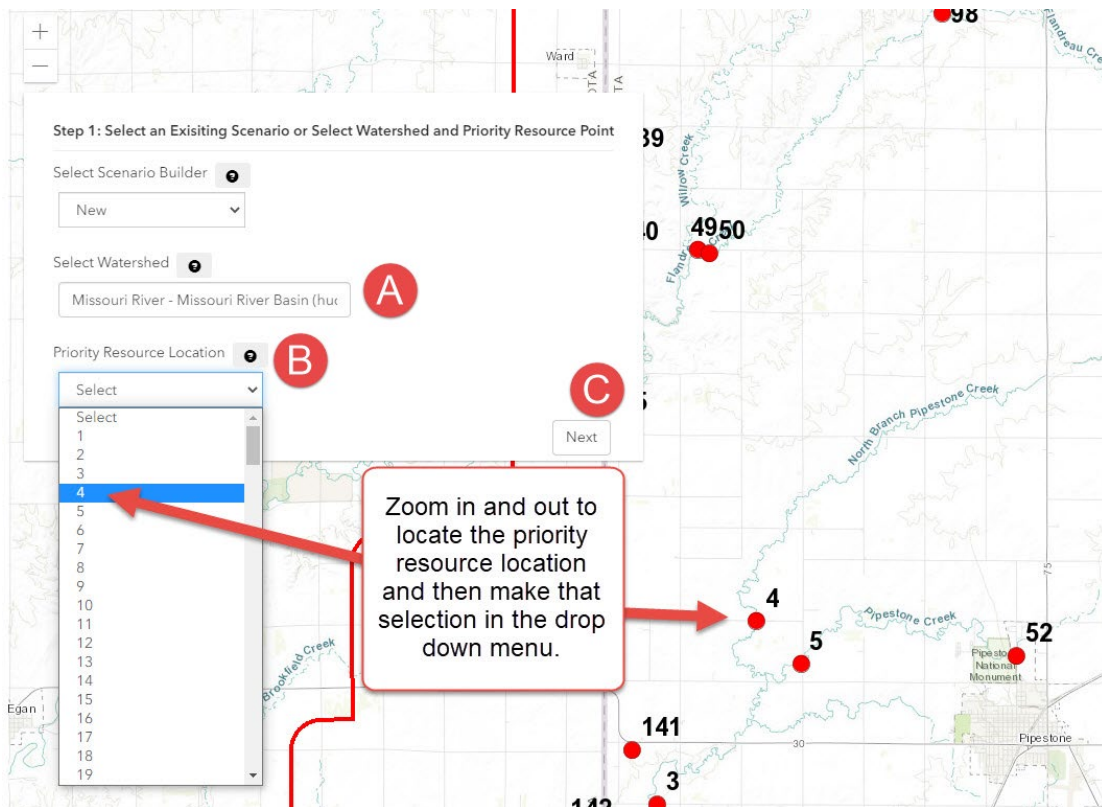
Start typing watershed name or huc id

A

Priority Resource Location

B   C

Next

When you have selected both your watershed and priority resource location, push the 'Next' button (C) in the bottom right-hand corner of the Step 1 screen. You will be directed to Step 2.

4.9.2 Step 2: Select Water Quality Parameters

Step 2: The user will select water quality parameter(s) that are to be addressed in the scenario report. At least one parameter must be selected. This step tells the Scenario Builder which types of filters to apply to the best management practices being targeted, which are chosen in Step 3.

In the image below on the left-hand side, the user can select what water quality parameters to use. By default, none are selected.

On the right-hand side of the image, two additional buttons in the lower right-hand portion of the tool. The 'Start Over' button will take the user back to the Welcome screen of Scenario Builder and will not remember any of the selections made. If the 'Back' button is clicked, the user will go back one step and all data will be remembered.

TIP: Use the 'Start Over' button to clear all choices made and to restart the Scenario Builder from the beginning. Use the 'Back' and 'Next' buttons to move between steps without losing data selections on different steps. Once you have gotten to Step 8, you can save your report and access it from Step 1.

4.9.3 Step 3: Select Conservation Practices

Step 3: In this step, the user will select what kind of practices will be in the Scenario Builder report. At minimum, one NRCS practice must be selected. Use the scroll bar on the right side to view all available practices. Use the help icon to learn more about NRCS practice help locations and the differences from treatment group practices in legacy PTMApp data.

NRCS practices selected at this step will be part of the Scenario Builder report. NRCS practices that are not selected here will not end up in the final report. After pushing 'Next', the map will update with the potential practice locations within the priority resource location selected in Step 1.

4.9.4 Step 4: Select Summary Location

Step 4: Summary location selection determines at what scale water quality benefits are calculated. If 'At Field Edge' is chosen, the reduction potential of the treatment group practice is at field edge. If 'At Watershed Outlet, Lake, or Stream Reach' is chosen, the reduction potential of the treatment group practice will be at the priority resource location. A selection must be made at this step-in order to move to Step 5.

When you push 'Next', the map will not change.

If additional information is sought regarding what selection should be made, make sure to click on the help button next to the Step 4 title. Additionally, the user can hover over the radial button and additional information will pop up. As an example, the image below is hovering over (not clicking) the 'At Field Edge' text. Additional information pops up next to it to provide information related to 'At Field Edge' and how that will impact BMP reduction potential. Note: the hover over help information is different than the help button information.

4.9.5 Step 5: Select Practice Cost

Step 5: Selecting Practice Costs is a multi-step process comprised of the cost method and the cost type.

4.9.5.1 Cost Method

First, cost method must be chosen. The user can choose from the standard 'Default' cost calculations or a new way of calculating costs called 'Useful Life'.

Default Costs: are based off the 2019 NRCS Environmental Quality Incentives Program schedule. Some costs (operation and maintenance) are not always part of the default cost calculation. Default costs do not consider the lifetime costs of the BMP.

Useful Life Cost: are estimating the total cost to plan, design, construct, operate, maintain, and finance the best management practice for the expected lifetime of the practice. A 2% discount rate is used in this calculation.

After selecting either 'Default Cost' or 'Useful Life Cost', the user will be required to select the cost type associated with the cost method. The table below outlines the differences between the cost types by cost method. Multiple cost types can be selected within the cost method.

Table 13 Scenario Builder - NRCS Practices - Cost Method and Type Explanation

Cost Type	Default Cost Method	Useful Life Cost Method
Total	The total cost of the best management practice based off 2019 EQIP costs.	Total cost of the best management practice including cost to plan, design, construct, operate, maintain, and finance. A 2% discount rate is used.
Cost Effectiveness	Total cost divided by the estimated annual median load reduction the practice provides.	Total useful life cost divided by the estimated annual median load reduction the practice provides. This cost effectiveness considers the best management practice's life expectancy.
Annualized	N/A	Annualized Useful Life takes the total useful life cost and divides it by the estimated life expectancy of a best management practice.

After completing the selections for cost method and cost type, push the 'Next' button to go to Step 6. Going from Step 5 to Step 6 will refresh the map on the screen. This update will reflect the choices made in Step 5 regarding cost methods and cost types. **Note**: the map may not update if the BMPs fall within the filter range values.

4.9.6 Step 6: Select Additional Filters

Step 6 is an optional step where the user can further refine what BMPs end up in the Scenario Builder report. There are two additional criterion the user can filter by: size of practice, and practice performance.

These filter criteria can be used to remove the extremes of the lower and upper bounds of the PTMApp BMP data for size of practice and to set a lower bound for practice performance. These filters are pre-determined bounds based on each specific treatment group.

TIP: **You can view/change the lower and upper bounds of these practices in Step 8.**

If selections for additional filters in Step 6 were made, pushing the 'Next' button will update the map to reflect the BMPs that are within the filtering criteria bounds.

4.9.7 Step 7: Sort Practices for Report

Sorting practices for the report will not impact any of the BMPs that end up in the report. At this step, practice selection has been finalized. The final report and the shapefiles that will be available to download will reflect what practices are on the map.

There are 6 different ways to sort practices within the PDF report. Hovering over each sorting preference will provide information on how the sorting feature will work (low to high, high to low.

Table 14 Scenario Builder - NRCS Practices - Sorting Options

Sorting Option	Unit	Sorted By	User Options Could Affect Output By
Total Cost	Dollars	Lowest to Highest BMP cost	Total Cost could be 'Default Total Cost or 'Useful Life Total Cost' depending on what user selected in Step 5.
Useful Life Annualized	Dollars/Year	Least to greatest annualized useful life cost	
Cost Effectiveness	Dollar per unit load reduction	Least to greatest default cost effectiveness	
Practice Size	Acres	Smallest to largest surface area	
Performance	Decimal percent load reduction	Greatest to least percentage of annual load reduction at the practice	
Annual load reduction	Mass per year	Greatest to least estimated annual load reduction	

Sorting by **Cost Effectiveness**, **Performance**, and **Annual Load Reduction** require a 2-step process. After pushing the radial button for the sorting selection, a drop-down menu will appear at the bottom of the tool. Additional information regarding which water quality parameter to rank by will be required. In the image below, the two-step process is shown.

After making the selections in Step 7, push the 'Next' button to proceed to Step 8. There will be no updates to the map because no filters were applied in Step 7.

4.9.8 Step 8: View, Adjust, Save, or Download Data

Step 8: There are no additional filters or sorting criteria that are applied in this step. This step is where the user can save the choices from the previous 7 steps. When clicking 'Save Scenario Builder', the user will get the screen below 'Save Selections'. Here the user can add a name to saved scenario so that it can be accessed on Step 1 of the Scenario Builder.

The 'Description' box is used to add comments regarding scenario choices. This is not yet functional.

After saving Scenario Builder, the user is immediately redirected to Step 1 of the tool. To go back to Step 8 after saving, from Step 1, use the 'Select Scenario Builder' drop down menu and locate the saved Scenario Builder. The user will be redirected back to Step 8 to proceed to use the 'Generate Report' and 'Export to Shapefile' features.

4.9.8.1 Generate Reports

The 'Generate Reports' section allows you to download the Scenario Builder report.

The 'Generate Reports' section allows the user to download the scenario build report. The report will have a header showing the report details of who made the report, what watershed the report was made for, what

priority resource location is being used, and when the report was generated.

Selection Criteria is also present in the header, providing information on what water quality parameter(s) were used in the creation of the report, what treatment groups were used, how the treatment groups are ranked, and what storm event (2 year or 10 year) was used to estimate median benefits of each treatment practice. The default storm event is always a 2 year-24-hour storm event. To change this event, use 'Modify Report Default Inputs', which is addressed later in this section.

There is a map showing the current extent of the zoom of the map on the website. To zoom in and print a map that shows a more specific area, use the +/- icon just above the tool and below the PTMApp icon in the upper right-hand corner of the screen. Re-generate the report with the map zoomed to the extent you want.

This shows the headers of the Scenario Builder output table.

Table 15 Headers of the Scenario Builder Report

Header	Definition	Units	Shapefile Output Attribute Relationship
Practice Type	The NRCS practice or treatment group.		Grp_code
Catch ID	The catchment ID number associated with where the BMP is located		N/A
Drainage Area Treated	The upstream drainage area to the BMP	Square feet	Wtsarea_
Practice Size	The surface area of the practice rounded to the nearest whole number	Acres	N/A

Header	Definition	Units	Shapefile Output Attribute Relationship
Township	Township number of where BMP is based on PLSS		section
Range	Range number of where BMP is based on PLSS		range
Section	Section number of where BMP is based on PLSS		section
PTMApp Cost	The cost of the BMP either in default total cost or useful life total cost depending on what the user inputted in Step 5.	Dollars	Bmp_tot
Annualized Useful Life Cost	The useful life of the BMP divided by the expected life expectancy of the BMP type	Dollars/Year	N/A
Estimated Annual Sediment Reduction	The annual sediment reduction by the BMP at either field edge or priority resource location depending on what the user inputted in Step 4.	Ton	Est_s_re
Cost Effectiveness to Treat Sediment	The dollar per ton to reduce sediment using this specific BMP. Cost effectiveness is based on default cost or annualized useful life cost depending on what the user chose in Step 5.	Dollars/Ton	Est_s_re_1
Estimated Annual Total Phosphorus Reduction	The annual total phosphorus reduction by the BMP at either field edge or priority resource location depending on what the user inputted in Step 4.	Lb.	Est_p_re
Cost Effectiveness to Treat Total Phosphorus	The dollar per lb to reduce TP using this specific BMP. Cost effectiveness is based on default cost or annualized useful life cost depending on what the user chose in Step 5.	Dollars/Lb.	Est_p_re_1
Estimated Annual Total Nitrogen Reduction	The annual total nitrogen reduction by the BMP at either field edge or priority resource location depending on what the user inputted in Step 4.	Lb.	Est_n_re

Header	Definition	Units	Shapefile Output Attribute Relationship
Cost Effectiveness to Treat Total Nitrogen	The dollar per lb to reduce TN using this specific BMP. Cost effectiveness is based on default cost or annualized useful life cost depending on what the user chose in Step 5.	Dollars/Lb.	Est_n_re_1

4.9.8.2 Export to Shapefile

In the next section of Step 8, Export to Shapefile, the user can export the treatment group practices (polygon shapefile), selected watershed boundary (priority resource boundary, polygon shapefile), and the priority resource location (point shapefile). Pushing these buttons will start an automatic download to a downloads folder on the user's computer. The files will be in a zipped file format. To access the information within the folder, the user will need to unzip the folder and then load the shapefiles into a geospatial information system program (like ArcMap, ArcGIS Pro, or QGIS).

After the files have been unzipped, they will appear in this format:

After loading the location outlet, selected practices, and selected watershed boundary into the desired geospatial information system program, attributes for the shapefiles can be accessed.

4.9.8.2.1 Location Point

The 'Location Point' attributes are listed in the table below.

Table 16 Location Point - Point Shapefile Attributes

Attribute Title	Name	Definition	Units
P_res_ca	Priority Resource Catchment ID	The priority resource location that was chosen in Step 1 of the Scenario Builder	
Acres	Acres	Watershed area in aces. The drainage area to the priority resource location chosen.	Acres
Wshed_mi	Watershed Minimum Travel Time	Minimum travel time for water to reach priority resource point	Hours
Sediment	Sediment lost at priority resource location	The amount of sediment passing through the priority resource location per year	Tons
tp_sum	Total Phosphorus lost at priority resource location	The amount of total phosphorus passing through the priority	Lbs

Attribute Title	Name	Definition	Units
		resource location per year	
tn_sum	Total nitrogen lost at priority resource location	The amount of total nitrogen passing through the priority resource location per year	lbs

4.9.8.2.2 Practices

The practice attributes are listed in Table 17.

Table 17 Practices Shapefile - Attribute Table

Attribute Title	Name	Definition	Units
Grp_code	Group Code	NRCS number	
Unq_bmp_	Unique BMP ID	The unique BMP ID number associated with this one polygon	
Wtsarea_	Watershed Area	The drainage area to the BMP	Acres
Bmp_tot_	BMP Total Cost	The BMP Total Cost is either the Default Total Cost OR the Useful Life Total Cost that was selected in Step 5 of Scenario Builder	Dollars

Attribute Title	Name	Definition	Units
Est_s_re	Estimated Sediment Reduction	The total estimated sediment reduction potential of the BMP at either the priority resource location OR field edge depending on what you chose in Step 4 of the Scenario Builder	Tons / year
Est_s_re_1	Estimated cost effectiveness of sediment reduction	Cost effectiveness of sediment at either the priority resource location or at field edge AND based on default total cost OR total useful life cost depending on your choices in Scenario Builder	Total Cost / Tons /year
Est_p_re	Estimated Total Phosphorus Reduction	The total estimated phosphorus reduction potential of the BMP at either the priority resource location OR field edge depending on what you chose in Step 4 of the Scenario Builder	Lbs / year
Est_p_re_1	Estimated cost effectiveness of total phosphorus reduction	Cost effectiveness of total phosphorus at either that priority resource location or at field edge AND based on default total cost OR total useful life cost depending on your choices in Scenario Builder	Total Cost / lbs / year
Est_n_re	Estimated Total Nitrogen Reduction	The total estimated total nitrogen reduction potential of the BMP at either the priority resource location OR field edge depending on what you chose in Step 4 of the Scenario Builder	lbs / year
Est_n_re_1	Estimated cost effectiveness of total nitrogen reduction	Estimated cost effectiveness of total nitrogen at either that priority resource location or at field edge AND based on default total cost OR total useful life cost depending on your choices in Scenario Builder	Total Cost / lbs / year
Township	Township	The township number of the BMP location based on the Public Land Survey System	
Range	Range	The range number of the BMP location based on the Public Land Survey System	
Section	Section	The section number of the BMP location based on the Public Land Survey System	

Attribute Title	Name	Definition	Units
Catch_id	Catchment ID	The catchment number associated with the catchment on PTMApp Desktop of where the BMP is located	

4.9.8.2.3 Selected Boundary

The Selected Boundary attributes are in Table 18.

Table 18 Selected Boundary - Attribute Table

Attribute Title	Name	Definition	Units
P_res_ca	Priority Resource Catchment ID	Priority Resource Catchment ID	

4.9.9 Modifying Default Filters Within PTMApp Web Scenario Builder

Within Step 8, there is an additional dropdown menu labeled 'Modify Report Default Inputs'. Clicking this button will prompt a warning and require an acknowledgement that modifying default inputs is not recommended unless the user has a strong understanding of how and why adjustments to the default boundary conditions should be made.
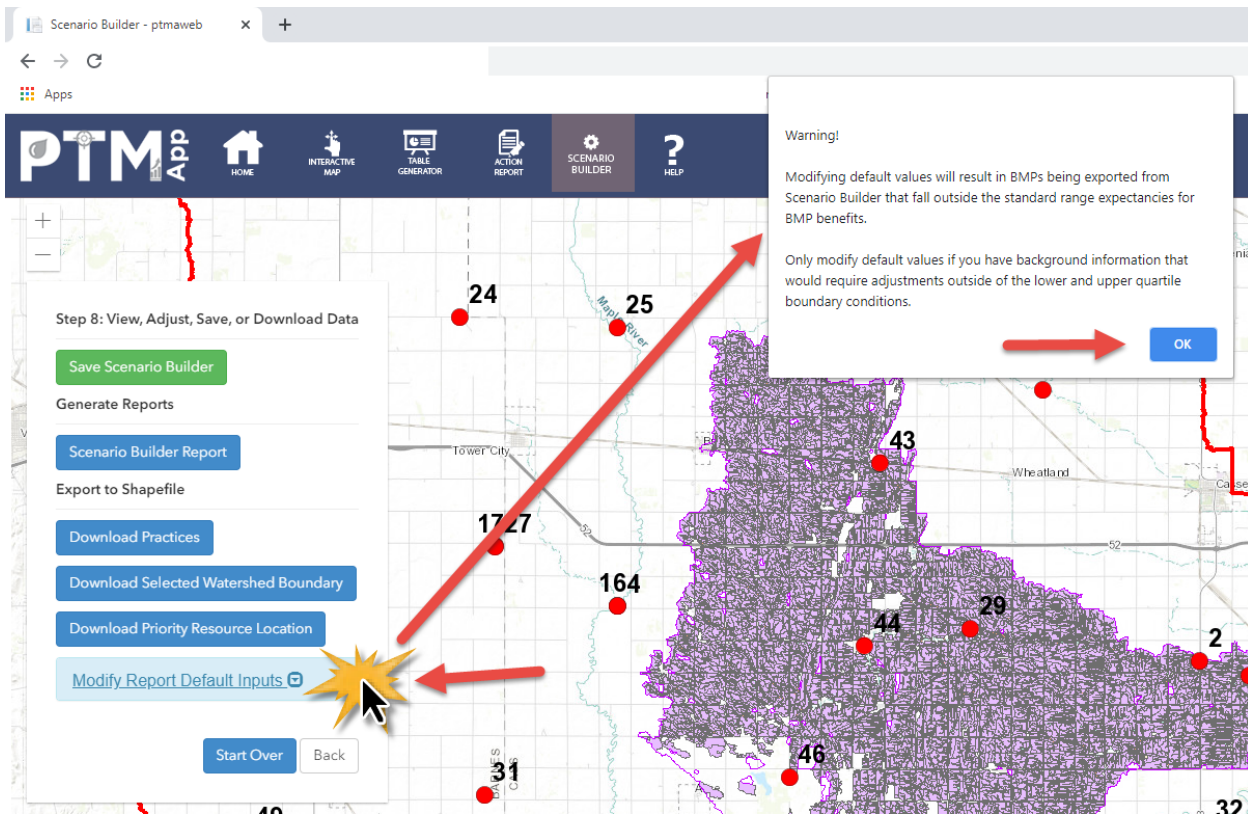
After accepting the warning pop-up by pushing 'OK', additional buttons populate in the dropdown area of the 'Modify Report Default Inputs'.

There are many things to adjust within the 'Modify Report Default Inputs' that can affect what practices end up in the Scenario Builder report. The user can adjust all the filter values for load reduction, practice costs, cost

effectiveness, size of practice, storm condition, and whether the data is summarized at the field edge or at the watershed outlet location. In short, these buttons allow you to go in and change all information that you have selected in the previous 7 steps all in one location.

4.9.9.1 Load Reduction - 1

Pushing 'Load Reduction (1) opens the following screen: The buttons and their functions are described in Table 19 that follows the figure.
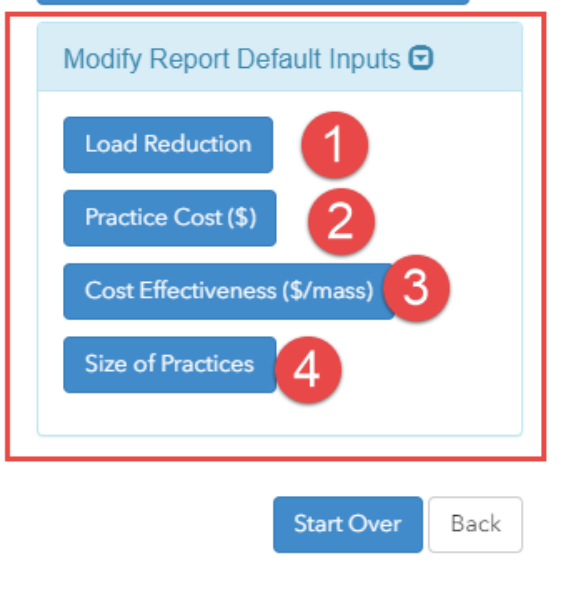
Table 19 Scenario Builder - NRCS Practices - Load Reduction Modify Default Inputs

Button	Description	Impact	Unit where applicable
A	User to change the BMP reduction potential from the default 2-year, 24-hour storm event to a 10-year, 24-hour storm event.		
B	User can change the BMP reduction potential between 'At Field Edge' and 'At Watershed Outlet, Lake or Stream Reach'. If user changes the location where BMP reduction is calculated, the light green box where the arrow next to 'B' is pointing will change to reflect the changes made in the radial button.	This will overwrite the decision made in Step 4 of Scenario Builder.	Mass/year
C	User can add or remove treatment groups from the final Scenario Builder report and map by checking this box.	This will overwrite the decision made in Step 3 of Scenario Builder	
D	Checking or unchecking this box will add or remove the filter for BMP performance. If the check box next to button C is selected AND a check box next to button F is checked AND Performance % Reduction next to button D is checked, values will populate in the boxes in the Performance (% reduction) column. The values are decimal percent. If a BMP to be used in the report must have at least 50% reduction potential, the number to be inputted into the cell should be 0.5. If a BMP is to reduce 100% of the parameter, a value of 1 should be in the cell.	This will overwrite your decision made in Step 6. It can also affect the decisions made in Step 2 and Step 3 if the user adds additional check boxes next to button C and F.	Decimal percent
E	The cells that button E is pointing to should be populated IF the check box next to button C and F are also checked. These values will reflect the required minimum sediment, total phosphorus, or total nitrogen then BMP must retain to be in the report	If multiple parameters (sediment, total phosphorus, total nitrogen) are selected at the same time, the BMP must meet ALL of those parameters to be included.	Mass/year (tons for sediment, lbs for total phosphorus, total nitrogen)

Button	Description	Impact	Unit where applicable
F	The parameters that are being used to filter BMPs by. If multiple parameters are selected, the BMP must meet ALL the parameter specifications to be part of the report.	The checkboxes will be filled according to the initial selections made in Step 2. If you change the check boxes here, it will overwrite your decision made it Step 2.	
G	These radial buttons allow the user to toggle between the 6 treatment groups. The user can adjust each of the 6 treatment groups as listed above.	Any changes made to buttons A and B between radial buttons next to button G will be changed for ALL other treatment groups. There cannot be a situation where one treatment group is at a 2-year 24-hour storm event and a different one is at a 10-year 24-hour storm event.	
H	Save your changes. After pushing save, the map will update accordingly.	You will be redirected back to the standards Step 8 viewing page	

4.9.9.2 Practice Cost - 2

Selecting 'Practice Cost ($)' from the 'Modify Report Default Inputs' dropdown will bring up the following screen: The buttons and their functions are described in Table 20 that follows the figure.

Table 20 Scenario Builder - NRCS Practices - Practice Cost Modify Default Inputs

Button	Description	Impact	Unit
A	Using the radial button, the user can change the way costs are calculated for the Scenario Builder report	Changing this radial button will overwrite your choice made in Step 5 of Scenario Builder	
B	Shows the user they are in 'Practice Cost' tab		
C	Shows the user they can toggle to 'Cost Effectiveness' tab		

Button	Description	Impact	Unit
D	Shows that the Storage treatment group is selected and part of the report		
E	Total Cost has been selected as a filtering criterion. The default filtering criteria is the BMP must be greater than $200 and less than $250,000 to be included in the scenario (for storage practices)	If this checkbox is changed, it will overwrite the choice made in Step 5 of Scenario Builder	Dollars (based on Default Cost because that is what is selected next to button A)
F	Allows the user to switch between treatment groups to adjust the filtering criteria for the other treatment groups if necessary		
G	Pushing save will update the map and take the user back to Step 8.		

4.9.9.3 Cost Effectiveness - 3

Selecting 'Cost Effectiveness ($/mass)' from the 'Modify Report Default Inputs' dropdown will bring up the following screen: The buttons and their functions are described in Table 21 that follows the figure.

Table 21 Scenario Builder - NRCS Practices - Cost Effectiveness Modify Default Inputs

Button	Description	Impact	Unit
A	Using the radial button, the user can change the way costs are calculated for the Scenario Builder report	Changing this radial button will overwrite your choice made in Step 5 of Scenario Builder	
B	Switches back to Practice Cost page		

Button	Description	Impact	Unit
C	Shows that the current page is showing Cost Effectiveness		
D	Enables changes to the storm condition that BMP reduction potential is based off. If user changes the storm condition here, it will also change it in the 'Modify Report Default Inputs' 'Load Reduction' page.	If user changed this radial button in the 'Load Reduction' 'Modify Report Default Inputs' page, changing the button here will overwrite that decision.	
E	Enables changes to the location at where BMP reductions are being calculated. If user changes the BMP reduction potential here, it will also change it in the 'Modify Report Default Inputs' 'Load Reduction' page	If user changed this radial button in the 'Load Reduction' 'Modify Report Default Inputs' page, changing the button here will overwrite that decision. It will also overwrite the decision made in Step 4 of Scenario Builder.	Mass/ year Sediment would be in tons/year. Total phosphorus and total nitrogen would be in lbs/year
F	The check box will show if the treatment group type is currently active within Scenario Builder. If the box is unchecked, the current NRCS practice type is not part of Scenario Builder. If the checkbox is checked, the NRCS practice type is part of the current Scenario Builder. User can turn the NRCS practice type on or off by using the check box.	By adjusting the check box, the user will be adding or subtracting the NRCS practice type from their choice made in Step 3 and in any other previous 'Modify Default Report Inputs' screens.	
G	Cost Effectiveness checkbox will show if the user has previously selected to filter by cost effectiveness in Step 5	Adjusting the check box (to the on or off position) will overwrite the cost effectiveness choice in Step 5	$/mass/year
H	Enables the user to add or remove specific parameters from the NRCS practice selection on how to filter the treatment groups	Changing this selection will overwrite the decisions made in Step 3.	

Button	Description	Impact	Unit
I	Enables user to toggle between different NRCS practices and make changes.		
J	Save your changes and update map	Pushing save will take you back to Step 8.	

4.9.9.4 Practice Size - 4

Selecting 'Size of Practice' from the 'Modify Report Default Inputs' dropdown will bring up the following screen: The buttons and their functions are described in Table 22 that follows the figure.

Table 22 Scenario Builder: NRCS Practices - Practice Size Adjust Default Inputs

Button	Description	Impact	Unit
A	The checkbox will enable or disable filtering by the size of the practice.	By default, this check box is either on or off depending on user decision made in Step 6 of the Scenario Builder. Changing the check box here will overwrite the decision made in Step 6.	Acres (surface area of the practice)
B	This column shows which NRCS practices are selected. By default, the checkboxes that are checked are the same ones that the user chose in Step 3 of Scenario Builder.	Adjusting what boxes are checked or unchecked will overwrite the decisions made in Step 3.	
C	Shows the current filtering criteria being used to filter out the BMPs	Changing these will adjust what practices are shown on the map and which ones will end up in the PDF and shapefile.	Acres (surface area of the practice)
D	Use the scroll bar to scroll to the bottom of the screen to push 'Save' where your changes will take effect and the map will update.		

All 'Adjust Default Input' buttons have now been discussed. Save the adjustments and download the report and shapefiles to have on your local computer.

4.10 Requesting Help
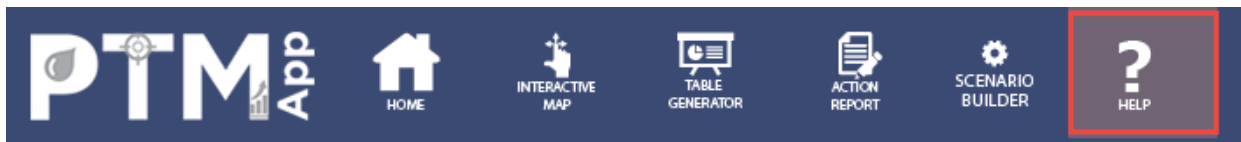
The user can request help from the web administrator by pressing the help button from any page and completing the help request form:

The 'Name' field will auto-populate the name of the registered user. Please be detailed in your comment as to what your problem may be. Once done, click 'Submit'. The help request form is then emailed to the web administrator, who opens a trouble ticket and coordinates the response to the user.

Patience is required during the use of PTMApp-Web when using large datasets. The application has been tested using data for watersheds approaching 2,000 square miles. The amount of data processed for large watersheds is tens of millions of records, which can require considerable time to display on the Interactive Map, Table Generator, and Action Report pages. Printing these large files is also a known issue.

5 PTMApp-Web Product Examples

The following sections walk through specific examples of how to use and apply PTMApp-Web to generate the maps, tables, and data needed for watershed planning, to apply for grant applications, or to estimate progress to a water quality goal, among other tasks. The "Standard" PTMApp products can largely be created through the web. The Standard products are those meeting much of the daily business needs of local water quality practitioners. Data for each of these examples comes from Ashley Creek, in the Sauk River Watershed District, but could also be generated for any other watershed.

Water quality data and BMP information generated in PTMApp-Desktop can be displayed and summarized visually in PTMApp-Web within the Interactive Map Section of the PTMApp website. This section allows the user to generate maps for each watershed available on PTMApp-Web.

The subsections below outline the steps necessary to generate maps describing sediment and nutrient sources and BMP locations, costs, and removal efficiencies. These maps are formatted in PTMApp-Web and exported to

an image file, which can be easily inserted into Microsoft Word documents or printed for use in meetings. As PTMApp-Desktop standard output products and naming conventions do not typically change between projects, these steps could easily be followed for any watershed you may be investigating.

5.1 Source Assessment Planning Maps – Identify the Largest Sources of Runoff, Sediment, Total Phosphorus (TP), and Total Nitrogen (TN)

Source assessment maps are maps which identify areas contributing the greatest amounts of sediment, total phosphorus, or total nitrogen downstream. These maps can be very useful when identifying specific areas within your watershed to install practices or to focus conservation efforts. Detailed below is a step-by-step guide for creating source assessment maps. Each of the examples provided was created within the Interactive Map section of PTMApp-Web.

5.1.1 Example 1: Catchment Loading Source Assessment

☞ **HOW TO:**

Description – In this step, you will create a source assessment map which shows the sediment yield (tons/acre/year) generated within each catchment and delivered to the catchment outlet.

Use/Need – This is important as it represents each catchment's delivery of sediment to edge-of-field or nearest concentrated flow path (e.g., stream or ditch channel) and could be used to determine pollutant 'hotspots' on the landscape.

TIP: *Before making a new map, always click the 'Reset & Clear Graphics' button in the Dynamic Legend tab if a map had previously been made. This button removes all existing layers on your map to start you off with a fresh Basemap!*

Steps to Create

1) For your watershed, choose 'Sauk River – Ashley (huc0701020203)' and for your Basemap, choose 'Streets'. Any other ESRI basemap could be chosen, but the default Topographic basemap should work well for this map.
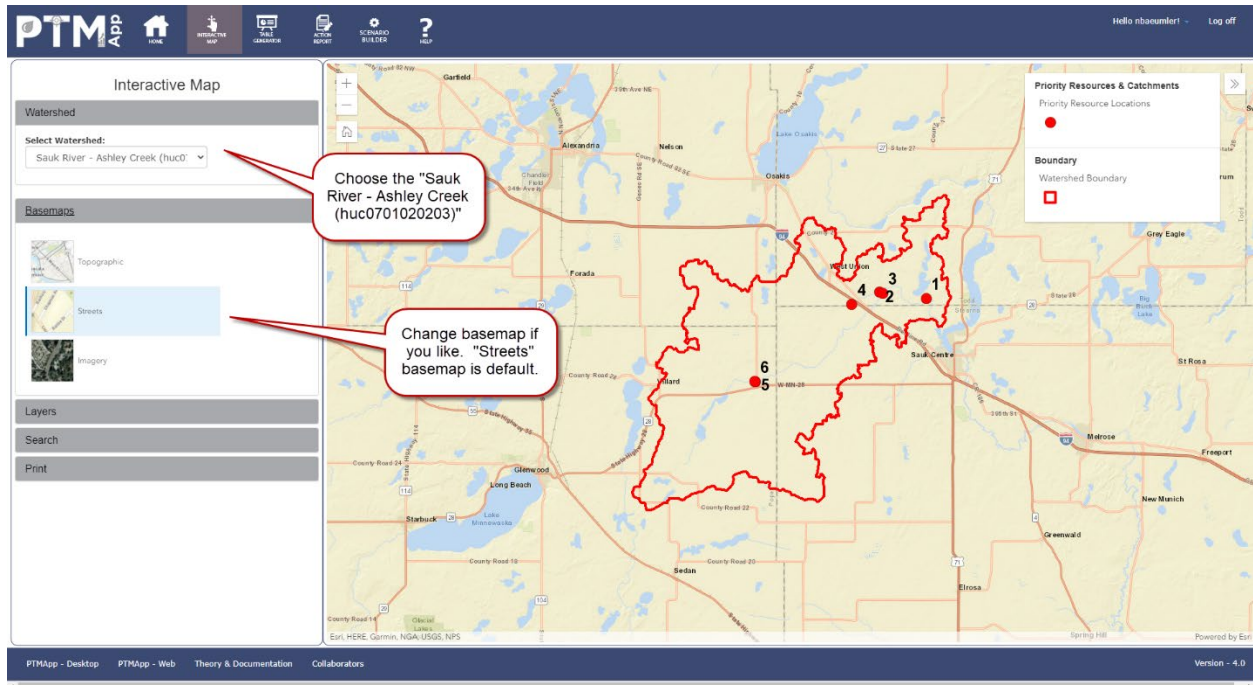
2) In the 'Layers' tab, make sure 'Boundary' and 'Priority Resources' are checked and click on the Dynamic Legend Graphic next to 'Priority Resources & Catchments.'
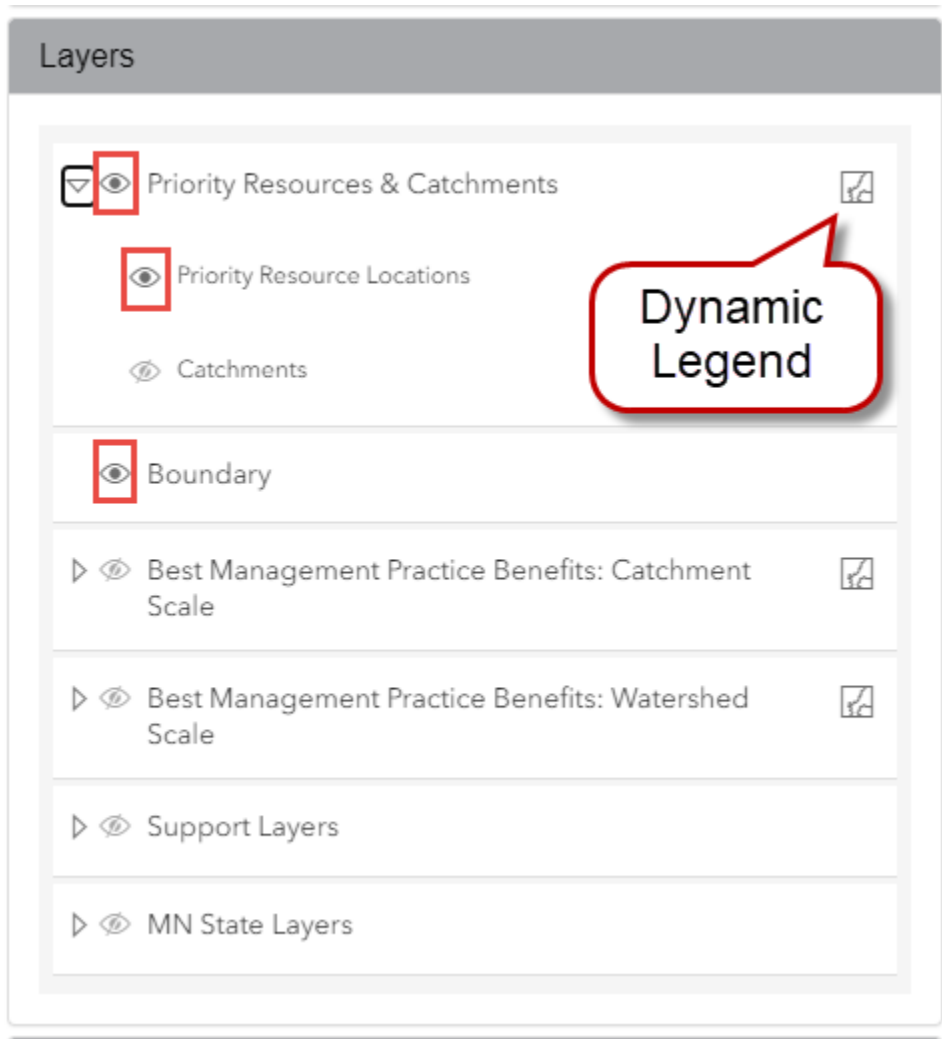
3) Clicking the ⬚ icon will activate the Dynamic Legend tab as shown below:
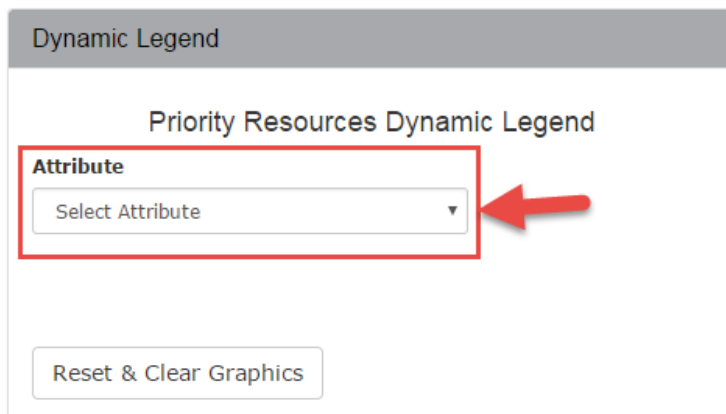
4) In the 'Attribute' dropdown, select 'Sediment delivery to Catchment, tons/acre/year'. This attribute shows the sediment yield (tons/acre/year) generated within each catchment and delivered to its outlet.
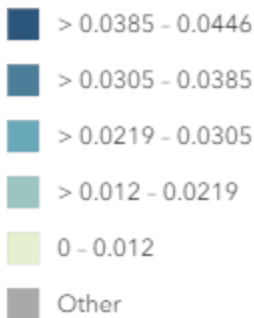
Due to programming compatibility limitations, the legend break values are currently unable to be edited by the user. This issue is being addressed and the capability will be added as soon as it is resolved. Currently, the default break values are determined by a 'natural breaks' classification.

5) If you wish, you can print this map within the 'Print' layer using the 'layout' or 'map' export options (see section 4.4 for more details on this process and available options).

TIP: *Do not forget that when attributes are selected in the 'Dynamic Legend' layer, a new layer appears in the 'Layers' section where transparency can be increased and decreased for the newly displayed data.*

6) If using the 'layout' export option, your map should look something like this.
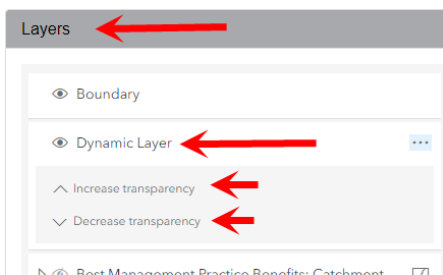
Catchment Sediment Yield (tons/acre/year) to the Flowline
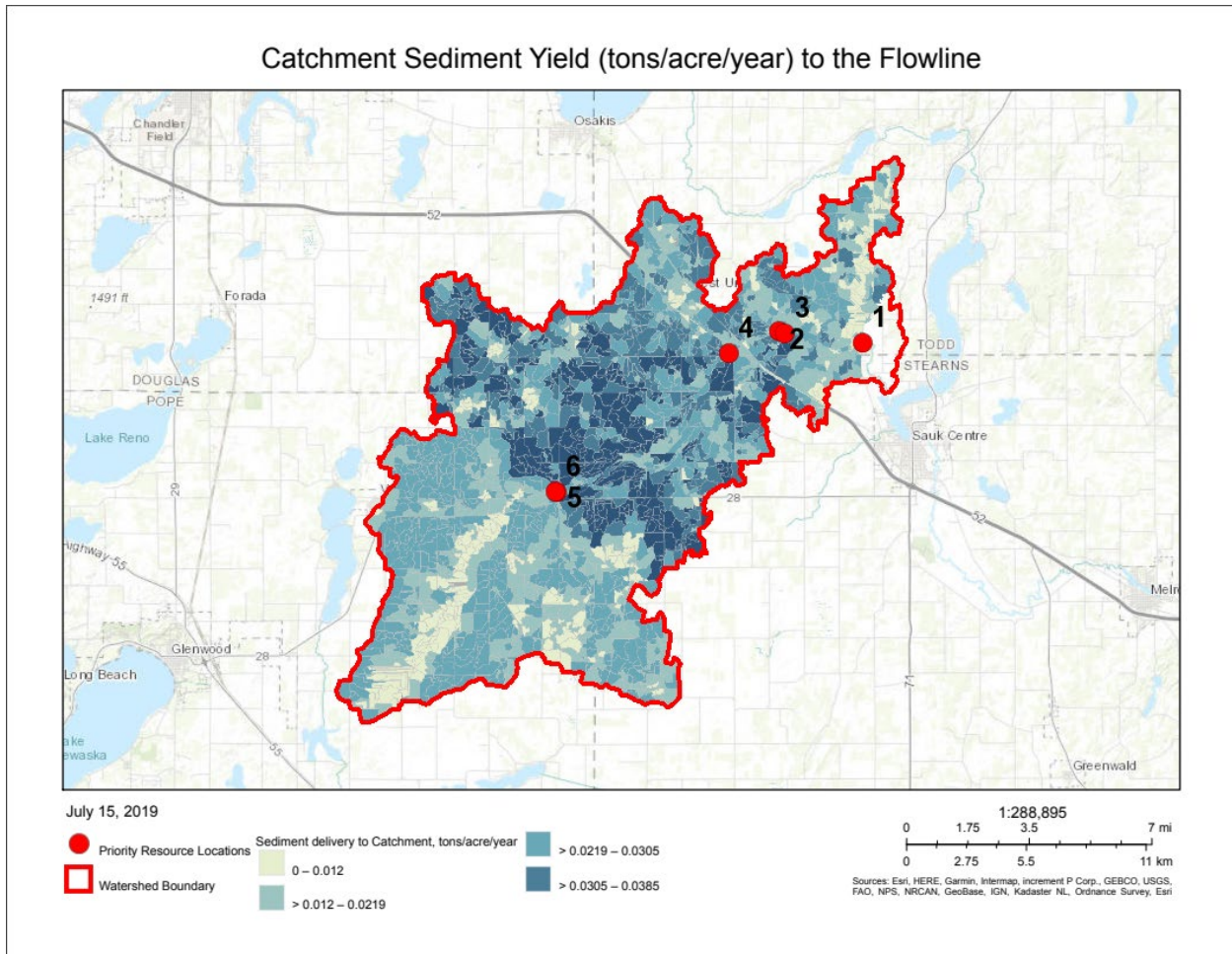
5.1.2 Example 2: Resource Location Source Assessment

Description – The resource location source assessment map describes the sediment, TP, or TN load generated in each catchment which is delivered to the priority resource point. This differs from the Catchment Yield/Load Map as it describes the amount of sediment, TP, or TN reaching a downstream priority resource location (e.g., lake, stream, river, or water quality monitoring station) as opposed to just the catchment outlet.
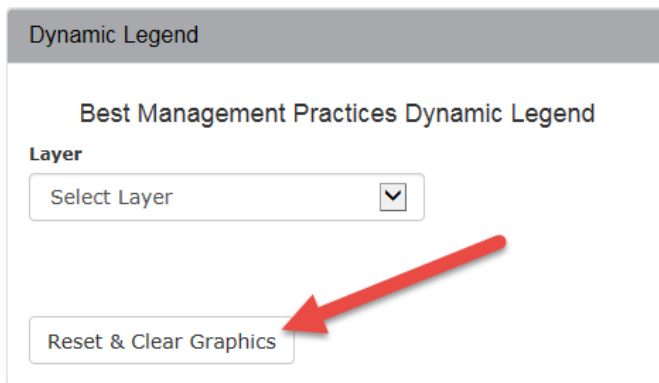
Use/Need – The resource location source assessment map is important as it illustrates the amount of sediment, TP, or TN reaching and impacting downstream locations and can be directly compared with water quality goals at each resource point.

Steps

1) If another map is open. Click 'Reset & Clear Graphics' in the Dynamic Legend tab:

   This will clear out any information you currently have on your map.

2) Like the steps in Example 1, for your watershed, choose 'Sauk River – Ashley Creek (huc0701020203)' and for your Basemap, choose 'Streets'.

3) In the 'Layers' tab, make sure 'Boundary' and 'Priority Resource Locations' are marked visible 👁 and click on the Dynamic Legend Graphic 📊 next to 'Priority Resources & Catchments'.

4) Clicking the ⬚ icon will activate the Dynamic Legend tab as shown:
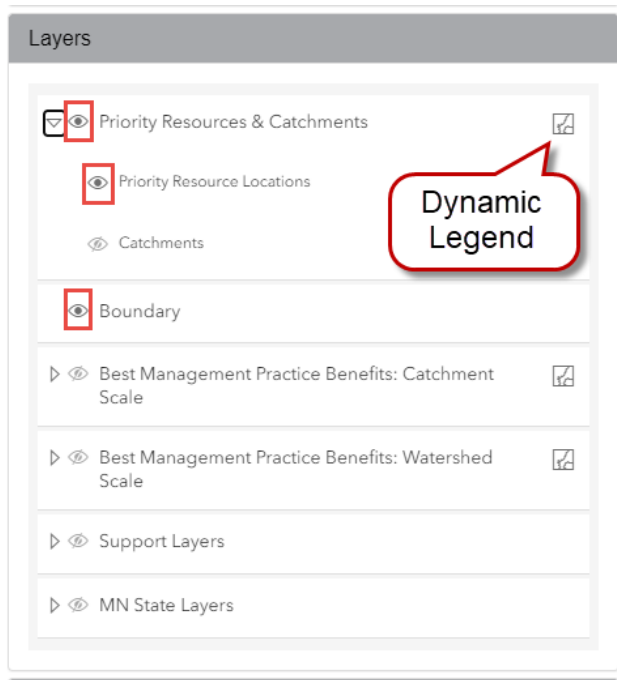
5) In the 'Attribute' dropdown, select 'Sediment delivery to Resource of Concern, tons/year'. This attribute shows the sediment load (tons/year) delivered from the catchment outlet to the priority resource point of concern. This selection activates a new selection to appear titled 'Priority Resource.' In this case, we want to know the amount of sediment delivered from each catchment to the watershed outlet. The watershed outlet in this example is priority resource point 1. In the 'Priority Resource' dropdown, choose '1'. PTMApp-Web will then automatically generate a map showing sediment delivery from each individual catchment to priority resource point 1.
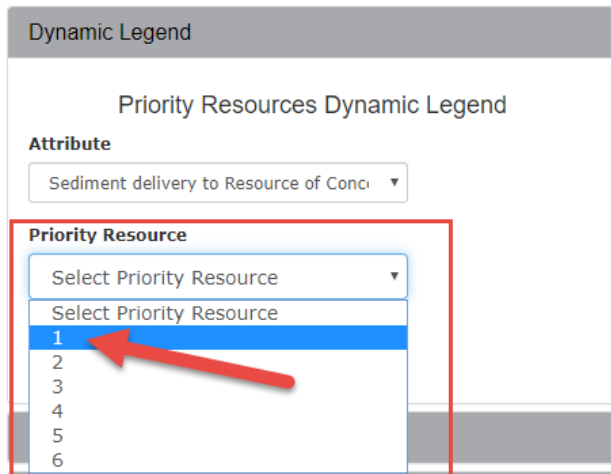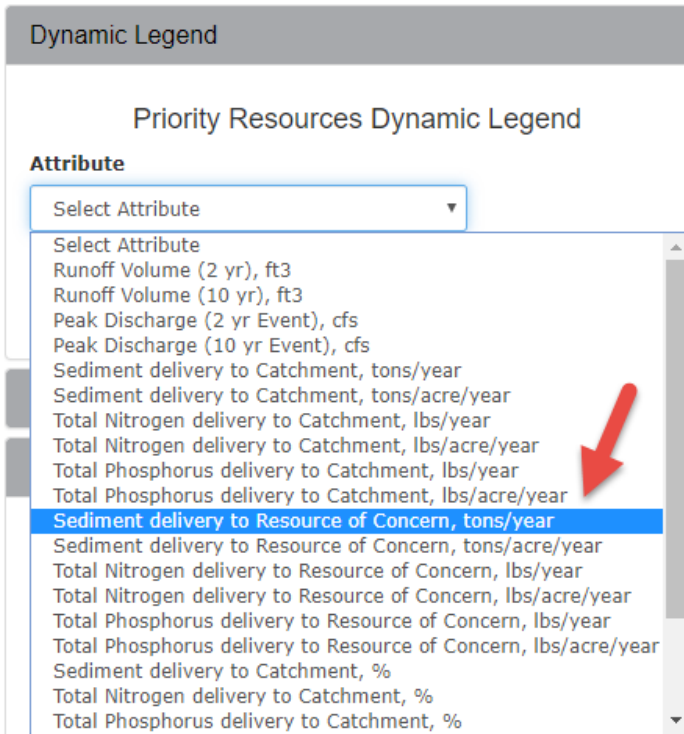
6) Due to programming compatibility limitations, the legend break values are currently unable to be edited by the user. This issue is being addressed and the capability will be added as soon as it is resolved. Currently, the default break values are determined by a 'natural breaks' classification.

Dynamic Layer

Sediment delivery to Resource of Concern, tons/year

■ > 1.64 – 3.2

■ > 0.9 – 1.64

■ > 0.48 – 0.9

■ > 0.2 – 0.48

□ 0 – 0.2

■ Other
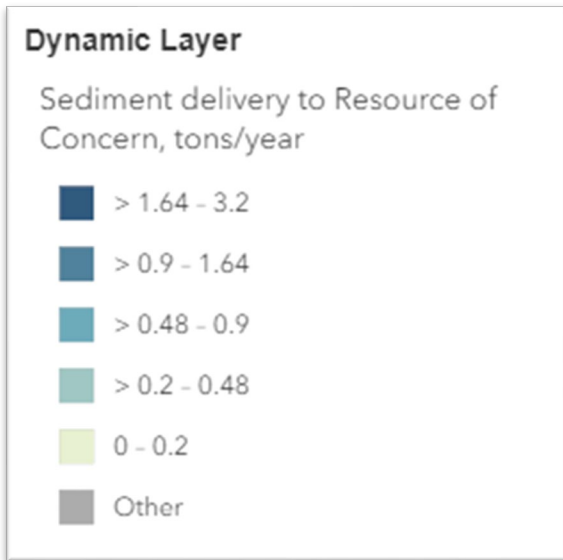
7) If you wish, you can print this map within the 'Print' layer using the 'layout' or 'map' export options (see section 4.4 for more details on this process and available options).

Print

Export

Layout	Map Only

Title

Sediment Load to the Ashle·

Page setup

Letter ANSI A Landscap▼

File format

PDF ▼

▷ Advanced Options

Export

7) For this map, we can name it "Sediment Load to the Ashley Creek Outlet (tons/year)". After adding the title, click 'Export Map as Image'.

8) Your final map should look something like this:

Sediment Load to the Ashley Creek Outlet (tons/year)
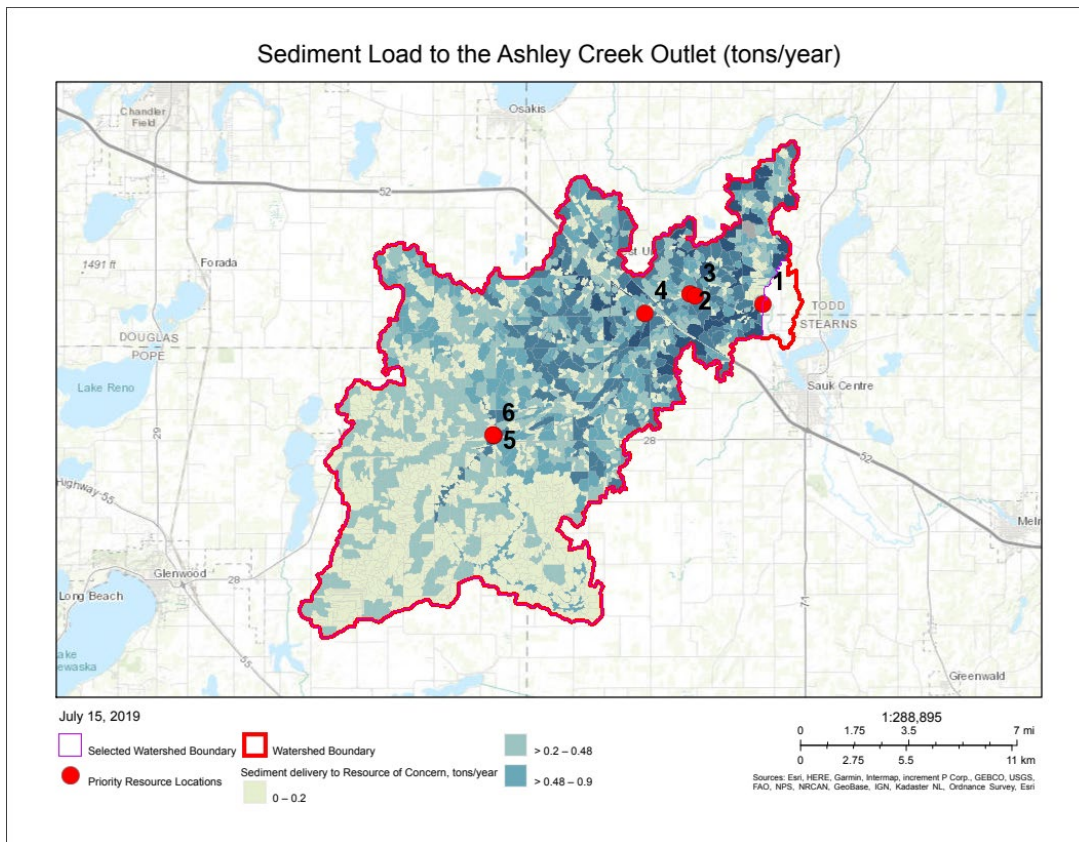
TIP: *The previous map could also be created for UPSTREAM priority resource points.*

☞ HOW TO:

Description – If you need a Source Assessment Map for other upstream priority resources, you only need to change one item from the previous steps (see below).

Use/Need – This map may be important as you might have different water quality goals for tributaries than you do for the mainstream/river in your study area. You should also note that similar catchments may have different yields/loads depending on what priority resource you are looking at.

Steps to Create

1) Follow steps 1-4 as detailed above but use priority resource '2' instead of '1' (see red arrow in figure below). Priority resource 2 is the outlet of Silver Creek, a tributary to Ashley Creek. Choosing Resource

Point 2 then updates your catchment loading values in your map (see catchments within the green circle below).
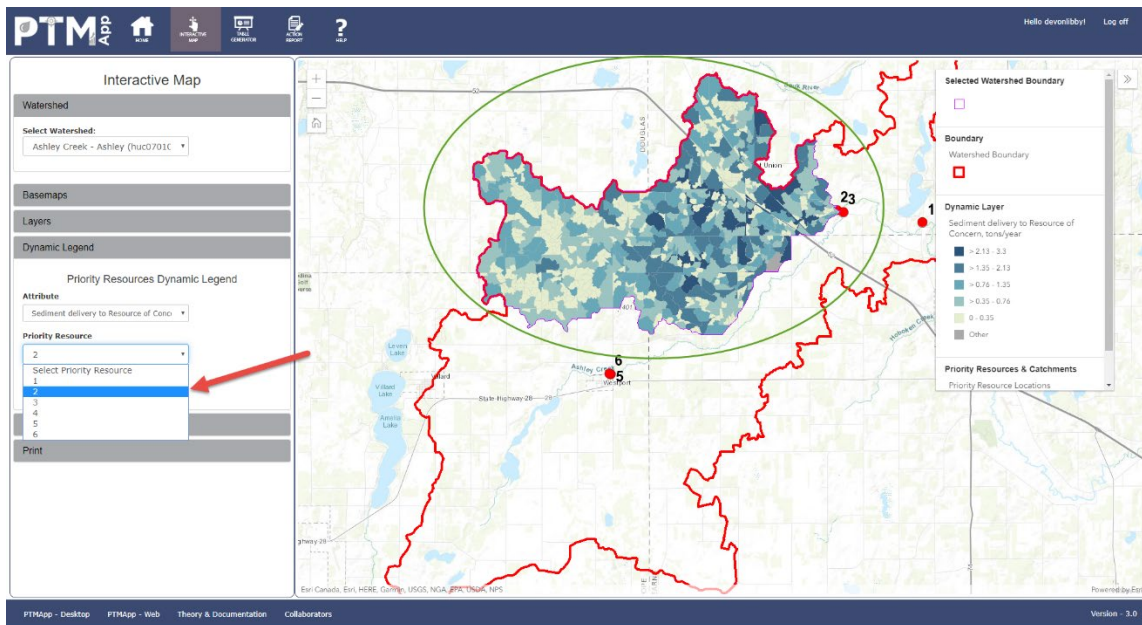
2) If you wish to print the map, you may want to zoom in and re-center the Silver Creek Watershed in your map viewer or select default map view by clicking the home symbol. ⌂ Your new map should look like this:
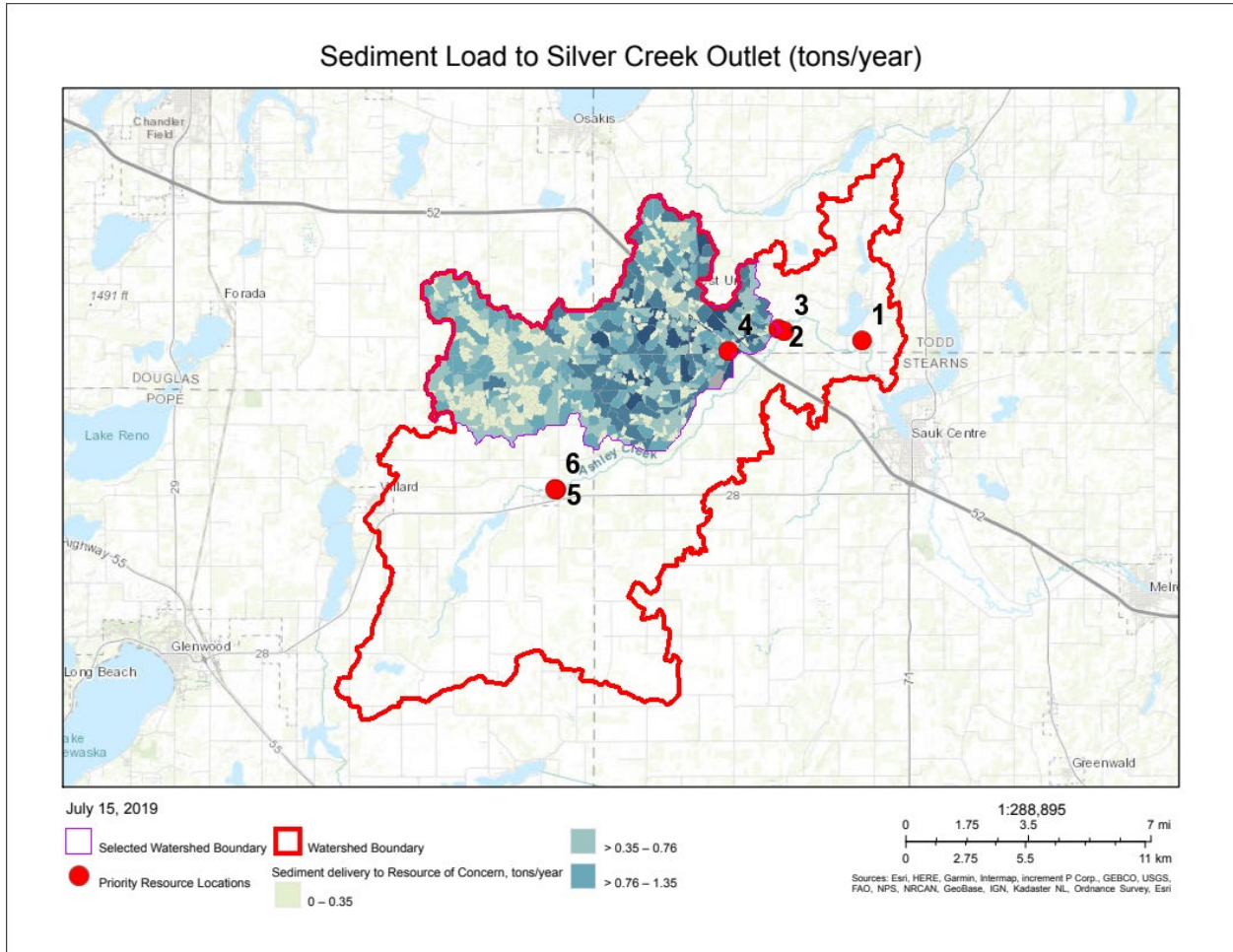
5.2 BMPs: Technical Feasibility and Effectiveness

One of the predominant uses of PTMApp is determining where BMP opportunities are technically feasible on the landscape, what their benefits are (both at the edge-of-field and at downstream water resource), and their estimated cost to install. BMP locations and benefits can be shown on a map in PTMApp-Web for various uses, and can display information on location, water quality benefit, area treated, and cost-effectiveness among other items.

The following PTMApp product examples walk the user through the steps necessary to create various BMP treatment group-specific maps. PTMApp groups BMPs based on how they treat sediment, TP, and TN. The six BMP treatment groups, and example BMPs which would fit within each group, are listed in the table below.

Table 23 PTMApp Treatment Group Code to BMP Type Table

PTMApp-Desktop Group Code	BMP Treatment Group	BMP Examples in Each Treatment Group
1	Storage	Water and Sediment Control Basin (WASCOB); Embankment Pond; Wetland Restoration/Creation; Drainage Water Management/Controlled Drainage Structure
2	Filtration	Grassed Waterway, Filter/Buffer Strip
3	Bio-filtration	Denitrifying bioreactor
4	Infiltration	2-stage Ditch; Infiltration Trench
5	Protection	Grade Stabilization; Tillage Management (e.g., No-Till or Reduced Till); Shoreline Protection
6	Source Reduction	Nutrient Management; Cover Crops; Perennial Crops; Critical Planting Areas

Each of the following maps could be generated for any or all treatment groups.

Five product examples are shown below, but many more products could be created with the attributes available on PTMApp-Web. A full list of these attributes, and their association with the underlying PTMApp-Desktop data, can be found on the PTMApp-Web Attribute Catalog in Appendix A of this document.

New or updated watershed data may contain NRCS BMPs instead of treatment group practices. If this is the case, the following examples are still applicable. The only difference will be that instead of treatment groups, the user will get outputs in NRCS specific practices.

5.2.1 Example 3: Locate BMP Opportunities and Their Upstream Drainage Area

☞ HOW TO:

Description – Illustrate where storage practices are feasible on the landscape (according to PTMApp-Desktop) and the amount of upstream area each will treat.

Use/Need – Determine the drainage area. This map could be used to locate and rank the BMPs which treat the largest upstream drainage area.

Steps to Create

1) If another map is open. Click 'Reset & Clear Graphics' in the Dynamic Legend tab:

This will clear out any information you currently have on your map.

2) Return to the Layers tab and make the Boundary, Priority Resources & Catchments, and Best Management Practice Benefits: Catchment Scale with the sublayer Storage (optional) are visible 👁, then click on the Best Management Practice Benefits: Catchment Scale Dynamic Legend icon:
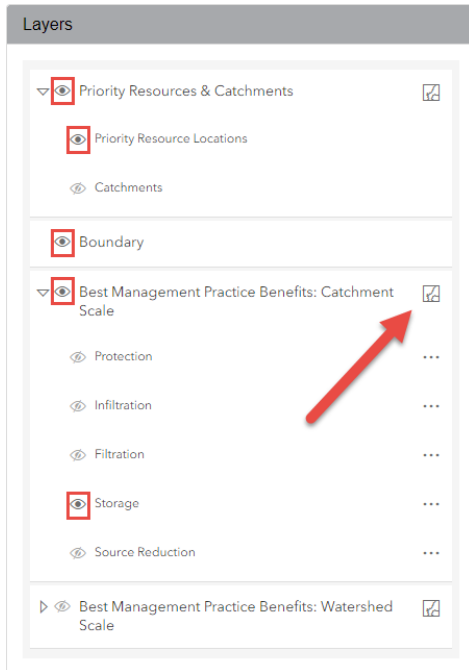
3) This will activate the Dynamic Legend tab. In the Dynamic Legend tab in the Layer dropdown select 'storage' practices:
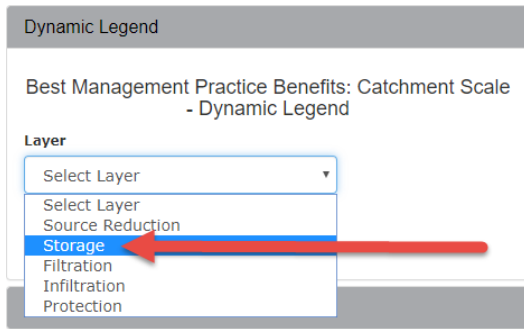
4) Selecting storage practices will activate another dropdown: 'Attribute'. Select the 'Area, ft2' attribute, which will display each storage practice's upstream watershed area in square-feet. You could also create maps for any of the other BMPs group types shown above as well.
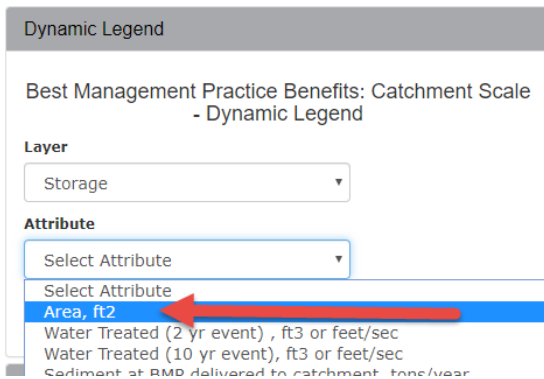
Note: The 'storage' under the layer 'Best Management Practice benefits: Catchment Scale' will have to be made invisible ⊘ Storage since it is on top of the new dynamic layer symbolizing drainage area.

5) If you wish, you can print this map:

Storage Practice Drainage Area (sq-ft)

July 15, 2019

Priority Resource Locations
Watershed Boundary

Area, ft2
43,593 – 503,266
> 503,266 – 1,296,285
> 1,296,285 – 2,442,027
> 2,442,027 – 3,920,825
> 3,920,825 – 5,378,699
Other

1:288,895

0   1.75   3.5   7 mi
0   2.75   5.5   11 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri
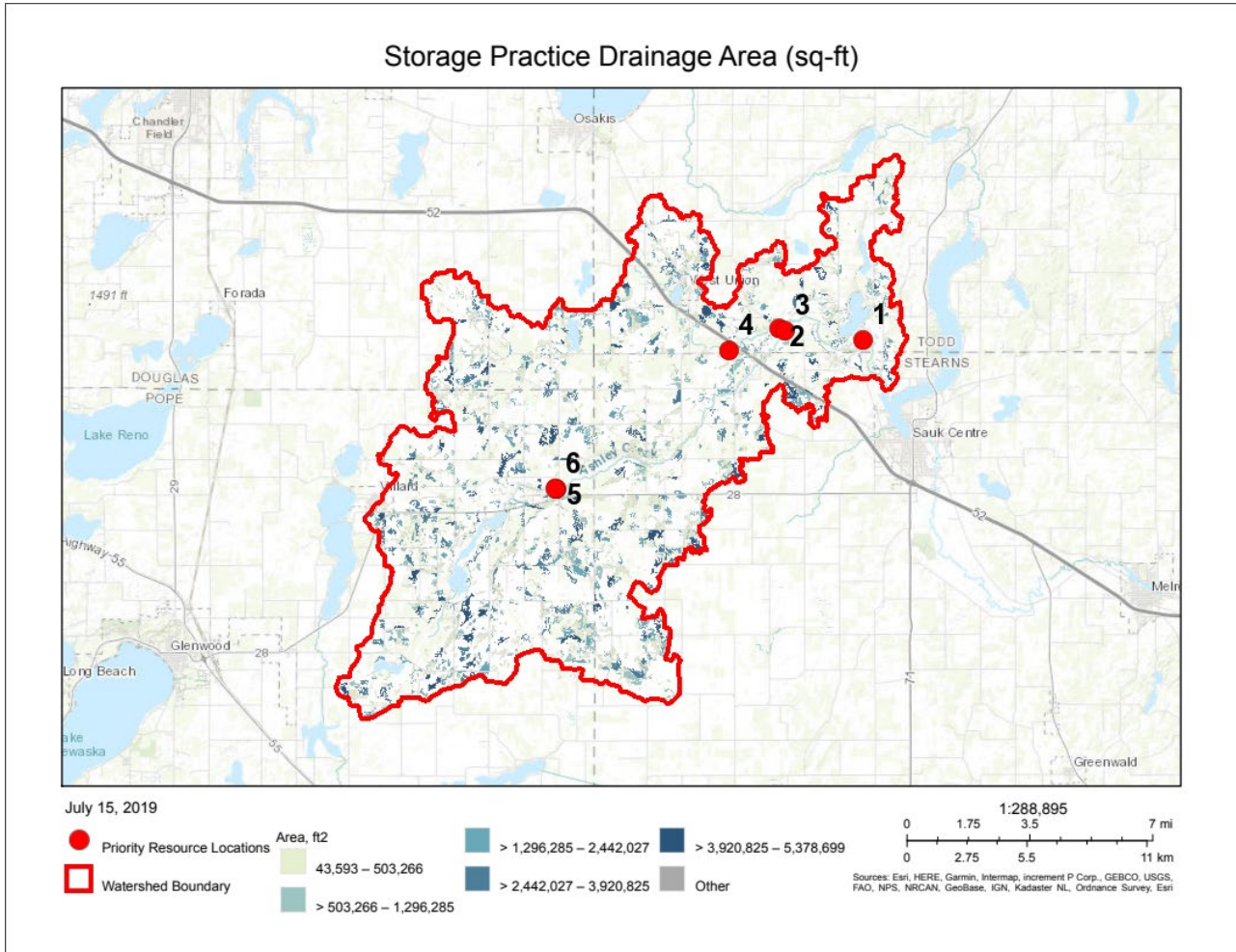
5.2.2 Example 4: BMP Effectiveness for Reducing Total Phosphorus at the BMP

☞ HOW TO:

Description – Illustrate where storage practices are feasible on the landscape (according to PTMApp-Desktop) AND their effectiveness for treating total phosphorus at the BMP.

Use/Need – Grant applications, watershed planning activities, etc.

Steps to Create

1) If another map is open. Click 'Reset & Clear Graphics' in the Dynamic Legend tab:

This will clear out any information you currently have on your map.

2) Return to the Layers tab and make the Boundary, Priority Resources & Catchments, and Best Management Practice Benefits: Catchment Scale with the sublayer Storage (optional) are visible 👁, then click on the Best Management Practice Benefits: Catchment Scale Dynamic Legend icon 📈:

3) This will activate the Dynamic Legend tab for Best Management Practices. For the Layer dropdown choose 'storage' practices.
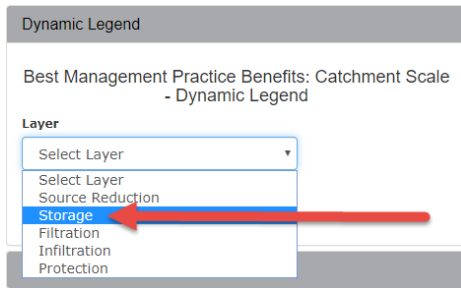
4) Choosing storage practices automatically creates another dropdown: 'Attribute'. Choose the 'Total Phosphorus Reduction (10 yr event), %'. This will show all storage practices on the landscape and their estimated effectiveness at reducing total phosphorus as a percentage between 0-100%.
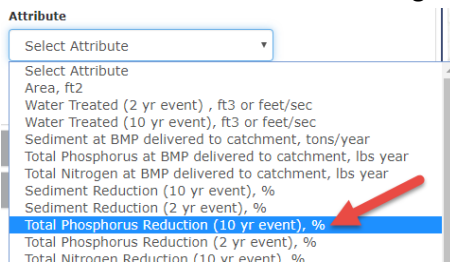

Note: Due to programming compatibility limitations, the legend break values are currently unable to be edited by the user. This issue is being addressed and the capability will be added as soon as it is resolved. Currently, the default break values are determined by a 'natural breaks' classification.

5) Based on the BMP statistics run with this dataset, all storage BMPs are within 38.7-51.6% effective at reducing total phosphorus delivered to the BMP.

Note: The 'storage' under the layer 'Best Management Practice benefits: Catchment Scale' will have to be made invisible ⊘ Storage since it is on top of the new dynamic layer.

6) This map can also be printed, and should look like this:

Storage BMP Total Phosphorus Reduction (%)
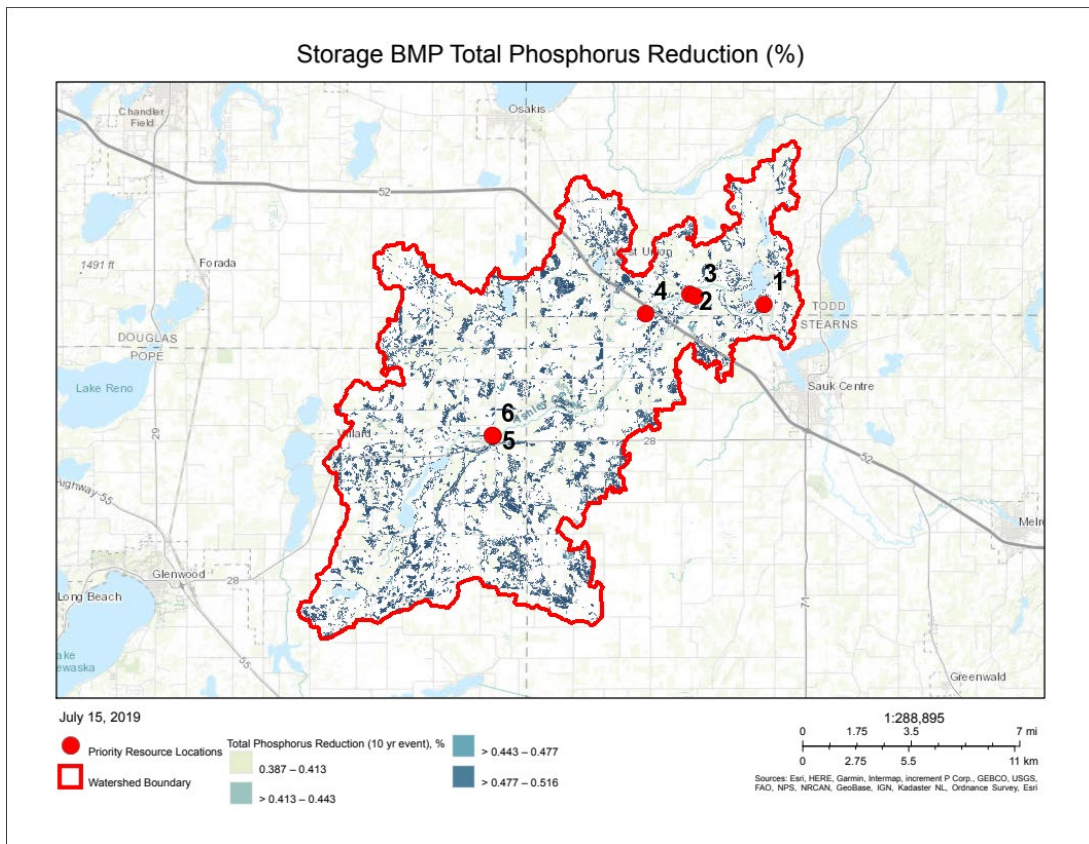
5.2.3 Example 5: BMP Effectiveness for Reducing Sediment at the Catchment Outlet (Edge-of-Field)

☞ HOW TO:

Description – Illustrate where filtration practices are feasible on the landscape (according to PTMApp-Desktop) AND their effectiveness for treating sediment at the catchment outlet.

Use/Need – Determine BMP effectiveness for treating sediment, TP, or TN before delivery to the edge-of-field or concentrated flow path (i.e., what gets into waterways); use in grant applications, watershed planning, setting/benchmarking water quality goals.

Steps

1) If another map is open. Click 'Reset & Clear Graphics' in the Dynamic Legend tab:
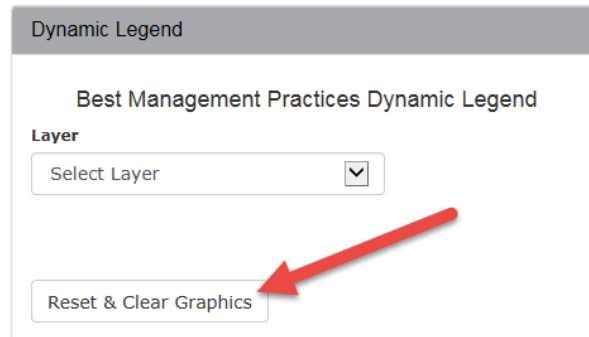
This will clear out any information you currently have on your map.

2) Return to the Layers tab and make the Priority Resources & Catchments, Boundary, and Best Management Practice Benefits: Catchment Scale with the sublayer Filtration (optional) are visible 👁, then click on the Best Management Practice Benefits: Catchment Scale Dynamic Legend icon :
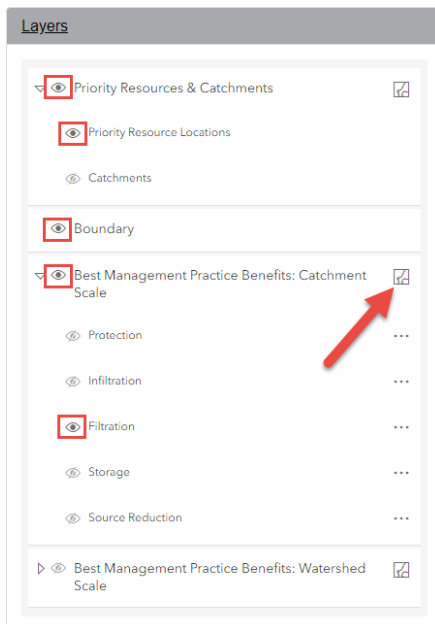
3) This will activate the Dynamic Legend tab for Best Management Practices. For the Layer dropdown choose 'filtration' practices.
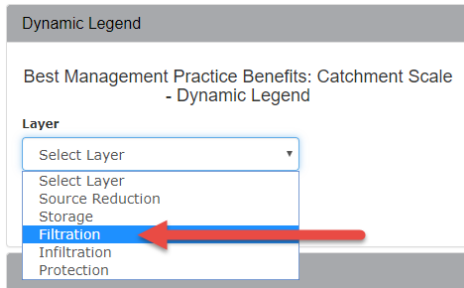
4) Choosing filtration practices automatically creates another dropdown: 'Attribute'. Choose the 'Sediment Reduction at Catchment (10 yr event), tons/year'. This will show all filtration practices on the landscape and their estimated effectiveness at reducing sediment (units = tons/year) as measured at the catchment outlet. The legend is below:
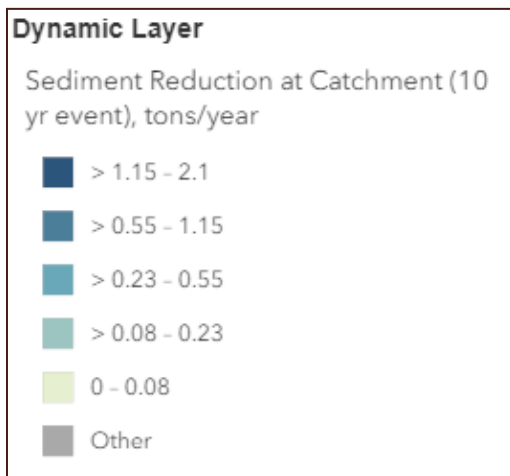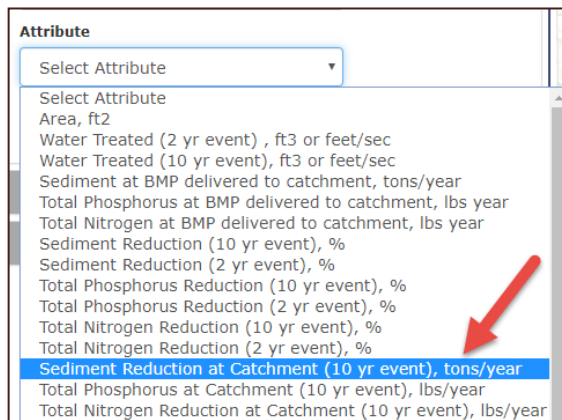
Note:

1) The 'filtration' under the layer 'Best Management Practice benefits: Catchment Scale' will have to be made invisible ⊘ Filtration since it is on top of the new dynamic layer symbolizing sediment reduction.

2) Due to programming compatibility limitations, the legend break values are currently unable to be edited by the user. This issue is being addressed and the capability will be added as soon as it is resolved. Currently, the default break values are determined by a 'natural breaks' classification.

5) Printed map should look like this,

Filtration BMP Sediment Reduction at the Catchment Outlet (tons/year)
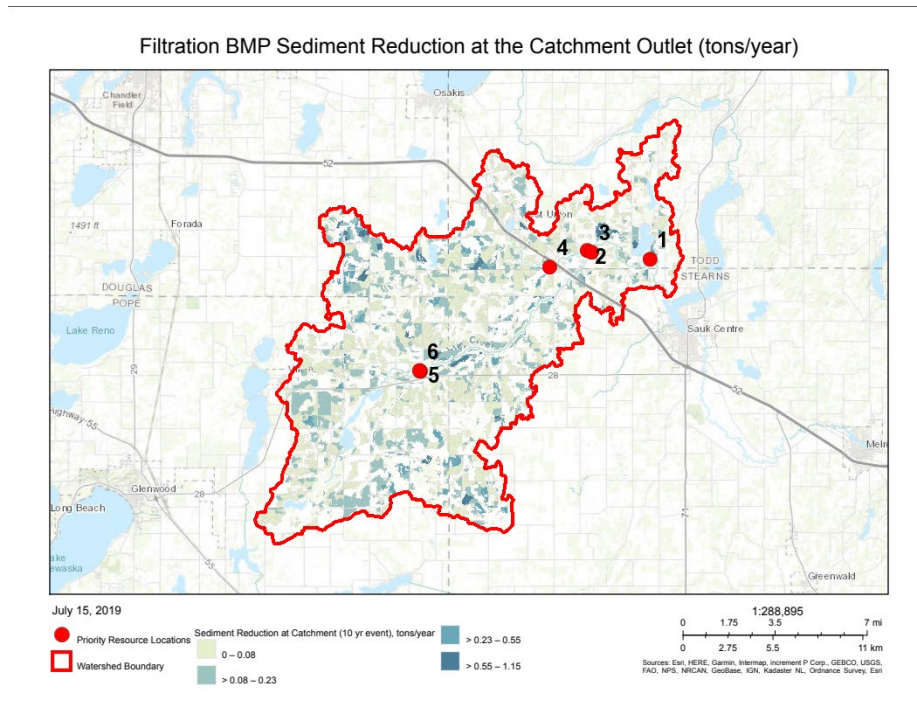
5.2.4 Example 6: BMP Effectiveness for Reducing Sediment at the Priority Resource

☞ **HOW TO:**

Description – Illustrate where filtration practices are feasible on the landscape (according to PTMApp-Desktop) AND their effectiveness for treating sediment at the outlet of Silver Creek (priority resource point #2 in the Ashley Creek Watershed).

Use/Need – Determine sediment, TP, or TN delivery to a downstream resource of concern. This could include a river/stream outlet, lake outlet, monitoring location, etc. This map could be used in grant applications or watershed planning to illustrate the BMPs (in this case filtration BMPs) which have the highest reduction potential to a certain resource location.

Steps to Create

1) If another map is open. Click 'Reset & Clear Graphics' in the Dynamic Legend tab:
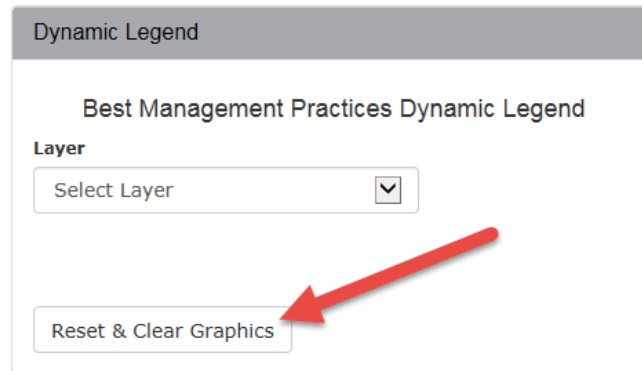
This will clear out any information you currently have on your map.

2) Return to the Layers tab and make the Boundary, Priority Resources & Catchments, and Best Management Practice Benefits: Catchment Scale are visible 👁, then click on the Best Management Practice Benefits: Watershed Scale Dynamic Legend icon 🖉 :
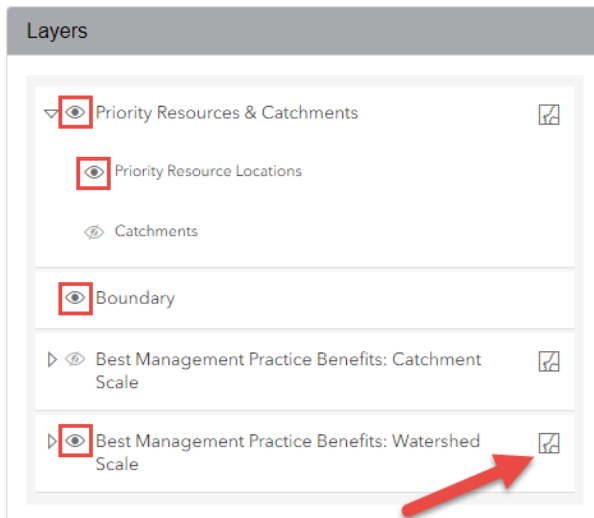
3) This will activate the Dynamic Legend tab:

4) In the Dynamic Legend tab, choose the following options for each dropdown menu:
   a. Attribute: 'Sediment Reduction at Resource (10 yr event), tons/year'
   b. Priority Resource: '2'
      i. *Note: This is the resource point at the confluence of Silver Creek with Ashley Creek.*
   c. Treatment Group: 'Filtration'

Dynamic Legend

Best Management Practice Benefits: Watershed Scale - Dynamic Legend

Attribute

Sediment Reduction at Resource ▾

Priority Resource

2 ▾

Treatment Group

Filtration ▾

Reset & Clear Graphics

5) If you wish, you can print this map. Since this area is smaller than the project area, you should also consider centering the Silver Creek Watershed in the map area so that the active BMP treatment areas are contained within the map. Your final product should look like this:

Filtration BMP Sediment Reduction in the Silver Creek Watershed (tons/year)
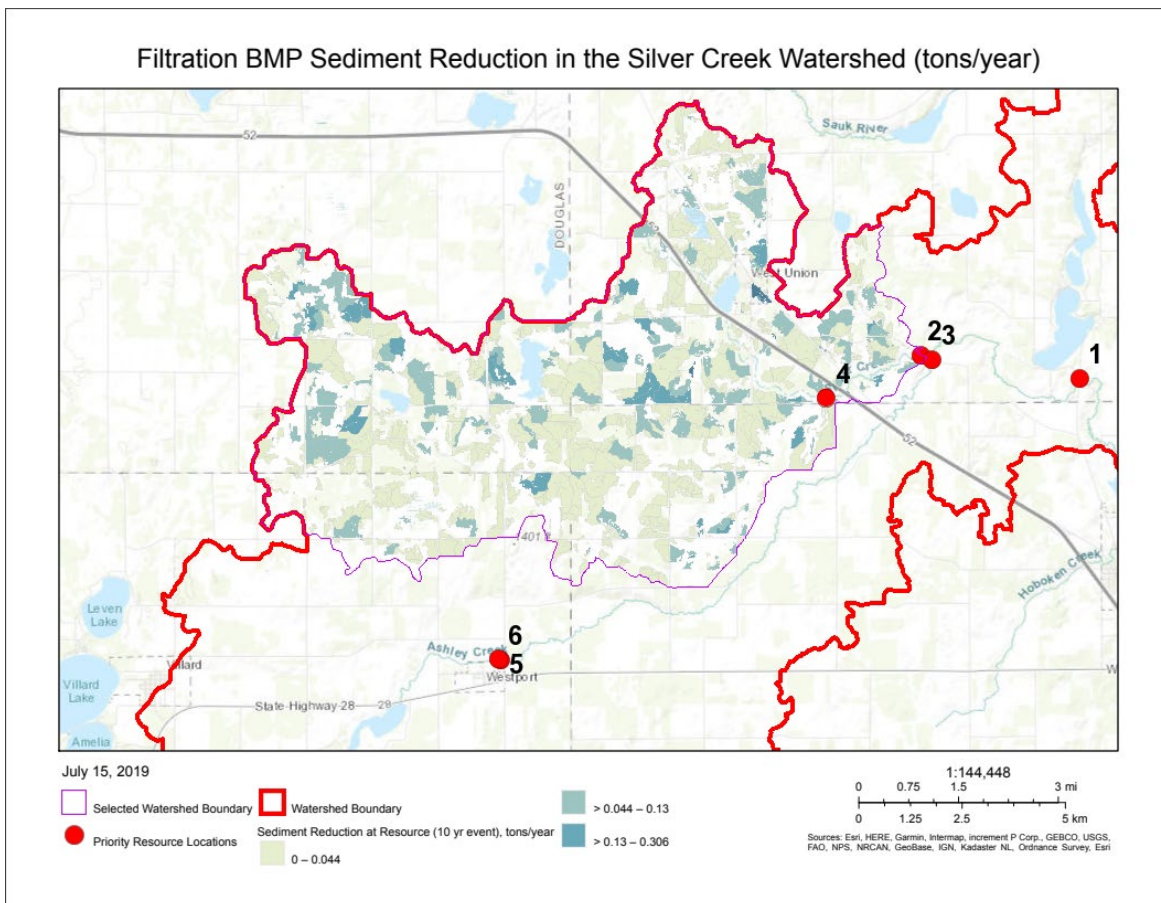
Similarly, if you wanted to know the impact of your BMPs at treating sediment at your watershed outlet, you could have instead chosen priority resource point '1', the priority resource point associated with the project area outlet.

Priority resource points available to you in PTMApp-Web are based on those chosen by project partners and other stakeholder during creation of these data products in PTMApp-Desktop. Only those created in PTMApp-Desktop are available to resolve data in the web portal.

5.2.5 Example 7: BMP Cost Effectiveness

Description – Illustrate where filtration practices are feasible on the landscape (according to PTMApp-Desktop) and their cost-effectiveness (dollars/ton) at reducing sediment delivered to a specific location.

Use/Need – Probably the most widely used factor for gauging and comparing various BMPs across a watershed is the effectiveness of each BMP in retaining targeted pollutants per dollar spent. For the Ashley Creek Watershed data used in this example, BMP cost effectiveness is summarized in dollars/ton for sediment and dollars/lb for TP and TN. To find the most cost-effective BMP(s), you want to look for the LOWEST dollar/ton or dollar/lb value(s). This map has uses in grant applications, watershed planning, and other conservation efforts.

Steps to Create

1) If another map is open. Click 'Reset & Clear Graphics' in the Dynamic Legend tab. This will clear out any information you currently have on your map.
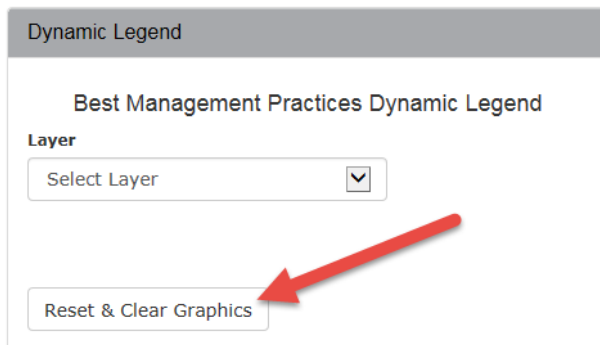
2) Return to the Layers tab and make the Boundary, Priority Resources & Catchments, and Best Management Practice Benefits: Catchment Scale are visible 👁, then click on the Best Management

Practice Benefits: Watershed Scale Dynamic Legend icon :
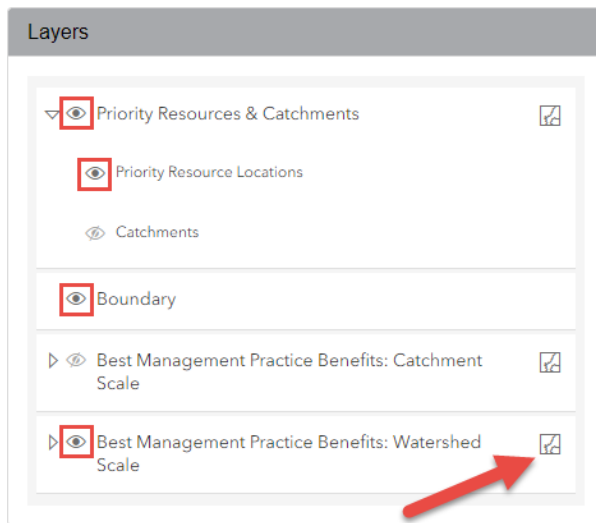
3) This will open the Dynamic Legend tab. In the 'Attribute' dropdown menu, select the 'Sediment Treatment Cost (10 yr event), dollars/ton' attribute, for Priority Resource, choose '2' and for Treatment Group, choose 'Filtration'. PTMApp-Web will populate the map to show the cost-effectiveness of all filtration BMPs providing sediment loading treatment to priority resource 2, or the Silver Creek outlet.
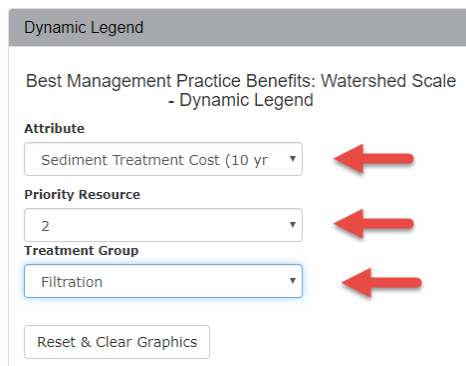
4) Due to programming compatibility limitations, the legend break values are currently unable to be edited by the user. This issue is being addressed and the capability will be added as soon as it is resolved. Currently, the default break values are determined by a 'natural breaks' classification.

5) Printing this map should generate a map that looks like the one below. *Keep in mind that the lighter colored practices are the preferred practices, as they are more cost-effective (i.e., have the lowest dollar/ton of sediment treated).*

Filtration BMP Cost Effectiveness (dollars/ton sediment)
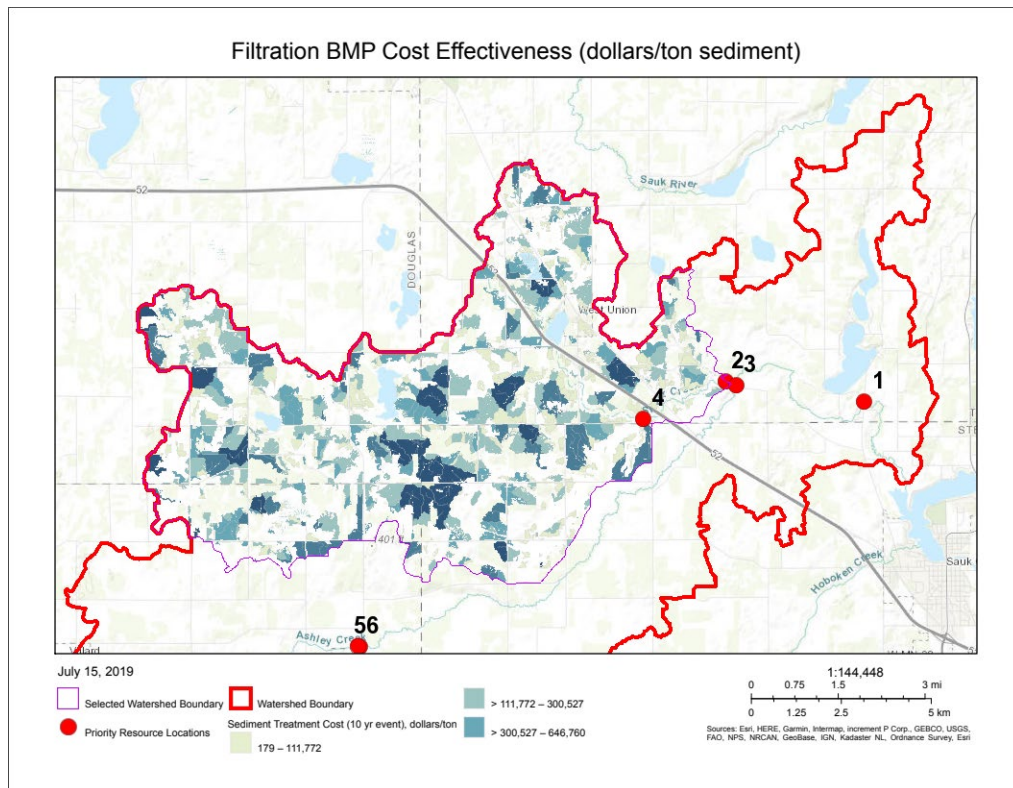
5.3 Using the Table Generator for Planning and Grant Submittal

The functionality of the Interactive Map provides for a visual understanding of source loads and BMP opportunity locations and impact. To apply for grant applications, though, you need a list of these source loads and BMP effectiveness values. The Table Generator can be used to extract this information and summarize it at scales that meet the needs of LGUs and their respective water quality plans. ***Be advised that you can download any of the data on the web using the Table Generator and complete analysis within Excel. This requires some knowledge of the PTMApp-Desktop product's naming conventions.***

Below are examples of products which can be created with the .csv downloaded from Table Generator. These output products were created for the Ashley Creek Watershed in the Sauk River Watershed District but can also be created for any watershed in PTMApp-Web.

5.3.1 Example 8: Source Assessment: Catchment Load Reaching Priority Resources

☞ **HOW TO:**

Description – Create a table listing the sediment load generated in each catchment and delivered to each of its downstream priority resource points.

Use/Need – Determining catchment locations contributing excessive runoff to resource locations to prioritize for BMP and CP implementation.

Steps to Create:

1) In the 'Select Watershed' dropdown menu choose your watershed. Then click 'Download All Data' in the Table Generator window:
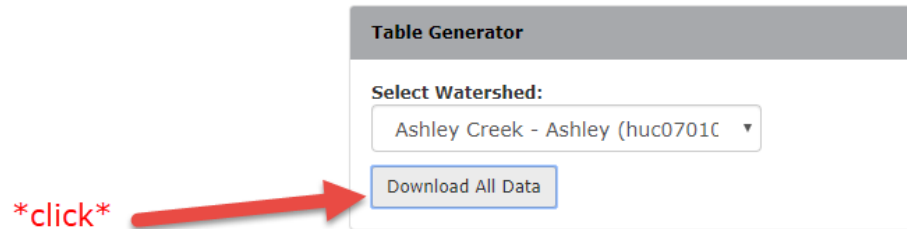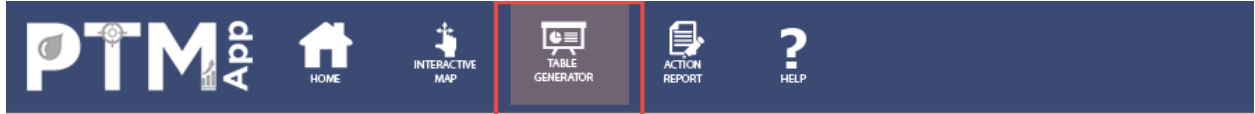
2) This button downloads one or more Excel spreadsheets which contain the PTMApp-Desktop data used to populate the data in PTMApp Web. For small datasets (i.e., HUC-12 or small HUC-10 watersheds) you will see one CSV file. For larger watersheds you may see multiple files. This is because, for larger watersheds, showing all the data in one spreadsheet would not allow the user to view the data in Microsoft Office Excel as it would exceed the limit for rows per spreadsheet, which is 1,048,576 for Office 2007 and newer versions. In those cases, the data were split by 'Pivot_ID'. For very large watersheds (HUC-8 watersheds or larger) even a single 'Pivot_ID' may exceed the row limit in Excel. In those cases, a 'README' file was created to state this. Data can instead be viewed in a text editor application. The below guidance follows pivot table creation assuming only one CSV file is created for your watershed (as in Ashley Creek Watershed).

3) For BMP-specific operations, creating a Pivot table in Excel is the most efficient way to summarize and rank data.

4) To create a pivot table, select all cells (Ctrl+A keyboard shortcut) and navigate to Insert >> PivotTable.
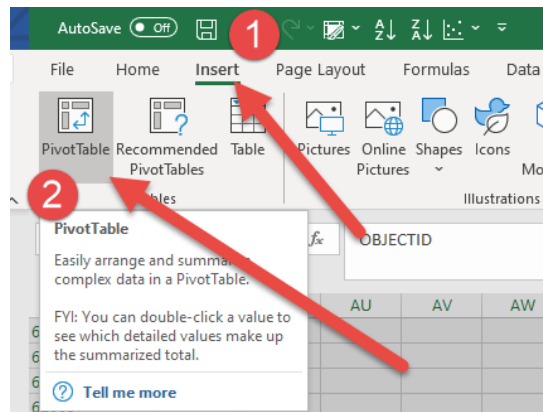
5) The 'Create PivotTable' dialog box will open:
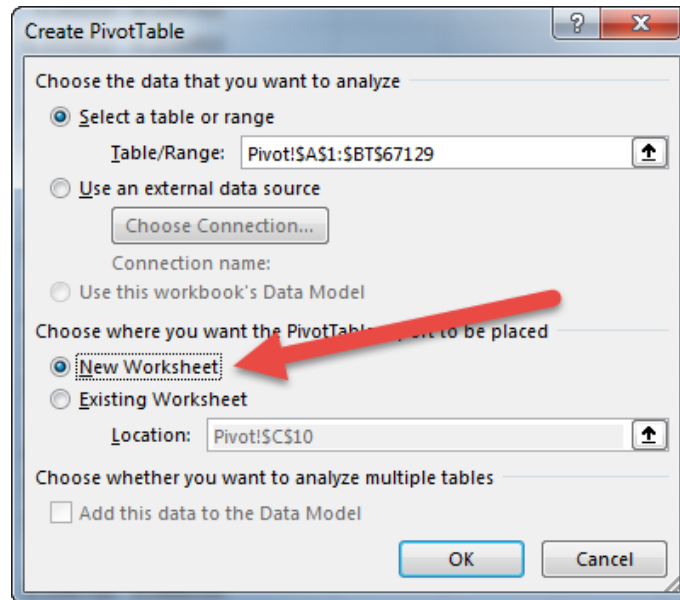
Click on 'New Worksheet' to place the pivot table in a separate worksheet. Then click OK.

6) You should see the 'PivotTable Fields' dialog box open on an empty worksheet:
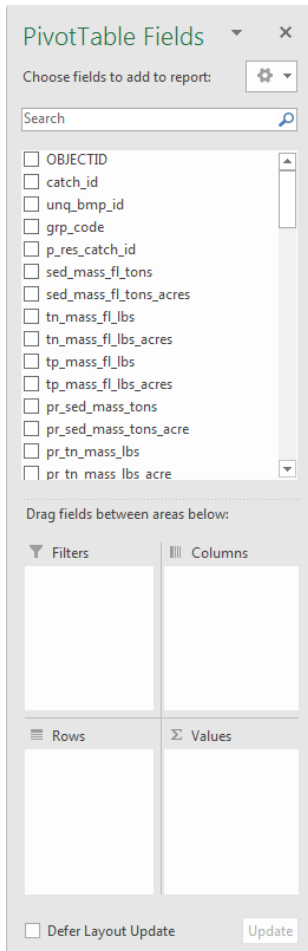
7) Data will be sorted into Rows, Columns, and Value fields to be analyzed. Additionally, the 'Filter' field allows you to select data within a certain field. Its use will be discussed in later examples. **To find sediment load generated in each catchment and delivered to each of its downstream priority resource points, choose the following options:**

    a. **Rows:** 'catch_id' - Catchment ID

    b. **Columns:** 'p_res_catch_id' - Unique whole number ID for priority resource catchment

    c. **Values:** 'pr_sed_mass_tons' – Sediment mass in tons delivered from catchment outlet to priority resource catchment outlet

    d. **Filter:** NONE

Assigning these data to each of the categories above should yield the results below:

Sum of pr_sed_mass_tons   Column Labels

Row Labels	1	2	3	4	5	6 (blank)	Grand Total
26	0.237965423						0.237965423
66	0.377454232						0.377454232
80	0.305110639						0.305110639
131	0.081898812						0.081898812
159	0.429855008						0.429855008
161	0.552990568						0.552990568
180	0.491231259						0.491231259
182	0.478896707						0.478896707
233	0.477107314						0.477107314
261	0.140763828	0.219610011					0.36037384
263	0.377749728						0.377749728
300	0.137764976						0.137764976
308	0.301247537						0.301247537
334	0.107118261						0.107118261
337	0.461443117						0.461443117
361	0.226324288	0.353095535					0.579419823
386	0.113050614	0.176373766					0.28942438
405	0.510959918						0.510959918
417	0.609302901	0.950592338					1.559895239
421	0.120856642	0.188552193					0.309408836
422	0.153389932	0.239308386					0.392698317
474		0.2288843	0.357089489				0.585973789
526	0.325273157						0.325273157
612	0.720033394						0.720033394
673	0.435312165						0.435312165
686	0.049997531						0.049997531
694	0.170880738						0.170880738
777		0.67994673					0.67994673
844	0.152878388	0.238510311		0.299801141			0.69118984
873		0.71442162					0.71442162
883	0.324704906	0.506582186					0.831287092
903	2.972051658						2.972051658
905	0.084207606						0.084207606
933	0.136432019	0.212851822		0.2675491			0.616832941
961	1.237276628	1.930313611					3.167590238
962	0.039139395						0.039139395
965	0.255661621						0.255661621
967	0.150566255						0.150566255
1049	0.080741618						0.080741618
1060	0.002098011	0.003273172					0.005371183
1079	0.138820465	0.216578109					0.355398574

PivotTable Fields

Choose fields to add to report:

Search

- [ ] OBJECTID
- [x] catch_id
- [ ] unq_bmp_id
- [ ] grp_code
- [x] p_res_catch_id
- [ ] sed_mass_fl_tons
- [ ] sed_mass_fl_tons_acres
- [ ] tn_mass_fl_lbs
- [ ] tn_mass_fl_lbs_acres
- [ ] tp_mass_fl_lbs
- [ ] tp_mass_fl_lbs_acres
- [x] pr_sed_mass_tons
- [ ] pr_sed_mass_tons_acre
- [ ] pr_tn_mass_lbs
- [ ] pr_tn_mass_lbs_acre
- [ ] pr_tp_mass_lbs
- [ ] pr_tp_mass_lbs_acre
- [ ] sed_mass_fl_rank
- [ ] tn_mass_fl_rank

Drag fields between areas below:

Filters

Columns
p_res_catch_id

Rows
catch_id

Values
Sum of pr_sed_mass_t...

Sheet1   huc0701020203_pivot (3)

TIP: Within 'Select Values', be sure to choose an operation besides 'Count' to analyze your data. For most cases with PTMApp data, SUM is the best choice as either (1) there is only one value to analyze or (2) you are adding multiple values within a given area (e.g., catchment). To adjust this value, click on the Values dropdown arrow and select 'Value Field Settings'. Within the Value Field Settings dialog box, click 'Sum' and hit OK.

Sum of r_sq2_...

- Move Up
- Move Down
- Move to Beginning
- Move to End
- Move to Report Filter
- Move to Row Labels
- Move to Column Labels
- Move to Values
- Remove Field
- Value Field Settings...
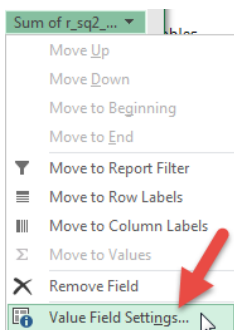
8) In this table, each catchment ID is listed to the left and the priority resource point value is listed on the top. The sediment load (tons/year) generated in each catchment and delivered to each priority resource

point is found under the numbered columns. A 'Totals' row is provided at the bottom of the table (need to scroll down to find), which is a sum of all catchment loads delivered to the resource point. There is also is also a 'Totals' column on the right-hand-side of the table, which is a sum of the catchments' contribution to all resource points. Scrolling through this table you can see many catchments contribute to multiple priority resources, and their values tend to decline moving downstream.

9) You can sort the columns to find which catchments contribute greater load to each priority resource point or export to a table and use within GIS with other PTMApp-Desktop data.

5.3.2 Example 9: Identify BMPs for Grant Funding – By Load Reduction

Description – Create a table ranking BMPs based on their ability to remove sediment at each priority resource point.

Use/Need – A list of BMP opportunities which could be used in a prospective grant application to install best-of-best practices for reaching a water quality goal at a specific resource. This methodology is for sediment but could also easily be applied for TP or TN reductions.

Steps to Create:

1) Click 'Download All Data' in the Table Generator window:
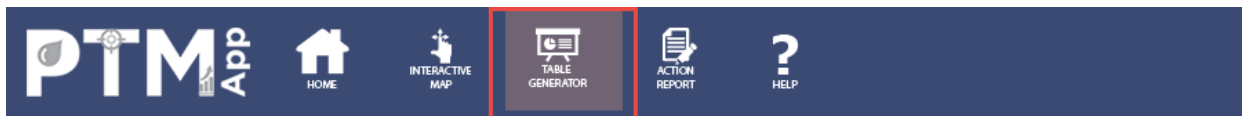
2) This button downloads a single Excel spreadsheet which contain the PTMApp-Desktop data used to populate the data in PTMApp-Web:

3) For BMP-specific operations, creating a Pivot table in Excel is the most efficient way to summarize and rank data.

4) To create a pivot table, select all cells (Ctrl+A keyboard shortcut) and navigate to Insert >> PivotTable.
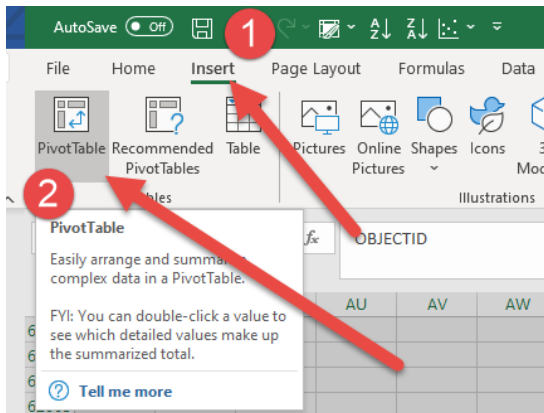
5) The 'Create PivotTable' dialog box will open:
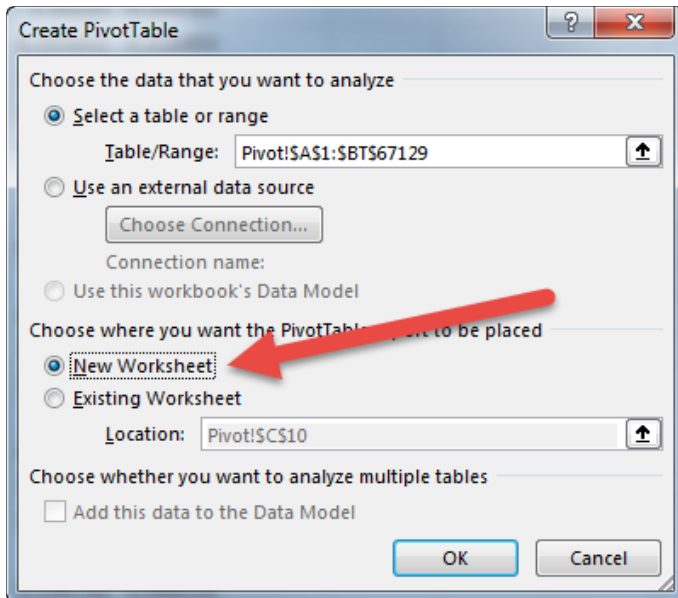
Click on 'New Worksheet' to place the pivot table in a separate worksheet. Then click OK.

6) You should see the 'PivotTable Fields' dialog box open on an empty worksheet:
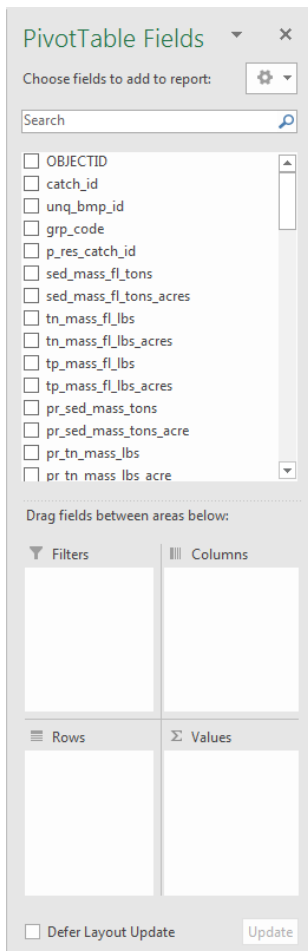
7) Data will be sorted into Rows, Values, and Filter fields to be analyzed. Columns will not be used in this example. **To find the BMPs with the highest sediment reduction to priority resources, choose the following options:**

    a. **Rows:** 'unq_bmp_id' - Unique BMP ID

    b. **Columns:** EMPTY

    c. **Values:** 'r_sq2_10' – median sediment load reduction (tons/year) based on a 10-year, 24-hour runoff event

    d. **Filter:** 'p_res_catch_id' – priority resource ID

Assigning these data to each of the categories above should yield the results below:

8) Using the filter option (shown below), you can select specific priority resource points. This dropdown should be in cell B1.
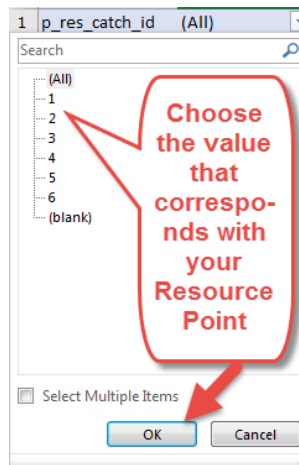
9) Choosing Resource point #6, for example, lists sediment reduction values for all BMPs upstream of priority resource point #6 in Ashley Creek. To sort these and find the **MOST EFFECTIVE** of these BMPs, select the columns that contain your BMP ID and reduction values (Columns A & B) and paste them (VALUES ONLY) into a new window. Click on 'Sort & Filter' and 'Sort Z to A'. After deleting the unnecessary remaining rows (listing the 'Grand Total' and 'p_res_catch_id'), you should be left with these two columns: 'Row Labels' and 'Sum of r_sq2_10'.
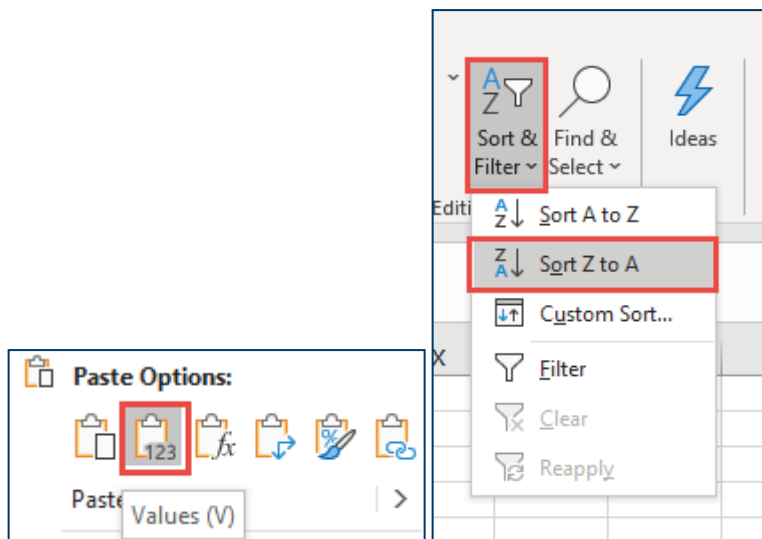
10) Select Column B and Click on 'Sort & Filter' and 'Sort Largest to Smallest'. Select 'Expand the Selection' in the 'Sort Warning' dialog box and select 'sort'

11) Here the top 20 BMPs are selected, which have a combined annual sediment reduction of 29.7 tons.

TIP: If you want to only select certain BMP types, it is as simple as adding the field 'grp_code' to filters portion of your pivot table and setting the appropriate filters for the desired query.

☞ HOW TO:

Steps to Create

Once your pivot table is created following steps 1-6 above, choose the following attributes in each layer:

      a. **Rows:** 'unq_bmp_id' - Unique BMP ID

      b. **Columns:** 'p_res_catch_id' – priority resource ID

      c. **Values:** 'r_sq2_10' – median sediment load reduction (tons/year) based on a 10-year, 24-hour runoff event

      d. **Filter:** 'grp_code' – BMP treatment group

Assigning these data to each of the categories above should yield the results below:

Now shown in the Pivot Table are the annual sediment reductions (tons/year) for BMPs at each priority resource point. Here you can see some BMPs treat multiple priority resource points. If you wish, you can filter by BMP group by adjusting the 'grp_code' filter (Cell B1).
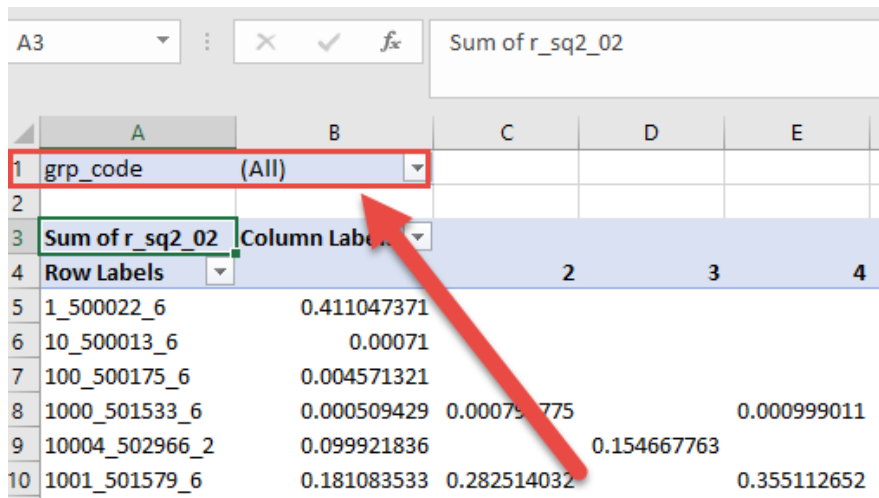
You can choose to look at specific group codes should you be interested in only certain BMP types. A list of common BMPs within each BMP group is shown in Table 24 PTMApp Treatment Group Code to BMP Type Table.

Table 24 PTMApp Treatment Group Code to BMP Type Table

PTMApp-Desktop Group Code	BMP Treatment Group	BMP Examples in Each Treatment Group
1	Storage	Water and Sediment Control Basin (WASCOB); Embankment Pond; Wetland Restoration/Creation; Drainage Water Management/Controlled Drainage Structure
2	Filtration	Grassed Waterway, Filter/Buffer Strip
3	Bio-filtration	Denitrifying bioreactor
4	Infiltration	2-stage Ditch; Infiltration Trench
5	Protection	Grade Stabilization; Tillage Management (e.g., No-Till or Reduced Till); Shoreline Protection
6	Source Reduction	Nutrient Management; Cover Crops; Perennial Crops; Critical Planting Areas

Lastly, follow step #9 above to copy and paste your data to a new Worksheet and sort to find the BMPs with the highest reduction amounts.

TIP: You may want to use the steps above for other PTMApp attributes that describe sediment, TP, and TN reduction for BMPs. Simply change the 'Values' layer in your pivot table to the attribute name in Table 25 below and continue with the same analysis as above.

Table 25 Attribute names assoicated with PTMApp data table outputs that can be used to filter BMP criterion

Value Filter Name	Description	Unit and Scale of Results
SQ2_10	Sediment reduction (10 yr event), %	% at BMP
SQ2_02	Sediment reduction (2 yr event), %	% at BMP
PQ2_10	Total Phosphorus reduction (10 yr event), %	% at BMP
PQ2_02	Total Phosphorus reduction (2 yr event), %	% at BMP
NQ2_10	Total Nitrogen reduction (10 yr event), %	% at BMP
NQ2_02	Total Nitrogen reduction (2 yr event), %	% at BMP
C_SQ2_10	Sediment reduction at catchment (10 yr event), tons/year	tons/year at catchment outlet
C_PQ2_10	Total Phosphorus reduction at catchment (10 yr event), lbs/year	lbs/year at catchment outlet
C_NQ2_10	Total Nitrogen reduction at catchment (10 yr event), lbs/year	lbs/year at catchment outlet
C_SQ2_02	Sediment reduction at catchment (2 yr event), tons/year	tons/year at catchment outlet
C_PQ2_02	Total Phosphorus reduction at catchment (2 yr event), lbs/year	lbs/year at catchment outlet
C_NQ2_02	Total Nitrogen reduction at catchment (2 yr event), lbs/year	lbs/year at catchment outlet

Value Filter Name	Description	Unit and Scale of Results
R_SQ2_10	Sediment reduction at resource (10 yr event), tons/year	tons/year at resource location
R_PQ2_10	Total Phosphorus reduction at resource (10 yr event), lbs/year	lbs/year at resource location
R_NQ2_10	Total Nitrogen reduction at resource (10 yr event), lbs/year	lbs/year at resource location
R_SQ2_02	Sediment reduction at resource (2 yr event), tons/year	tons/year at resource location
R_PQ2_02	Total Phosphorus reduction at resource (2 yr event), lbs/year	lbs/year at resource location
R_NQ2_02	Total Nitrogen reduction at resource (2 yr event), lbs/year	lbs/year at resource location

5.4 Using the Action Report for Planning and Grant Submittal

The functionality of the Interactive Map provides a visual understanding of source loads as well as BMP opportunity locations and impact. However, to apply for grant applications you need a list of these source loads and BMP effectiveness values. While the Table Generator allows the user access to the full tabular dataset underlying the PTMApp-Web data, it does require a working knowledge of both PTMApp naming conventions and Excel pivot tables. The Target BMP Action Report (or simply Action Report) Tool helps streamline the extraction of the most commonly queried and useful BMP information in PTMApp-Web and summarize it at scales that meet LGU water quality planning needs with a few simple steps.

Targeted BMP Action Reports contain a cover page which outlines the general 'Report Details' and user input 'Selection Criteria' used to query and generate the report. This information is accompanied by a map displaying BMPs within the selected subwatershed.

Following the cover page is the printed list of BMPs in order of most to least preferred or the probable implementation order given the user-defined criteria. Below is an example the final page of the report which has one additional row totaling values along with a footnote disclaimer.

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280015032_533320_6	181,103	$56.90	3.19	$17.82	0.960	$59.24	19.36	$2.94
Reduced Till	280018613_540118_6	777,961	$121.56	6.70	$18.16	2.052	$59.24	41.35	$2.94
Reduced Till	280018642_539804_6	419,523	$157.61	8.65	$18.22	2.653	$59.40	53.47	$2.95
Reduced Till	280015225_533886_6	678,933	$177.98	9.66	$18.43	3.005	$59.23	60.55	$2.94
Reduced Till	280014955_33289_6	21,385,447	$244.62	13.27	$18.44	4.133	$59.19	83.29	$2.94
Reduced Till	280017516_537818_6	2,720,845	$444.47	23.86	$18.63	7.500	$59.27	151.14	$2.94
Reduced Till	280016383_36111_6	39,516,968	$83.40	4.48	$18.63	1.409	$59.19	28.39	$2.94
Reduced Till	280020071_542284_6	1,101,147	$216.75	11.58	$18.72	3.643	$59.50	73.41	$2.95
Reduced Till	280017902_538663_6	86,380	$79.25	4.16	$19.05	1.338	$59.24	26.96	$2.94
Reduced Till	280014921_533340_6	719,029	$149.91	7.83	$19.14	2.527	$59.32	50.93	$2.94
Grand Total from BMPs in Selection			$7,780.00	522.02		131.222		2644.54	

Disclaimer: Practices shown are from raw results created using PTMApp-Desktop and uploaded to the web. Users should review actual locations for practicability to implement. Cost-Effectiveness values may vary slightly from actual calculation based on number of significant digits shown. The number of practices printed is based on selection criteria but is limited to 40, or up to 3 pages.

5.4.1 Example 10: Find the Top 40 Most Cost-Effective Management Practices (Reduced Till) Based on Sediment Reduction Benefits at the Catchment Outlet (I.E. Edge-of-Field)

☞ HOW TO:

Description – Generate a list of the top 40 most cost-effective management practices based on reduction benefits at the edge-of-field/catchment outlet (according to PTMApp-Desktop). In this example, sediment will be used as the water quality parameter of interest.

Use/Need – Determine the 40 most cost-effective management locations for treating sediment, TP, or TN before delivery to the edge-of-field or concentrated flow path (i.e., what gets into waterways); use in grant applications, watershed planning, setting/benchmarking water quality goals.

Steps to Create

1) If an Action Report is already generated, click 'Reset Selection' at the bottom of the page:
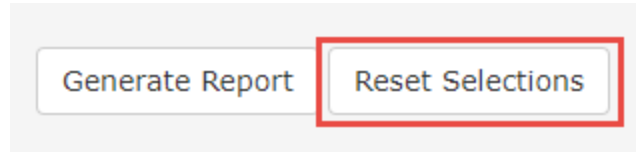
This will clear the selected information back to the default settings and should be pressed if any previous maps were generated in the same PTMApp-Web session.

2) In 'Step 1: Select Watershed and Priority Resource Point' choose 'Redeye River – Redeye River (huc07010107)' for the watershed and '35' for the 'Location Point Number'

By choosing location point 35 – we are specifying that we are only concerned with the top 40 management practices in the Redeye River Watershed.

It is important to note that the map displayed in this step will print in the report the way it is seen in this window, except for the legend being removed and placed outside the data frame. Set the scale and position the map accordingly.

3) In 'Step 2: Select Parameter', select 'Sediment' from the dropdown (this is default)

This drop down selects the water quality parameter (Sediment, TN, TP) of concern which the ranking will be based.

4) In 'Step 3: Select Type of Practice (NRCS Practice)' select 'Reduced Till'.

In this step, the user specifies which practice types should be considered in the Action Report. In this example, we are only concerned with Reduced Till practices so only select 'Reduced Till'.

5) Step 3 may have legacy treatment group data if the PTMApp data has not been modernized. In this case, you will select between the original treatment group data for your action report. The steps within Action Report remain the same except the user will have different practice choices for Step 3.

6) In 'Step 4: Basis for Practice Selection' select the following:
   ➢ 'Method to Rank BMPs' – 'Cost-Effectiveness (lowest $/mass)' (This is default)
      o *This is the most popular method to rank BMPs and is derived from dividing BMP cost ($) by the reduction benefit mass (tons for sediment or pounds for TN and TP). This normalizes that data for all BMPs showing the best return on investment. In this example sediment was selected in step 2 so this will be the water quality reduction applied to the calculation for ranking, however, the generated report will additionally supply the statistics of the other water quality benefits received from the BMP.*
   ➢ 'Method Used to Select BMPs' – 'Number of Highest Ranked BMPs' (This is default)
      o *This option works in combination with the 'Method to Rank BMPs' – The default applied in this example simply ranks the most cost-effective BMPs. Other options in this drop down serve to filter the data by setting thresholds or ranges for BMP inclusion/exclusion based on cost-effectiveness, total load reduction, and total cost.*
   ➢ '(# of BMPs to Print) max 40' – '40' (This is default)
      o *This option is dynamic based on the selection of the 'Method Used to Select BMPs' selected by the user. For additional information on these options see (section 4.7, step 4, B).*
   ➢ 'Outlet Location' – 'Catchment Outlet'
      o *In this example, we are looking at edge-of-field or catchment benefits from the BMPs so 'Catchment Outlet' is selected. If 'Watershed Outlet' was selected, BMP reductions would be measured at the 'Location Point Number' outlet selected in step 1.*
   ➢ 'Storm Event' – '2-year'
      o *In this example, we are measuring BMP benefits/reductions for a 2-year, 24-hour design storm event. The other option is a 10-year, 24-hour storm event.*
   ➢ 'Anticipated performance'
      o Reduced Till – Median Q2 (expected) (This is default)
      o **NOTE: If PTMApp data is legacy data, it will have treatment groups instead of NRCS practices. Step 4 remains the same, but you will only see the 6 treatment group options instead of the 24 NRCS practice types.**
      o *Anticipated performance of BMP types is derived from a reduction ratio which is based on the empirical statistical distribution of BMP effectiveness for each practice type. This section will default to the Median Q2 effectiveness for practice types selected in step 3.*

Step 4 : Basis For Practice Selection

Method to Rank Practices ⊕

Cost-Effectiveness (lowest $/mas ⌄

Method Used to Select Practices ⊕

Number of Highest Ranked Practi ⌄   40   (# of BMPs to Print) max 40

Outlet Location ⊕

Catchment Outlet ⌄

Storm Event ⊕

2 - Year ⌄

OPTIONAL: Adjust Anticipated Practice Performance ⊕

	Low (25th percentile)	Moderate (50th percentile)	High (75th percentile)
Conservation Cover	○	○	○
Cover Crop	○	○	○
Critical Area Planting	○	○	○
Denitrifying Bioreactor	○	○	○
Drainage Water Management	○	○	○
Farm Pond	○	○	○
Filter Strip	○	○	○
Forage and Biomass Planting	○	○	○
Grade Stabilization	○	○	○
Grassed Waterway	○	○	○
Infiltration Trench/Small Infiltration Basin	○	○	○
Large Wetland Restoration	○	○	○
Multi-stage Ditch (open channel)	○	○	○
No Till	○	○	○
Nutrient Management (Nitrogen)	○	○	○
Nutrient Management (Phosphorus)	○	○	○
Nutrient Management of Groundwater	○	○	○
Prescribed Grazing	○	○	○
Reduced Till	○	●	○
Regional Wetland/Pond	○	○	○
Riparian Herbaceous Cover	○	○	○
Saturated Buffer	○	○	○
WASCOB	○	○	○
Wetland Shoreline Restoration	○	○	○

7) Lastly, select "Generate Report" at the bottom of the page. Depending on the size of the area and complexity of the parameters selected, this process may take a while. Databases are queried on input parameters and calculations are done on the fly to generate the report. The report will download as a pdf.

This full Action Report for this example can be view in Appendix A: 6.7 Action Report Example 10.

5.4.2 Example 11: Find the Top 40 Most Cost-Effective Management Practices (Reduced Till) Based on Sediment Reduction Benefits at the Resource Point (Watershed) Outlet

☞ HOW TO:

This example has identical user input parameters to the previous example, "5.4.1 Example 10", except for the BMP reduction benefits and subsequently the cost-effectiveness will be based on the Resource Point (Watershed) Outlet. This is accomplished by changing the 'Output Location' in Step 4 to 'Watershed Outlet'. All other parameters remain the same (see figure below).

The full Action Report for this example can be view in Appendix A: 6.8 Action Report Example 11.

When comparing the differences between Action Report Example 10 and 11, one can see that many of the same practices are pulled but with varying order, reductions, and cost-effectiveness. These differences can also be seen in the totals for each report (below).

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)

Watershed Outlet

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Grand Total from BMPs in Selection			$9,480.00	438.32		148.361		2989.94	

Catchment Outlet

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Grand Total from BMPs in Selection			$7,780.00	522.02		131.222		2644.54	

5.4.3 Example 12: Find the Most Cost-Effective Practices Based on Phosphorus Reduction Benefits at the Resource Point (Watershed) Outlet with Minimum Load Reduction Requirements

Description – Generates a list of most cost-effective BMPs based on a minimum reduction benefit at the Resource Point (Watershed) Outlet according to PTMApp-Desktop. In this example, Phosphorus will be used as the water quality parameter of interest and only BMPs with reductions over 1 pound annually will be considered.

Use/Need – Determine the most cost-effective BMPs for treating sediment, TP, or TN before delivery to Watershed outlet. Additionally, the example shows how to qualify a minimum benefit reduction; use in grant applications, watershed planning, setting/benchmarking water quality goals.
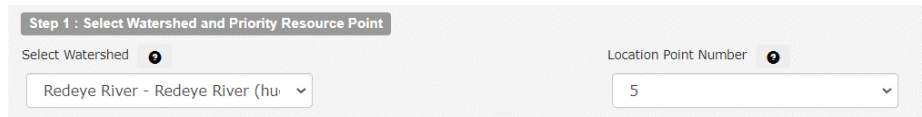
Steps to Create

1) If an Action Report is already generated, click 'Reset Selection' at the bottom of the page:
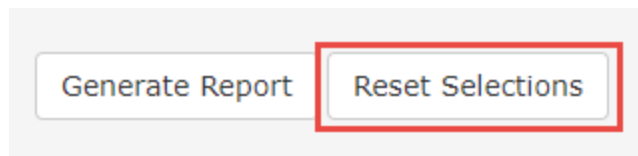
This will clear the selected information back to the default settings
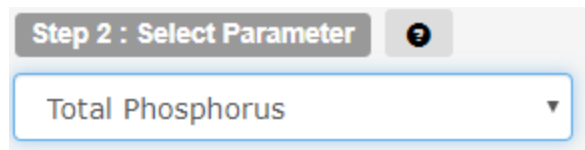
2) In 'Step 1: Select Watershed and Priority Resource Point' choose 'Redeye River – Redeye River (huc07010107)' for the watershed and '5' for the 'Location Point Number'

By choosing location point five – we are specifying that we are looking for most cost-effective practices in the entire watershed based of TP reductions at the watershed outlet.
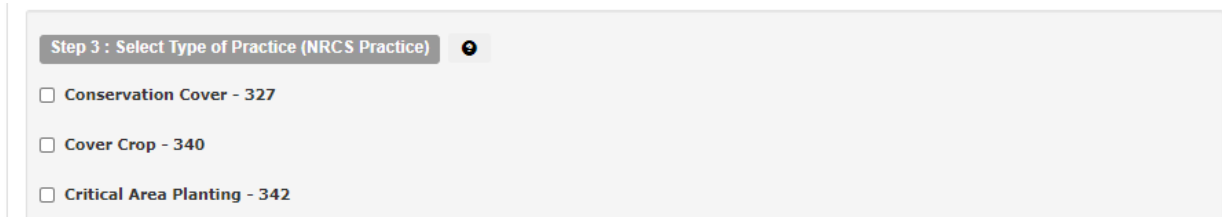
It is important to note that the map displayed in this step will print in the report the way it is seen in this window except for the legend being removed and placed outside the data frame. Set the scale and position the map accordingly.

3) In 'Step 2: Select Parameter', select 'Total Phosphorus' from the dropdown

This drop down selects the water quality parameter (Sediment, TN, TP) of concern which the ranking will be based.

4) In 'Step 3: Select Type of Practice (NRCS Practice)' select all NRCS practices.

In this step, the user specifies which practice types should be considered in the action report. In this example, we are looking at all the possibilities available in the dataset, so every available type of practice is selected.

5) If the watershed has legacy data, PTMApp data will still be in treatment groups. The steps remain the same, but there will be treatment groups listed instead of NRCS practices.

6) In 'Step 4: Basis for Practice Selection' select the following:
   ➢ 'Method to Rank BMPs' – 'Cost-Effectiveness (lowest $/mass)' (This is default)

- o *This is the most popular method to rank BMPs and is derived from dividing BMP cost ($) by the reduction benefit mass (tons for sediment or pounds for TN and TP). This normalizes that data for all BMPs showing the best return on investment. In this example total Phosphorus was selected in step 2 so this will be the water quality reduction applied to the calculation for ranking, however, the generated report will additionally supply the statistics of the other water quality benefits received from the BMP.*
- ➤ 'Method Used to Select BMPs' – 'Minimum Load Reduction'
  - o *This option works in combination with the 'Method to Rank BMPs' – By setting a minimum load reduction, a qualifier is set to the cost-effectiveness in order to ensure a threshold for reduction is met. Increases can be expected in overall ($/lb), total cost, and total TP reduction benefits selected benefits. Other options in this drop down serve to filter the data by setting thresholds or ranges for BMP inclusion/exclusion based on cost-effectiveness, total load reduction, and total cost.*
- ➤ '(lb)' – '1'
  - o *This option is dynamic based on the selection of the 'Method Used to Select BMPs' selected by the user. In this example, it represents the minimum poundage for annual TP reduction to be included in the report. For additional information on these options see (section 4.7, step 4, B).*
- ➤ 'Outlet Location' – 'Watershed Outlet'
  - o *In this example, we are looking at 'Watershed Outlet' which is BMP reductions measured at the 'Location Point Number' outlet selected in step 1. In this case, that is the entire watershed. The other option is Catchment Outlet or edge-of-field benefits from the BMPs selected.*
- ➤ 'Storm Event' – '2-year'
  - o *In this example, we are measuring BMP benefits/reductions for a 2-year, 24-hour design storm event. The other option is a 10-year, 24-hour storm event.*
- ➤ 'Anticipated performance'
    - ▪ All NRCS practices should be marked with – Median Q2 (expected)
  - o *Anticipated performance of BMP types is derived from a reduction ratio which is based on the empirical statistical distribution of BMP effectiveness for each practice type. This section will default to the Median Q2 effectiveness for practice types selected in step 3.*
  - o *If the watershed has legacy PTMApp data, Step 4 will show treatment group options for BMP practice performance. Median Q2 will still be the default.*

This will show treatment group selections if PTMApp data is legacy.

7) Lastly, select "Generate Report" at the bottom of the page. Depending on the size of the area and complexity of the parameters selected, this process may take a while. Databases are queried on input parameters and calculations are done on the fly to generate the report. The report will download as a pdf.

This full Action Report for this example can be view in Appendix A: 6.9 Action Report Example 12.

5.4.4 Example 13: Find Practices with the Greatest Nitrogen Load Reduction at the Resource Point (Watershed) Outlet with a Cost-Effectiveness Qualifier

Description – Generates a list of BMPs based on largest reduction benefits at the Resource Point (Watershed) Outlet according to PTMApp-Desktop. In this example, Nitrogen will be used as the water quality parameter of interest and only BMPs meeting a minimum cost-effectiveness value will be considered.

Use/Need – Determine the BMPs with the largest reduction benefits for treating sediment, TP, or TN before delivery to Watershed outlet. Additionally, the example shows how to qualify a minimum cost-effectiveness. This allows the user to generate a report focused at finding the BMPs providing the greatest reduction benefits while still maintaining an acceptable return on investment; use in grant applications, watershed planning, setting/benchmarking water quality goals.
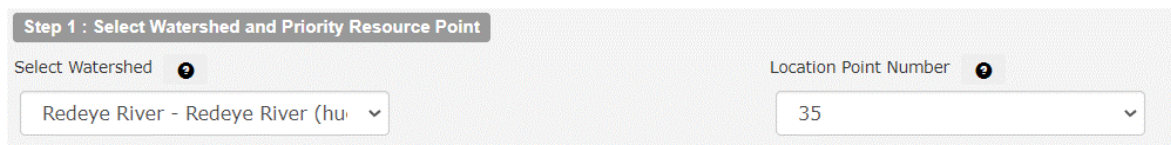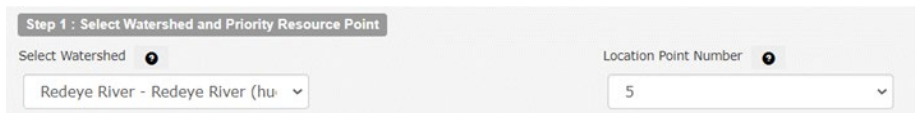
Steps to Create

1) If an Action Report is already generated, click 'Reset Selection' at the bottom of the page:
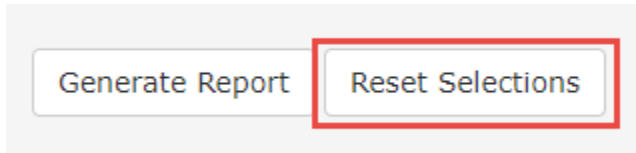
This will clear the selected information back to the default settings
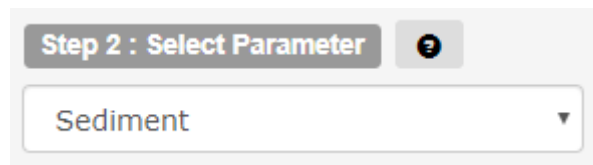
2) In 'Step 1: Select Watershed and Priority Resource Point' choose 'Red Eye – Red Eye (huc07010107)' for the watershed and '5' for the 'Location Point Number'

By choosing location point one – we are specifying that we are looking for most cost-effective practices in the entire watershed based of TN reductions at the watershed outlet.
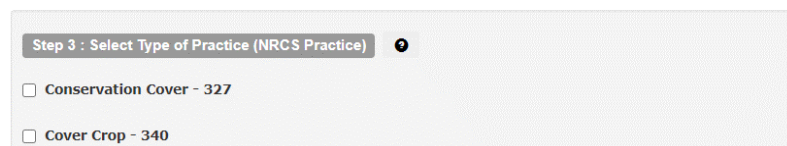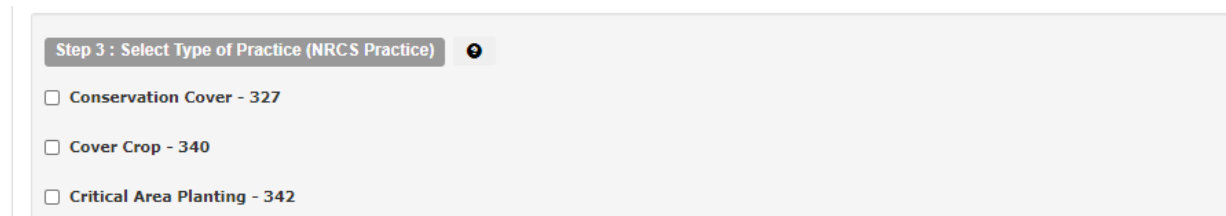
It is important to note that the map displayed in this step will print in the report the way it is seen in this window except for the legend being removed and placed outside the data frame. Set the scale and position the map accordingly.

3) In 'Step 2: Select Parameter', select 'Total Nitrogen' from the dropdown

This drop down selects the water quality parameter (Sediment, TN, TP) of concern which the ranking will be based.

4) In 'Step 3: Select Type of Practice (NRCS Practice)' select all NRCS practices.

In this step, the user specifies which practice types should be considered in the action report. In this example, we are looking at all the possibilities available in the dataset, so every available type of practice is selected.

5) If the watershed has legacy data, PTMApp data will still be in treatment groups. The steps remain the same, but there will be treatment groups listed instead of NRCS practices.

6) In 'Step 4: Basis for Practice Selection' select the following:
   ➢ 'Method to Rank BMPs' – 'Load Reduction'

- o *This method focuses the report on magnitude of the reduction benefit regardless of the cost.*
- ➢ 'Method Used to Select BMPs' – 'Less than Maximum Cost-Effectiveness'
    - o *This option works in combination with the 'Method to Rank BMPs' – Specifically a threshold is set for acceptable cost-effectiveness ensuring an acceptable return on investment. Other options in this drop down serve to filter the data by setting thresholds or ranges for BMP inclusion/exclusion based on total load reduction and total cost.*
- ➢ '($/lb)' – '100'
    - o *This option is dynamic based on the selection of the 'Method Used to Select BMPs' selected by the user. In this example, it represents the maximum allowable cost-effectiveness. In this example, a BMP is excluded from the report if it cost more than $100 per pound of TN it removes. For additional information on these options see (section 4.7, step 4, B).*
- ➢ 'Outlet Location' – 'Watershed Outlet'
    - o *In this example, we are looking at 'Watershed Outlet' which is BMP reductions measured at the 'Location Point Number' outlet selected in step 1. In this case, that is the entire watershed. The other option is Catchment Outlet or edge-of-field benefits from the BMPs selected.*
- ➢ 'Storm Event' – '2-year'
    - o *In this example, we are measuring BMP benefits/reductions for a 2-year, 24-hour design storm event. The other option is a 10-year, 24-hour storm event.*
- ➢ 'Anticipated performance'
    - o All NRCS practices should be marked with – Median Q2 (expected)
    - o *Anticipated performance of BMP types is derived from a reduction ratio which is based on the empirical statistical distribution of BMP effectiveness for each practice type. This section will default to the Median Q2 effectiveness for practice types selected in step 3.*
   - o *If the watershed has legacy PTMApp data, Step 4 will show treatment group options for BMP practice performance. Median Q2 will still be the default.*

Step 4 : Basis For Practice Selection

Method to Rank Practices

Load Reduction

Method Used to Select Practices

Less than Maximum Cost-Effectiv ∨ 100 ($/lb)

Outlet Location

Watershed Outlet

Storm Event

2 - Year

OPTIONAL: Adjust Anticipated Practice Performance

	Low (25th percentile)	Moderate (50th percentile)	High (75th percentile)
Conservation Cover	○	●	○
Cover Crop	○	●	○
Critical Area Planting	○	●	○
Denitrifying Bioreactor	○	●	○

This will show treatment group selections if PTMApp data is legacy.

7) Lastly, select "Generate Report" at the bottom of the page. Depending on the size of the area and complexity of the parameters selected, this process may take a while. Databases are queried on input parameters and calculations are done on the fly to generate the report. The report will download as a pdf.

This full Action Report for this example can be view in Appendix A: 6.10 Action Report Example 13.

Below are some examples from report totals using different values for "Less than Maximum Cost-Effectiveness". These results show how important it can be to set a reasonable value when querying maximum reduction values to ensure the user is getting an appropriate return on investment for targeted BMPs.

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Maximum of $100/lb									
Grand Total from BMPs in Selection			$468,966.00	2337.36		448.357		20754.15	
Maximum of $200/lb									
Grand Total from BMPs in Selection			$758,010.00	2267.73		422.493		21383.95	
No Maximum Set – Number of Highest Ranked BMPs									
Grand Total from BMPs in Selection			$1,666,628.00	2283.03		437.233		21474.85	

6 Appendix A: PTMApp-Web Attribute Catalog

Listed below are the attribute catalogs for the PTMApp-Web Interactive Map and Table Generator. These tables are listed in different sections but access similar PTMApp-Desktop data.

Each PTMApp-Web Interactive Map attribute is associated with the original PTMApp-Desktop data, including the table it is found in (Table Name), its attribute name within the table (Attribute Name), the original GIS data type (Data Type), a description of what the data means (Description), and the PTMApp-Desktop module and button the data is create in (Processed In).

The Table Generator data are summarized very similarly, but with another attribute that links the Table Generator attribute with its pair in the Interactive Map feature, should you wish to compare.

6.1 Interactive Map Attribute Table: Priority Resources & Catchments

Table 26 PTMApp-Web Attributes - Priority Resources & Catchments

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Runoff Volume (2 yr), ft3	table_catchment	RO_vol_2yr	Double	Catchment runoff volume in cubic feet for 2-year 24-hr rainfall event	Catchments and Loading > Summarize Catchment Loadings
Runoff Volume (10 yr), ft3	table_catchment	RO_vol_10yr	Double	Catchment runoff volume in cubic feet for 10-year 24-hr rainfall event	Catchments and Loading > Summarize Catchment Loadings
Peak Discharge (2 yr Event), cfs	table_catchment	PeakQ_2yr	Double	Catchment peak discharge in cubic feet per second for 2-year 24-hr rainfall event	Catchments and Loading > Summarize Catchment Loadings
Peak Discharge (10 yr Event), cfs	table_catchment	PeakQ_10yr	Double	Catchment peak discharge in cubic feet per second for 10-year 24-hr rainfall event	Catchments and Loading > Summarize Catchment Loadings

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Sediment delivery to catchment, tons/year	table_catchment	sed_mass_fl_tons	Double	Annual sediment mass (delivered to the catchment outlet) in tons, summed over the catchment	Catchments and Loading > Summarize Catchment Loadings
Sediment delivery to catchment, tons/acre/year	table_catchment	sed_mass_fl_tons_acre	Double	Annual sediment yield (delivered to the catchment outlet) in tons/acre/year, summed over the catchment	Catchments and Loading > Summarize Catchment Loadings
Total Nitrogen delivery to catchment, lbs/year	table_catchment	tn_mass_fl_lbs	Double	Annual total nitrogen mass (delivered to the catchment outlet) in pounds, summed over the catchment	Catchments and Loading > Summarize Catchment Loadings
Total Nitrogen delivery to catchment, lbs/acre/year	table_catchment	tn_mass_fl_lbs_acre	Double	Annual total nitrogen yield (delivered to the catchment outlet) in pounds/acre/year, summed over the catchment	Catchments and Loading > Summarize Catchment Loadings
Total Phosphorus delivery to	table_catchment	tp_mass_fl_lbs	Double	Annual total phosphorus mass (delivered to the catchment outlet) in	Catchments and Loading > Summarize

PTMApp-Web	PTMApp-Desktop				
Attribute Name	**Table Name**	**Attribute Name**	**Data Type**	**Description**	**Processed In**
catchment, lbs/year				pounds, summed over the catchment	Catchment Loadings
Total Phosphorus delivery to catchment, lbs/acre/year	table_catchment	tp_mass_fl_lbs_acre	Double	Annual total phosphorus yield (delivered to the catchment outlet) in pounds/acre/year, summed over the catchment	Catchments and Loading > Summarize Catchment Loadings
Sediment delivery to resource of concern, tons/year	table_p_res_catchment_route	pr_sed_mass_tons	Double	Sediment mass in tons delivered from catchment outlet to priority resource catchment outlet	Catchments and Loading > Sediment, TP and TN Channel Routing
Sediment delivery to resource of concern, tons/acre/year	table_p_res_catchment_route	pr_sed_mass_tons_acre	Double	Sediment yield in tons per acre delivered from catchment outlet to priority resource catchment outlet	Catchments and Loading > Sediment, TP and TN Channel Routing
Total Nitrogen delivery to resource of concern, lbs/year	table_p_res_catchment_route	pr_tn_mass_lbs	Double	Total nitrogen mass in tons delivered from catchment outlet to priority resource catchment outlet	Catchments and Loading > Sediment, TP and TN Channel Routing

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Total Nitrogen delivery to resource of concern, lbs/acre/year	table_p_res_catchment_route	pr_tn_mass_lbs_acre	Double	Total nitrogen yield in tons per acre delivered from catchment outlet to priority resource catchment outlet	Catchments and Loading > Sediment, TP and TN Channel Routing
Total Phosphorus delivery to resource of concern, lbs/year	table_p_res_catchment_route	pr_tp_mass_lbs	Double	Total phosphorus mass in tons delivered from catchment outlet to priority resource catchment outlet	Catchments and Loading > Sediment, TP and TN Channel Routing
Total Phosphorus delivery to resource of concern, lbs/acre/year	table_p_res_catchment_route	pr_tp_mass_lbs_acre	Double	Total phosphorus yield in tons per acre delivered from catchment outlet to priority resource catchment outlet	Catchments and Loading > Sediment, TP and TN Channel Routing
Sediment delivery to catchment, %	table_r_catchment	sed_mass_fl_rank	Double	Annual sediment yield (delivered to the catchment outlet) ranking, relative to all catchments	Catchments and Loading > Priority Resource Delivery

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Total Nitrogen delivery to catchment, %	table_r_catchment	tn_mass_fl_rank	Double	Annual total nitrogen yield (delivered to the catchment outlet) ranking, relative to all catchments	Catchments and Loading > Priority Resource Delivery
Total Phosphorus delivery to catchment, %	table_r_catchment	tp_mass_fl_rank	Double	Annual total phosphorus yield (delivered to the catchment outlet) ranking, relative to all catchments	Catchments and Loading > Priority Resource Delivery
WQI delivery to catchment, %	table_r_catchment	wqi_mass_fl	Double	Water quality index ranking based on sediment, total nitrogen, and total phosphorus (delivered to the catchment outlet), relative to all catchments	Catchments and Loading > Priority Resource Delivery
Sediment delivery to resource of concern, %	table_r_p_res_catchment	sed_mass_pr_rank	Double	Annual sediment yield (delivered to the priority resource) ranking, relative to priority resource catchment	Catchments and Loading > Priority Resource Delivery

6.2 Interactive Map Attribute Table: Support Layers

Table 27 PTMApp-Web Attributes - Support Layers - PTMApp Lakes

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Lake ID #	Lakes_route	Lake_ID	Long	The Lake ID that is associated with the lake in PTMApp Desktop	User input. Preprocessing of data prior to PTMApp Desktop use
Area (acres)	Lakes_route	Area_ac	Float	The surface area of the lake	User input. Preprocessing of data prior to PTMApp Desktop use
Volume (acre-feet)	Lakes_route	Vol_acft	Float	Lake volume (acre-feet)	Catchments and Loading > Build Lake Routing Data
Depth (feet)	Lakes_route	Depth_ft	Float	Mean lake depth (feet)	Catchments and Loading > Build Lake Routing Data
Drainage Area (acres)	Lakes_route	DA_ac	Float	Drainage area to lake (acre feet)	Catchments and Loading > Build Lake Routing Data

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Average Annual Runoff Depth (feet)	Lakes_route	Runoff_ft_yr	Float	Annual runoff depth delivered to the lake (feet/year)	Catchments and Loading > Build Lake Routing Data
Hydraulic Residence Time (years)	Lakes_route	HRT_yrs	Float	Hydraulic residence time (years)	Catchments and Loading > Build Lake Routing Data
% sed. retained by lake	Lakes_route	(SQ2_10)*100	Float	The percent of sediment delivered to the lake that remains in the lake	Catchments and Loading > Build Lake Routing Data
% TP retained by lake	Lakes_route	(PQ2_10)*100	Float	The percent of TP delivered to the lake that remains in the lake	Catchments and Loading > Build Lake Routing Data
% TN retained by lake	Lakes_route	(NQ2_10)*100	Float	The percent of TN delivered to the lake that remains in the lake	Catchments and Loading > Build Lake Routing Data
Est. sed entering lake (t/yr)	Lakes_route	L_SQ2_10	Double	The estimated amount of sediment entering the lake (tons/year)	Catchments and Loading > Build Lake Routing Data

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Est. TP entering lake (lb/yr)	Lakes_route	L_PQ2_10	Double	The estimated amount of total phosphorus entering the lake (lb/year)	Catchments and Loading > Build Lake Routing Data
Est. TN entering lake (lb/yr)	Lakes_route	L_NQ2_10	Double	The estimated amount of total nitrogen entering the lake (lb/year)	Catchments and Loading > Build Lake Routing Data
Est. sed. retained by lake (t/yr)	Lakes_route	Lret_sed	Double	The estimated amount of sediment retained in the lake (tons/year)	Catchments and Loading > Build Lake Routing Data
Est. TP retained by lake (lb/yr)	Lakes_route	Lret_tp	Double	The estimated amount of total phosphorus retained in the lake (lb/year)	Catchments and Loading > Build Lake Routing Data
Est. TN retained by lake (lb/yr)	Lakes_route	Lret_tn	Double	The estimated amount of total nitrogen retained in the lake (lb/year)	Catchments and Loading > Build Lake Routing Data
Est. sed. leaving lake (t/yr)	Lakes_route	Lout_sed	Double	The estimated amount of sediment leaving the lake (tons/year)	Catchments and Loading > Build Lake Routing Data

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Est. TP. leaving lake (lb/yr)	Lakes_route	Lout_tp	Double	The estimated amount of total phosphorus leaving the lake (lb/year)	Catchments and Loading > Build Lake Routing Data
Est. TN. leaving lake (lb/yr)	Lakes_route	Lout_tn	Double	The estimated amount of total nitrogen leaving the lake (lb/year)	Catchments and Loading > Build Lake Routing Data

Table 28 PTMApp-Web Attributes - Support Layers

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Stream Power Index	None	Spi_ranks	Raster - 32-bit float	Relative rank of the amount of water volume and sediment.	SPI Rank
Water Course Lines	None	Fac_surf or fac_total	Raster - 32-bit signed integer	Flow accumulation lines showing	User Input
Sediment Mass Delivered to Catchment	None	Sed_mass_fl	Raster - 32-bit float	Sediment mass delivered to the catchment outlet (t/ac/yr)	Sediment Routing to Catchment Outlet
Sediment Mass Leaving Landscape	None	Sed_mass	Raster - 32-bit float	Sediment mass leaving the landscape adjusted by calibration factor (t/ac/yr)	Sediment Routing to Catchment Outlet

6.3 Interactive Map Attribute Table: State Layers

Table 29 Interactive Map Attribute Table - State Layers

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
Counties	County Name	County name	MNGEO Commons	https://gisdata.mn.gov/
	Number	County number		
	FIPS	Federal information processing standard code		
Roads	Street Name	Name of street	MNGEO Commons	https://gisdata.mn.gov/
	Route System	Primary route system designator indicating what jurisdiction owns the road		
	Route Number	The Route Number designating the		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
		primary route (Like 35W)		
Township and Range	Township	Township Number PLSS	MNGEO Commons	
	Range	Range Number PLSS		
	Area	The area of the Range in square meters		https://gisdata.mn.gov/
	Perimeter	The perimeter of the Range in meters		
Sections	Section	The Section number of the PLS System	MNGEO Commons	https://gisdata.mn.gov/
Wetlands	Wetland Type	The type of wetland it is	MN DNR	
	Acres	The surface area of the wetland (acres)		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
	Description	Description of the wetland		http://www.dnr.state.mn.us/eco/wetlands/nwi_proj.html
	Symbol	Simplified Landscape Position category based on hydrogeomorphic classification.		
Lakes	Name	The name of the lake	MNGEO Commons	https://gisdata.mn.gov/dataset/water-mn-public-waters
	Acres	The surface area of the lake (acres)		
Rivers and Streams	Name	Name of the river/stream reach	MN DNR Division of Fish & Wildlife	
	Number	Kittle Number – Watercourse ID per		https://gisdata.mn.gov/dataset/water-dnr-hydrography

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
		DNR Fisheries Stream Survey database		
	Type	Stream Type Description		
Subwatershed	HUC Number	The 12-digit hydrologic unit code for the subwatershed	US Geological Survey	https://www.usgs.gov/core-science-systems/ngp/national-hydrography
	Subbasin Name	The name of the subbasin the subwatershed is in		
	Hydrologic Unit Type	The character designator for watershed type (defining drainage characteristics)		
	Noncontributing area in acres	The area that does not flow toward the outlet of the hydrologic unit		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
Watershed	HUC Number	The 10-digit hydrologic unit code for the watershed	US Geological Survey	https://www.usgs.gov/core-science-systems/ngp/national-hydrography
	Subbasin Name	The name of the subbasin the watershed is in		
	Hydrologic Unit Type	The character designator for watershed type (defining drainage characteristics)		
Subbasin	HUC Number	The 8-digit hydrologic unit code for the subbasin	US Geological Survey	https://www.usgs.gov/core-science-systems/ngp/national-hydrography
	Name	The name of the subbasin		
Land Use	N/A	N/A	Multi-Resolution	https://www.mrlc.gov/data/nlcd-2016-land-cover-conus

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
			Land Characteristics Consortium (MRLC)	
Impaired Streams (2018)	AUID	Assessment Unit Identifier	MNGEO Commons	https://www.pca.state.mn.us/water/minnesotas-impaired-waters-list
	Category	TMDL Category		
	Name	Name of Stream		
	Reach Description	Description of the Reach		
	Use Classification	Water Use Designation		
	Stream Reach Miles	The length of the stream reach		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
	Affected Use	What the stream is impacted for regarding impairment		
	Approved TMDL	What, if any, TMDL has been approved		
	Needs Plan TMDL	What, if any, TMDL needs to be developed		
	Impairment Parameter	What the impairment parameter is that has it on the impaired waters list		
	HUC 8	What HUC 8 watershed the stream reach is in		
	HUC 8 Name	The name of the HUC 8 watershed the stream reach is in		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
	HUC 4	What HUC 4 watershed the stream reach is in		
	HUC 4 Name	The name of the HUC 4 watershed the stream reach is in		
	County	The name of the County the stream reach is in		
Conservation Practices (eLINK)	Organization	Organization associated with grant funds	State Funded Best Management Practices	https://bwsr.state.mn.us/elink
	BMP Type	Type of BMP on landscape		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
	BMP Category	General category of the BMP (6 categories possible)		
	Major Name	Name of the major watershed where practice is mapped		
	Watershed	Subwatershed where BMP is mapped		
Impaired Lakes (2018)	AUID	Lake ID	MNGEO Commons	https://gisdata.mn.gov/
	Category	TMDL Category		
	Name	Name of Lake		
	Reach Description	Lake Location Identification		

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
	Use Classification	Water Use Designation		
	Affected Use	What the lake is impacted for regarding impairment		
	Approved TMDL	What, if any, TMDL has been approved		
	Needs Plan TMDL	What, if any, TMDL needs to be developed		
	Impairment Parameter	What the impairment parameter is that has it on the impaired waters list		
	HUC 8	What HUC 8 watershed the lake is in		

PTMApp-Web	State Layers Associated Information				
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**	
	HUC 8 Name	The name of the HUC 8 watershed the lake is in			
	HUC 4	What HUC 4 watershed the lake is in			
	HUC 4 Name	The name of the HUC 4 watershed the lake is in			
	County	The name of the County the lake is in			
Sampling Site	Station ID	Station ID number			
	Monitoring Site Description	Description of the monitoring site location			

PTMApp-Web	State Layers Associated Information			
Attribute Name	**Attribute**	**Description**	**Data Location**	**Link**
	Surface Water Name	Name of the waterbody being monitored		
	Surface Water Type	What kind of waterbody is being sampled		
	County Name	The county that the sampling site is in		
	8 Digit Huc	The HUC8 ID for where the sampling site is located		
	Number of Samples	How many samples have been taken at each site.		

6.4 Interactive Map Attribute Table: BMP Benefits: Watershed Scale

Table 30 PTMApp-Web Attributes - Best Management Practice Benefits: Watershed Scale

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Sediment reduction at resource (10 yr event), tons/year	table_ba_load_red	R_SQ2_10	Float	sediment reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event (tons/year)	Benefits Analysis > Generate Benefits Tables
Total Phosphorus reduction at resource (10 yr event), lbs/year	table_ba_load_red	R_PQ2_10	Float	Phosphorus reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	Benefits Analysis > Generate Benefits Tables
Total Nitrogen reduction at resource (10 yr event), lbs/year	table_ba_load_red	R_NQ2_10	Float	Nitrogen reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	Benefits Analysis > Generate Benefits Tables

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Sediment reduction at resource (2 yr event), tons/year	table_ba_load_red	R_SQ2_02	Float	sediment reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event (tons/year)	Benefits Analysis > Generate Benefits Tables
Total Phosphorus reduction at resource (2 yr event), lbs/year	table_ba_load_red	R_PQ2_02	Float	Phosphorus reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	Benefits Analysis > Generate Benefits Tables
Total Nitrogen reduction at resource (2 yr event), lbs/year	table_ba_load_red	R_NQ2_02	Float	Nitrogen reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	Benefits Analysis > Generate Benefits Tables
Sediment treatment cost (10 yr event), dollars/ton	table_ca_bmp_costeff	CI_SQ2_10	Float	sediment cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern	Cost Analysis

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
				based on 10-year, 24-hour event	
Total Phosphorus treatment cost (10 yr event), dollars/lb	table_ca_bmp_costeff	CI_PQ2_10	Float	Phosphorus cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event	Cost Analysis
Total Nitrogen treatment cost (10 yr event), dollars/lb	table_ca_bmp_costeff	CI_NQ2_10	Float	Nitrogen cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event	Cost Analysis
Sediment treatment cost (2 yr event), dollars/ton	table_ca_bmp_costeff	CI_SQ2_02	Float	sediment cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	Cost Analysis
Total Phosphorus treatment cost	table_ca_bmp_costeff	CI_PQ2_02	Float	Phosphorus cost index (BMP cost/reduction) at resource of concern based	Cost Analysis

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
(2 yr event), dollars/lb				upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event	
Total Nitrogen treatment cost (2 yr event), dollars/lb	table_ca_bmp_costeff	CI_NQ2_02	Float	Nitrogen cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event	Cost Analysis

6.5 Interactive Map Attribute Table: BMP Benefits: Catchment Scale

Table 31 PTMApp-Web Attributes - Best Management Practice Benefits: Catchment Scale

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Area, ft2	BMP results table (e.g., 'storage')	wtsArea_ft	Float	watershed	Benefits Analysis > Reduction Ratio
Water treated (2 yr Event), ft3 or feet/sec	BMP results table (e.g., 'storage')	D_2yr24hr	Float	volume or velocity of water delivered for 2-year, 24-hour precipitation event (cubic feet or feet/sec)	Benefits Analysis > Reduction Ratio
Water treated (10 yr Event), ft3 or feet/sec	BMP results table (e.g., 'storage')	D_10yr24hr	Float	volume or velocity of water delivered for 10-year, 24-hour precipitation event (cubic feet or feet/sec)	Benefits Analysis > Reduction Ratio
Sediment at BMP delivered to catchment, tons/year	bmp_implementation	SedCat_tn	Float	Sediment at the BMP that will be delivered to the catchment outlet, tons	Benefits Analysis > Treatment Trains (from user-created BMP shapefile)
Total Phosphorus at BMP delivered	bmp_implementation	tpCat_lbs	Float	Phosphorus at the BMP that will be delivered to a catchment outlet, pounds	Benefits Analysis > Treatment Trains

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
to catchment, lbs/year					(from user-created BMP shapefile)
Total Nitrogen at BMP delivered to catchment, lbs/year	bmp_implementation	tnCat_lbs	Float	Nitrogen at the BMP that will be delivered to a catchment outlet, pounds	Benefits Analysis > Treatment Trains (from user-created BMP shapefile)
Sediment reduction (10 yr event), %	BMP results table (e.g., 'storage')	SQ2_10	Float	Median (Q2) % reduction in sediment at BMP based upon 10-year, 24-hour event	Benefits Analysis > Reduction Efficiency
Sediment reduction (2 yr event), %	BMP results table (e.g., 'storage')	SQ2_02	Float	Median (Q2) % reduction in sediment at BMP based upon 2-year, 24-hours	Benefits Analysis > Reduction Efficiency
Total Phosphorus reduction (10 yr event), %	BMP results table (e.g., 'storage')	PQ2_10	Float	Median (Q2) % reduction in Phosphorus at BMP based upon 10-year, 24-hour event	Benefits Analysis > Reduction Efficiency
Total Phosphorus reduction (2 yr event), %	BMP results table (e.g., 'storage')	PQ2_02	Float	Median (Q2) % reduction in Phosphorus at BMP based upon 2-year, 24-hour	Benefits Analysis > Reduction Efficiency

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Total Nitrogen reduction (10 yr event), %	BMP results table (e.g., 'storage')	NQ2_10	Float	Median (Q2) % reduction in Nitrogen at BMP based upon 10-year, 24-hour event	Benefits Analysis > Reduction Efficiency
Total Nitrogen reduction (2 yr event), %	BMP results table (e.g., 'storage')	NQ2_02	Float	Median (Q2) % reduction in Nitrogen at BMP based upon 2-year, 24-hour	Benefits Analysis > Reduction Efficiency
Sediment reduction at catchment (10 yr event), %	BMP results table (e.g., 'storage')	C_SQ2_10	Float	sediment reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event (tons/year)	Benefits Analysis > Estimate Load Reductions
Total Phosphorus reduction at catchment (10 yr event), %	BMP results table (e.g., 'storage')	C_PQ2_10	Float	Phosphorus reduction at catchment based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	Benefits Analysis > Estimate Load Reductions
Total Nitrogen reduction at catchment (10 yr event), %	BMP results table (e.g., 'storage')	C_NQ2_10	Float	Nitrogen reduction at catchment based upon median (Q2) effectiveness @ resource of concern 10-	Benefits Analysis > Estimate Load Reductions

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
				year, 24-hour event (pounds/year)	
Sediment reduction at catchment (2 yr event), %	BMP results table (e.g., 'storage')	C_SQ2_02	Float	sediment reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event (tons/year)	Benefits Analysis > Estimate Load Reductions
Total Phosphorus reduction at catchment (2 yr event), %	BMP results table (e.g., 'storage')	C_PQ2_02	Float	Phosphorus reduction at catchment based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	Benefits Analysis > Estimate Load Reductions
Total Nitrogen reduction at catchment (2 yr event), %	BMP results table (e.g., 'storage')	C_NQ2_02	Float	Nitrogen reduction at catchment based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	Benefits Analysis > Estimate Load Reductions
Water treated (10 yr Event), %	BMP results table (e.g., 'storage')	R_10yr24hr	Float	Reduction ratio for 10-year, 24-hour event (must be between 0 - 1)	Benefits Analysis > Reduction Ratio

PTMApp-Web	PTMApp-Desktop				
Attribute Name	Table Name	Attribute Name	Data Type	Description	Processed In
Water treated (2 yr Event), %	BMP results table (e.g., 'storage')	R_2yr24hr	Float	Reduction ratio for 2-year, 24-hour event (must be between 0 - 1)	Benefits Analysis > Reduction Ratio

6.6 Table Generator Attribute Table

Table 32 Table Generator Attribute Table

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
OBJECTID	Object ID	Internal feature number	BMP results table (e.g., 'storage')	Benefits Analysis > BMP Suitability	
catch_id	Long Integer	Unique whole number ID for catchment	table_catchment	Catchments and Loading > Generate Catchments	
unq_bmp_id	text	BMP_ID "_" catch_id "_" grp_code	BMP results table (e.g., 'storage')	Benefits Analysis > BMP Suitability	
grp_code	Short Integer	BMP treatment group code, 1-7 (1=xxx, 2=xxx, 3=xxx, 4=xxx, 5=xxx, 6=xxx, 7=xxx)	BMP results table (e.g., 'storage')	Benefits Analysis > BMP Suitability	
p_res_catch_id	Long Integer	Unique whole number ID for priority resource catchment	BMP results table (e.g., 'storage')	Benefits Analysis > BMP Suitability	

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
sed_mass_fl_tons	Double	Annual sediment mass (delivered to the catchment outlet) in tons, summed over the catchment	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Sediment delivery to catchment, tons/year
sed_mass_fl_tons_acre	Double	Annual sediment yield (delivered to the catchment outlet) in tons/acre/year, summed over the catchment	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Sediment delivery to catchment, tons/acre/year
tn_mass_fl_lbs	Double	Annual total nitrogen mass (delivered to the catchment outlet) in pounds, summed over the catchment	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Total Nitrogen delivery to catchment, lbs/year
tn_mass_fl_lbs_acre	Double	Annual total nitrogen yield (delivered to the catchment outlet) in pounds/acre/year, summed over the catchment	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Total Nitrogen delivery to catchment, lbs/acre/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
tp_mass_fl_lbs	Double	Annual total phosphorus mass (delivered to the catchment outlet) in pounds, summed over the catchment	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Total Phosphorus delivery to catchment, lbs/year
tp_mass_fl_lbs_acre	Double	Annual total phosphorus yield (delivered to the catchment outlet) in pounds/acre/year, summed over the catchment	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Total Phosphorus delivery to catchment, lbs/acre/year
pr_sed_mass_tons	Double	Sediment mass in tons delivered from catchment outlet to priority resource catchment outlet	table_p_res_catchment_route	Catchments and Loading > Sediment, TP and TN Channel Routing	Sediment delivery to resource of concern, tons/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
pr_sed_mass_tons_acre	Double	Sediment yield in tons per acre delivered from catchment outlet to priority resource catchment outlet	table_p_res_catchment_route	Catchments and Loading > Sediment, TP and TN Channel Routing	Sediment delivery to resource of concern, tons/acre/year
pr_tn_mass_lbs	Double	Total nitrogen mass in tons delivered from catchment outlet to priority resource catchment outlet	table_p_res_catchment_route	Catchments and Loading > Sediment, TP and TN Channel Routing	Total Nitrogen delivery to resource of concern, lbs/year
pr_tn_mass_lbs_acre	Double	Total nitrogen yield in tons per acre delivered from catchment outlet to priority resource catchment outlet	table_p_res_catchment_route	Catchments and Loading > Sediment, TP and TN Channel Routing	Total Nitrogen delivery to resource of concern, lbs/acre/year
pr_tp_mass_lbs	Double	Total phosphorus mass in tons delivered from catchment outlet to priority resource catchment outlet	table_p_res_catchment_route	Catchments and Loading > Sediment, TP and TN Channel Routing	Total Phosphorus delivery to resource of concern, lbs/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
pr_tp_mass_lbs_acre	Double	Total phosphorus yield in tons per acre delivered from catchment outlet to priority resource catchment outlet	table_p_res_catchment_route	Catchments and Loading > Sediment, TP and TN Channel Routing	Total Phosphorus delivery to resource of concern, lbs/acre/year
sed_mass_fl_rank	Double	Annual sediment yield (delivered to the catchment outlet) ranking, relative to all catchments	table_r_catchment	Catchments and Loading > Priority Resource Delivery	Sediment delivery to catchment, %
tn_mass_fl_rank	Double	Annual total nitrogen yield (delivered to the catchment outlet) ranking, relative to all catchments	table_r_catchment	Catchments and Loading > Priority Resource Delivery	Total Nitrogen delivery to catchment, %
tp_mass_fl_rank	Double	Annual total phosphorus yield (delivered to the catchment outlet) ranking, relative to all catchments	table_r_catchment	Catchments and Loading > Priority Resource Delivery	Total Phosphorus delivery to catchment, %

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
wqi_mass_fl	Double	Water quality index ranking based on sediment, total nitrogen, and total phosphorus (delivered to the catchment outlet), relative to all catchments	table_r_catchment	Catchments and Loading > Priority Resource Delivery	WQI delivery to catchment, %
sed_mass_pr_rank	Double	Annual sediment yield (delivered to the priority resource) ranking, relative to priority resource catchment	table_r_p_res_catchment	Catchments and Loading > Priority Resource Delivery	Sediment delivery to resource of concern, %
tn_mass_pr_rank	Double	Annual total nitrogen yield (delivered to the priority resource) ranking, relative to priority resource catchment	table_r_p_res_catchment	Catchments and Loading > Priority Resource Delivery	Sediment delivery to resource of concern, %

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
tn_mass_pr_rank	Double	Annual total nitrogen yield (delivered to the priority resource) ranking, relative to priority resource catchment	table_r_p_res_catchment	Catchments and Loading > Priority Resource Delivery	Total Nitrogen delivery to resource of concern, %
tp_mass_pr_rank	Double	Annual total phosphorus yield (delivered to the priority resource) ranking, relative to priority resource catchment	table_r_p_res_catchment	Catchments and Loading > Priority Resource Delivery	Total Phosphorus delivery to resource of concern, %
wqi_mass_pr	Double	Water quality index ranking based on sediment, total nitrogen, and total phosphorus (delivered to priority resource outlet), relative to priority resource catchments	table_r_p_res_catchment	Catchments and Loading > Priority Resource Delivery	WQI delivery to resource of concern, %

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
wtsArea_ft	Float	watershed	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Ratio	Area, ft2
D_2yr24hr	Float	volume or velocity of water delivered for 2-year, 24-hour precipitation event (cubic feet or feet/sec)	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Ratio	Water treated (2 yr Event), ft3 or feet/sec
D_10yr24hr	Float	volume or velocity of water delivered for 10-year, 24-hour precipitation event (cubic feet or feet/sec)	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Ratio	Water treated (10 yr Event), ft3 or feet/sec
SedCat_tn	Float	Sediment at the BMP that will be delivered to the catchment outlet, tons	bmp_implementation	Benefits Analysis > Treatment Trains (from user-created BMP shapefile)	Sediment at BMP delivered to catchment, tons/year
tpCat_lbs	Float	Phosphorus at the BMP that will be delivered to a catchment outlet, pounds	bmp_implementation	Benefits Analysis > Treatment Trains (from user-created BMP shapefile)	Total Phosphorus at BMP delivered to catchment, lbs/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
tnCat_lbs	Float	Nitrogen at the BMP that will be delivered to a catchment outlet, pounds	bmp_implementation	Benefits Analysis > Treatment Trains (from user-created BMP shapefile)	Total Nitrogen at BMP delivered to catchment, lbs/year
SQ2_10	Float	Median (Q2) % reduction in sediment at BMP based upon 10-year, 24-hour event	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Efficiency	Sediment reduction (10 yr event), %
PQ2_10	Float	Median (Q2) % reduction in Phosphorus at BMP based upon 10-year, 24-hour event	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Efficiency	Total Phosphorus reduction (10 yr event), %
NQ2_10	Float	Median (Q2) % reduction in Nitrogen at BMP based upon 10-year, 24-hour event	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Efficiency	Total Nitrogen reduction (10 yr event), %

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
SQ2_02	Float	Median (Q2) % reduction in sediment at BMP based upon 2-year, 24-hour	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Efficiency	Sediment reduction (2 yr event), %
PQ2_02	Float	Median (Q2) % reduction in Phosphorus at BMP based upon 2-year, 24-hour	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Efficiency	Total Phosphorus reduction (2 yr event), %
NQ2_02	Float	Median (Q2) % reduction in Nitrogen at BMP based upon 2-year, 24-hour	BMP results table (e.g., 'storage')	Benefits Analysis > Reduction Efficiency	Total Nitrogen reduction (2 yr event), %
C_SQ2_10	Float	Sediment reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event (tons/year)	BMP results table (e.g., 'storage')	Benefits Analysis > Estimate Load Reductions	Sediment reduction at catchment (10 yr event), tons/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
C_PQ2_10	Float	Phosphorus reduction at catchment based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	BMP results table (e.g., 'storage')	Benefits Analysis > Estimate Load Reductions	Total Phosphorus reduction at catchment (10 yr event), lbs/year
C_NQ2_10	Float	Nitrogen reduction at catchment based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	BMP results table (e.g., 'storage')	Benefits Analysis > Estimate Load Reductions	Total Nitrogen reduction at catchment (10 yr event), lbs/year
C_SQ2_02	Float	sediment reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event (tons/year)	BMP results table (e.g., 'storage')	Benefits Analysis > Estimate Load Reductions	Sediment reduction at catchment (2 yr event), tons/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
C_PQ2_02	Float	Phosphorus reduction at catchment based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	BMP results table (e.g., 'storage')	Benefits Analysis > Estimate Load Reductions	Total Phosphorus reduction at catchment (2 yr event), lbs/year
C_NQ2_02	Float	Nitrogen reduction at catchment based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	BMP results table (e.g., 'storage')	Benefits Analysis > Estimate Load Reductions	Total Nitrogen reduction at catchment (2 yr event), lbs/year
R_SQ2_10	Float	sediment reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event (tons/year)	table_ba_load_red	Benefits Analysis > Generate Benefits Tables	Sediment reduction at resource (10 yr event), tons/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
R_PQ2_10	Float	Phosphorus reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	table_ba_load_red	Benefits Analysis > Generate Benefits Tables	Total Phosphorus reduction at resource (10 yr event), lbs/year
R_NQ2_10	Float	Nitrogen reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event (pounds/year)	table_ba_load_red	Benefits Analysis > Generate Benefits Tables	Total Nitrogen reduction at resource (10 yr event), lbs/year
R_SQ2_02	Float	sediment reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event (tons/year)	table_ba_load_red	Benefits Analysis > Generate Benefits Tables	Sediment reduction at resource (2 yr event), tons/year

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
R_PQ2_02	Float	Phosphorus reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	table_ba_load_red	Benefits Analysis > Generate Benefits Tables	Total Phosphorus reduction at resource (2 yr event), lbs/year
R_NQ2_02	Float	Nitrogen reduction at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event (pounds/year)	table_ba_load_red	Benefits Analysis > Generate Benefits Tables	Total Nitrogen reduction at resource (2 yr event), lbs/year
CI_SQ2_10	Float	Sediment cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event	table_ca_bmp_costeff	Cost Analysis	Sediment treatment cost (10 yr event), dollars/ton

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
CI_PQ2_10	Float	Phosphorus cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event	table_ca_bmp_costeff	Cost Analysis	Total Phosphorus treatment cost (10 yr event), dollars/lb
CI_NQ2_10	Float	Nitrogen cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 10-year, 24-hour event	table_ca_bmp_costeff	Cost Analysis	Total Nitrogen treatment cost (10 yr event), dollars/lb
CI_SQ2_02	Float	sediment cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_ca_bmp_costeff	Cost Analysis	Sediment treatment cost (2 yr event), dollars/ton

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
CI_PQ2_02	Float	Phosphorus cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event	table_ca_bmp_costeff	Cost Analysis	Total Phosphorus treatment cost (2 yr event), dollars/lb
CI_NQ2_02	Float	Nitrogen cost index (BMP cost/reduction) at resource of concern based upon median (Q2) effectiveness @ resource of concern 2-year, 24-hour event	table_ca_bmp_costeff	Cost Analysis	Total Nitrogen treatment cost (2 yr event), dollars/lb
Lred_C_SQ2_10	Float	sediment reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event	table_treat_train_catch	Benefits Analysis > Treatment Trains	

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
Lred_C_SQ2_02	Float	sediment reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_treat_train_catch	Benefits Analysis > Treatment Trains	
Lred_C_PQ2_10	Float	phosphorus reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_treat_train_catch	Benefits Analysis > Treatment Trains	
Lred_C_NQ2_10	Float	nitrogen reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event	table_treat_train_catch	Benefits Analysis > Treatment Trains	

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
Lred_C_NQ2_02	Float	nitrogen reduction at catchment based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_treat_train_catch	Benefits Analysis > Treatment Trains	
Lred_R_SQ2_10	Float	sediment reduction at resource based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event	table_treat_train_p_res	Benefits Analysis > Treatment Trains	
Lred_R_SQ2_02	Float	sediment reduction at resource based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_treat_train_p_res	Benefits Analysis > Treatment Trains	

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
Lred_R_PQ2_10	Float	phosphorus reduction at resource based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event	table_treat_train_p_res	Benefits Analysis > Treatment Trains	
Lred_R_PQ2_02	Float	phosphorus reduction at resource based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_treat_train_p_res	Benefits Analysis > Treatment Trains	
Lred_R_NQ2_10	Float	nitrogen reduction at resource based upon median (Q2) effectiveness @ resource of concern based on 10-year, 24-hour event	table_treat_train_p_res	Benefits Analysis > Treatment Trains	

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
Lred_R_NQ2_02	Float	nitrogen reduction at resource based upon median (Q2) effectiveness @ resource of concern based on 2-year, 24-hour event	table_treat_train_p_res	Benefits Analysis > Treatment Trains	
RO_vol_2yr	Double	Catchment runoff volume in cubic feet for 2-year 24-hr rainfall event	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Runoff Volume (2 yr), ft3
RO_vol_10yr	Double	Catchment runoff volume in cubic feet for 10-year 24-hr rainfall event	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Runoff Volume (10 yr), ft3
PeakQ_2yr	Double	Catchment peak discharge in cubic feet per second for 2-year 24-hr rainfall event	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Peak Discharge (2 yr Event), cfs

Attribute Name	Data Type	Description	PTMApp-Desktop Table Name	PTMApp-Desktop Button Attribute is Processed In	Attribute Name in the Interactive Map Feature
PeakQ_10yr	Double	Catchment peak discharge in cubic feet per second for 10-year 24-hr rainfall event	table_catchment	Catchments and Loading > Summarize Catchment Loadings	Peak Discharge (10 yr Event), cfs
pivoted		ID used to associate this worksheet to the Pivot worksheet			

6.7 Action Report Example 10

PTMApp-Web Targeted BMP Action Report

Report Details

PTMApp-Web User: Nathaniel Baeumler

Watershed: Redeye River - Redeye River (huc07010107)

Location Point Number: 35

Report Generation Date: 2021-03-24

Selection Criteria

Parameter: Sediment

Treatment Group(s):   Reduced Till

Basis for Practice Selection: Cost-Effectiveness (lowest $/mass)

Scale and Storm Event: Catchment Outlet, 2 - Year

Method Used to Select BMPs: Number of Highest Ranked Practices

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280019604_41951_6	172,526,480	$139.00	20.96	$6.63	2.348	$59.19	47.33	$2.94
Reduced Till	280018030_538751_6	330,183	$77.54	9.06	$8.56	1.307	$59.34	26.33	$2.94
Reduced Till	280019181_41324_6	306,502	$60.03	6.87	$8.73	1.014	$59.20	20.44	$2.94
Reduced Till	280014914_533269_6	313,768	$103.44	9.72	$10.65	1.746	$59.24	35.19	$2.94
Reduced Till	280014711_532734_6	3,711,662	$340.90	31.32	$10.89	5.753	$59.26	115.93	$2.94
Reduced Till	280017192_37457_6	51,129	$72.23	6.41	$11.27	1.219	$59.23	24.58	$2.94
Reduced Till	280016244_35788_6	144,236	$85.24	7.44	$11.46	1.440	$59.20	29.02	$2.94
Reduced Till	280018528_39700_6	95,530	$98.12	8.51	$11.53	1.657	$59.22	33.39	$2.94
Reduced Till	280019928_542912_6	269,905	$154.81	12.63	$12.26	2.610	$59.30	52.61	$2.94
Reduced Till	280017785_538467_6	2,442,060	$460.01	35.93	$12.80	7.758	$59.29	156.36	$2.94
Reduced Till	280019765_542268_6	513,976	$132.53	10.32	$12.84	2.238	$59.22	45.10	$2.94
Reduced Till	280016043_35074_6	245,148	$62.21	4.66	$13.34	1.051	$59.20	21.18	$2.94
Reduced Till	280020342_42997_6	290,894	$78.63	5.89	$13.35	1.326	$59.29	26.73	$2.94
Reduced Till	280015057_33261_6	11,391,435	$258.32	18.37	$14.07	4.360	$59.24	87.87	$2.94
Reduced Till	280015020_33496_6	33,561,840	$225.13	15.82	$14.23	3.801	$59.23	76.61	$2.94

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280015853_534809_6	553,803	$59.62	4.12	$14.47	1.006	$59.27	20.27	$2.94
Reduced Till	280017386_536943_6	4,055,299	$888.81	58.20	$15.27	14.960	$59.41	301.50	$2.95
Reduced Till	280023051_48419_6	83,689	$96.28	6.02	$15.98	1.626	$59.23	32.76	$2.94
Reduced Till	280020278_543025_6	590,131	$96.69	6.00	$16.11	1.632	$59.26	32.88	$2.94
Reduced Till	280017280_537725_6	2,056,981	$247.82	15.29	$16.20	4.183	$59.25	84.29	$2.94
Reduced Till	280015357_534167_6	1,315,349	$149.50	9.02	$16.57	2.523	$59.24	50.86	$2.94
Reduced Till	280020612_543797_6	61,354	$151.06	9.07	$16.65	2.546	$59.34	51.30	$2.94
Reduced Till	280017082_37379_6	207,354,693	$78.84	4.68	$16.85	1.331	$59.23	26.82	$2.94
Reduced Till	280018292_539208_6	155,807	$82.45	4.88	$16.91	1.388	$59.40	27.97	$2.95
Reduced Till	280017705_538190_6	609,237	$108.14	6.39	$16.92	1.824	$59.28	36.77	$2.94
Reduced Till	280015423_34166_6	150,426	$90.28	5.30	$17.04	1.524	$59.24	30.71	$2.94
Reduced Till	280020405_543555_6	783,612	$152.90	8.96	$17.06	2.580	$59.27	51.99	$2.94
Reduced Till	280018253_539519_6	3,109,960	$784.28	45.65	$17.18	13.229	$59.29	266.60	$2.94
Reduced Till	280017666_538182_6	833,126	$213.34	12.39	$17.22	3.601	$59.24	72.58	$2.94
Reduced Till	280017557_538767_6	3,012,816	$499.87	28.76	$17.38	8.421	$59.36	169.71	$2.95

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280015032_533320_6	181,103	$56.90	3.19	$17.82	0.960	$59.24	19.36	$2.94
Reduced Till	280018613_540118_6	777,961	$121.56	6.70	$18.16	2.052	$59.24	41.35	$2.94
Reduced Till	280018642_539804_6	419,523	$157.61	8.65	$18.22	2.653	$59.40	53.47	$2.95
Reduced Till	280015225_533886_6	678,933	$177.98	9.66	$18.43	3.005	$59.23	60.55	$2.94
Reduced Till	280014955_33289_6	21,385,447	$244.62	13.27	$18.44	4.133	$59.19	83.29	$2.94
Reduced Till	280017516_537818_6	2,720,845	$444.47	23.86	$18.63	7.500	$59.27	151.14	$2.94
Reduced Till	280016383_36111_6	39,516,968	$83.40	4.48	$18.63	1.409	$59.19	28.39	$2.94
Reduced Till	280020071_542284_6	1,101,147	$216.75	11.58	$18.72	3.643	$59.50	73.41	$2.95
Reduced Till	280017902_538663_6	86,380	$79.25	4.16	$19.05	1.338	$59.24	26.96	$2.94
Reduced Till	280014921_533340_6	719,029	$149.91	7.83	$19.14	2.527	$59.32	50.93	$2.94
Grand Total from BMPs in Selection			$7,780.00	522.02		131.222		2644.54	

Disclaimer: Practices shown are from raw results created using PTMApp-Desktop and uploaded to the web. Users should review actual locations for practicability to implement. Cost-Effectiveness values may vary slightly from actual calculation based on number of significant digits shown. The number of practices printed is based on selection criteria but is limited to 40, or up to 3 pages.

6.8 Action Report Example 11

PTMApp-Web Targeted BMP Action Report

Report Details

PTMApp-Web User: Nathaniel Baeumler

Watershed: Redeye River - Redeye River (huc07010107)

Location Point Number: 35

Report Generation Date: 2021-03-24

Selection Criteria

Parameter: Sediment

Treatment Group(s): Reduced Till

Basis for Practice Selection: Cost-Effectiveness (lowest $/mass)

Scale and Storm Event: Watershed Outlet, 2 - Year

Method Used to Select BMPs: Number of Highest Ranked Practices

March 24, 2021

Reduced Till   Location Outlet

Selected Watershed Boundary   Watershed Boundary

1:251,151

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280014914_533269_6	313,768	$103.44	8.94	$11.57	1.708	$60.55	34.43	$3.00
Reduced Till	280014711_532734_6	3,711,662	$340.90	29.28	$11.64	5.652	$60.32	113.90	$2.99
Reduced Till	280019604_41951_6	172,526,480	$139.00	11.09	$12.53	1.986	$70.00	40.02	$3.47
Reduced Till	280018030_538751_6	330,183	$77.54	6.17	$12.56	1.181	$65.66	23.80	$3.26
Reduced Till	280016244_35788_6	144,236	$85.24	5.88	$14.51	1.353	$63.00	27.27	$3.13
Reduced Till	280017192_37457_6	51,129	$72.23	4.73	$15.27	1.126	$64.17	22.69	$3.18
Reduced Till	280019181_41324_6	306,502	$60.03	3.81	$15.75	0.868	$69.15	17.49	$3.43
Reduced Till	280015020_33496_6	33,561,840	$225.13	14.21	$15.84	3.695	$60.92	74.47	$3.02
Reduced Till	280016043_35074_6	245,148	$62.21	3.90	$15.93	1.003	$62.03	20.21	$3.08
Reduced Till	280015057_33261_6	11,391,435	$258.32	15.34	$16.84	4.158	$62.13	83.80	$3.08
Reduced Till	280015853_534809_6	553,803	$59.62	3.50	$17.05	0.963	$61.89	19.41	$3.07
Reduced Till	280018528_39700_6	95,530	$98.12	5.50	$17.83	1.477	$66.43	29.77	$3.30
Reduced Till	280017785_538467_6	2,442,060	$460.01	25.54	$18.01	7.091	$64.87	142.90	$3.22
Reduced Till	280015357_534167_6	1,315,349	$149.50	7.87	$18.99	2.434	$61.41	49.06	$3.05
Reduced Till	280015032_533320_6	181,103	$56.90	2.93	$19.43	0.939	$60.60	18.92	$3.01

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280015423_34166_6	150,426	$90.28	4.62	$19.53	1.470	$61.41	29.63	$3.05
Reduced Till	280017386_536943_6	4,055,299	$888.81	43.47	$20.45	13.853	$64.16	279.18	$3.18
Reduced Till	280015225_533886_6	678,933	$177.98	8.53	$20.86	2.908	$61.20	58.61	$3.04
Reduced Till	280014955_33289_6	21,385,447	$244.62	11.44	$21.38	3.975	$61.54	80.10	$3.05
Reduced Till	280017082_37379_6	207,354,693	$78.84	3.49	$22.61	1.232	$64.01	24.82	$3.18
Reduced Till	280017280_537725_6	2,056,981	$247.82	10.71	$23.13	3.808	$65.07	76.75	$3.23
Reduced Till	280014921_533340_6	719,029	$149.91	6.40	$23.44	2.396	$62.58	48.28	$3.11
Reduced Till	280017705_538190_6	609,237	$108.14	4.57	$23.66	1.670	$64.75	33.66	$3.21
Reduced Till	280020342_42997_6	290,894	$78.63	3.29	$23.90	1.137	$69.13	22.92	$3.43
Reduced Till	280016383_36111_6	39,516,968	$83.40	3.46	$24.07	1.317	$63.33	26.54	$3.14
Reduced Till	280015257_534087_6	190,790	$56.28	2.29	$24.62	0.917	$61.38	18.48	$3.05
Reduced Till	280019765_542268_6	513,976	$132.53	5.36	$24.71	1.884	$70.36	37.96	$3.49
Reduced Till	280017666_538182_6	833,126	$213.34	8.61	$24.78	3.272	$65.20	65.94	$3.24
Reduced Till	280018292_539208_6	155,807	$82.45	3.24	$25.41	1.247	$66.13	25.13	$3.28
Reduced Till	280019928_542912_6	269,905	$154.81	6.07	$25.49	2.152	$71.93	43.37	$3.57

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Reduced Till	280016680_536350_6	187,830	$133.14	5.21	$25.54	2.094	$63.58	42.20	$3.16
Reduced Till	280015093_533339_6	4,869,857	$1,042.60	39.77	$26.21	17.175	$60.71	346.12	$3.01
Reduced Till	280017516_537818_6	2,720,845	$444.47	16.70	$26.61	6.827	$65.10	137.59	$3.23
Reduced Till	280018253_539519_6	3,109,960	$784.28	29.20	$26.86	11.759	$66.69	236.99	$3.31
Reduced Till	280016426_35602_6	155,807	$71.89	2.59	$27.71	1.149	$62.58	23.15	$3.11
Reduced Till	280016316_535892_6	4,754,415	$1,109.31	39.96	$27.76	17.655	$62.83	355.81	$3.12
Reduced Till	280017557_538767_6	3,012,816	$499.87	17.97	$27.81	7.440	$67.19	149.94	$3.33
Reduced Till	280017902_538663_6	86,380	$79.25	2.85	$27.83	1.211	$65.46	24.40	$3.25
Reduced Till	280018642_539804_6	419,523	$157.61	5.54	$28.43	2.360	$66.79	47.56	$3.31
Reduced Till	280018613_540118_6	777,961	$121.56	4.25	$28.63	1.820	$66.80	36.67	$3.31
Grand Total from BMPs in Selection			$9,480.00	438.32		148.361		2989.94	

Disclaimer: Practices shown are from raw results created using PTMApp-Desktop and uploaded to the web. Users should review actual locations for practicability to implement. Cost-Effectiveness values may vary slightly from actual calculation based on number of significant digits shown. The number of practices printed is based on selection criteria but is limited to 40, or up to 3 pages.

6.9 Action Report Example 12

PTMApp-Web Targeted BMP Action Report

Report Details

PTMApp-Web User: Nathaniel Baeumler

Watershed: Redeye River - Redeye River (huc07010107)

Location Point Number: 5

Report Generation Date: 2021-03-24

Selection Criteria

Parameter: Total Phosphorus

Treatment Group(s):   Conservation Cover, Cover Crop, Critical Area Planting, Denitrifying Bioreactor, Farm Pond, Fi

Basis for Practice Selection: Cost-Effectiveness (lowest $/mass)

Scale and Storm Event: Watershed Outlet, 2 - Year

Method Used to Select BMPs: Minimum Load Reduction

March 24, 2021

Saturated Buffer   No Till   Selected Watershed Boundary

Riparian Herbaceous Cover   Farm Pond   ● Location Outlet

1:1,004,605

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Saturated Buffer	170000288_525439_3	3,706,549	$59.15	11.63	$5.08	6.023	$9.82	0.00	Infinity
Saturated Buffer	170000537_537317_3	2,049,447	$67.60	1.52	$44.36	5.368	$12.59	0.00	$18,842.37
Riparian Herbaceous Cover	150003896_24807_2	91,328,193	$362.15	0.01	$34,178.57	22.494	$16.10	119.30	$3.04
Saturated Buffer	170000315_525944_3	3,007,165	$67.60	6.76	$9.99	4.198	$16.10	0.00	Infinity
Riparian Herbaceous Cover	150001794_8327_2	3,794,187,562	$467.50	0.00	$2,460,526,315.79	23.595	$19.81	16.61	$28.15
Saturated Buffer	170000515_536004_3	3,687,443	$59.15	1.67	$35.48	2.873	$20.59	0.00	Infinity
Farm Pond	100014846_33208_1	5,498,738	$255.84	1.00	$256.79	12.307	$20.79	132.79	$1.93
Riparian Herbaceous Cover	150005127_30448_2	105,321,263	$414.83	0.00	$2,358,999.15	18.252	$22.73	32.09	$12.93
Riparian Herbaceous Cover	150005668_31683_2	360,008,592	$395.07	0.00	$10,219,089.50	16.911	$23.36	27.67	$14.28
Riparian Herbaceous Cover	150005158_30448_2	95,948,866	$434.58	0.00	$1,658,575.68	16.751	$25.94	33.00	$13.17
Saturated Buffer	170000179_517929_3	2,251,539	$76.05	1.40	$54.47	2.905	$26.18	0.00	Infinity
Riparian Herbaceous Cover	150010580_52010_2	1,902,487,302	$441.17	0.00	$832,396,226.42	16.233	$27.18	18.14	$24.33
Saturated Buffer	170000259_524475_3	1,144,203	$84.50	1.17	$72.40	3.086	$27.38	60.69	$1.39

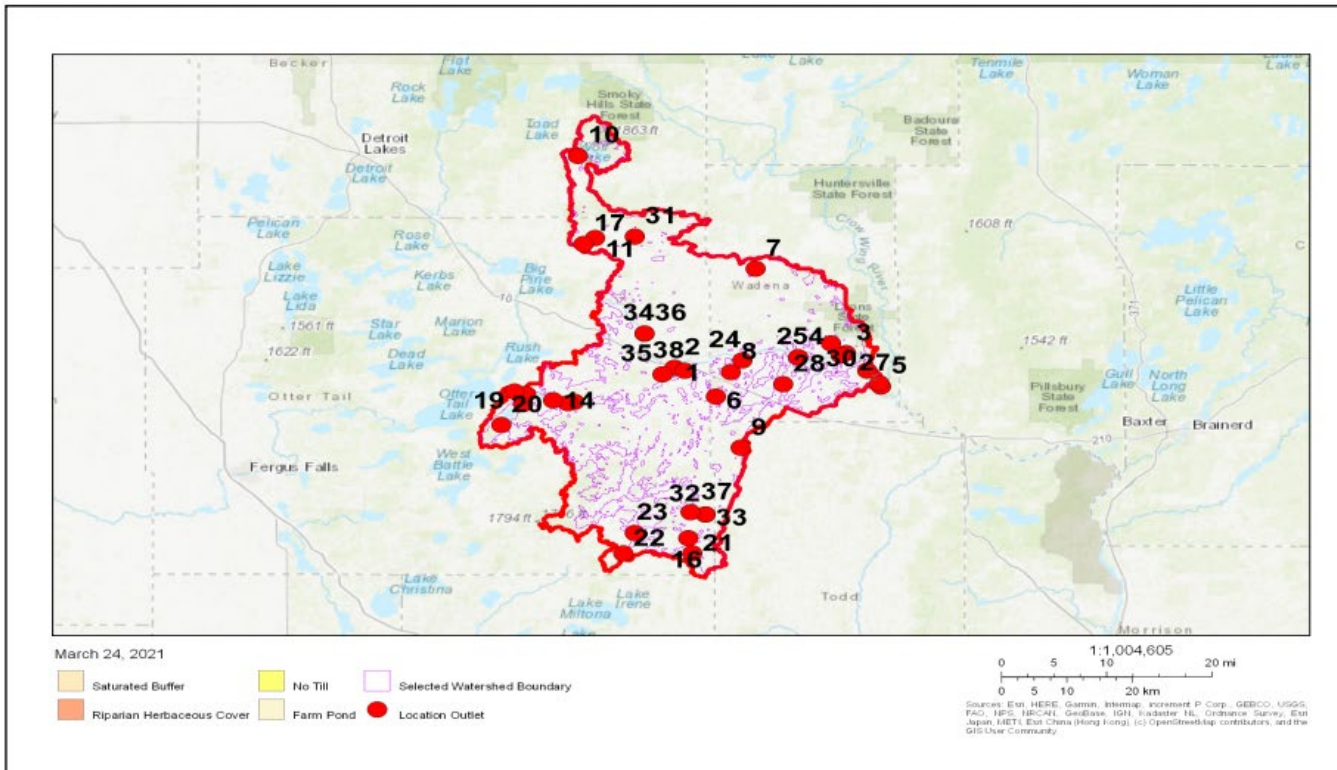| Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Saturated Buffer	170000401_31092_3	1,051,902	$143.64	5.96	$24.12	4.574	$31.40	90.74	$1.58
Saturated Buffer	170000079_507920_3	1,202,059	$67.60	0.61	$110.14	2.142	$31.56	28.61	$2.36
Riparian Herbaceous Cover	150010009_49613_2	2,082,260,578	$625.53	0.00	$947,772,727.27	19.226	$32.54	20.62	$30.34
Saturated Buffer	170000411_531272_3	1,842,780	$67.60	1.13	$59.85	2.022	$33.43	0.00	$14,889,867.84
Riparian Herbaceous Cover	150009920_49003_2	2,098,610,673	$665.04	0.00	$963,826,086.96	19.631	$33.88	20.98	$31.69
Saturated Buffer	170000637_542483_3	1,566,955	$59.15	0.35	$170.80	1.718	$34.43	0.00	Infinity
Riparian Herbaceous Cover	150010709_52010_2	1,878,946,384	$559.69	0.00	$1,142,224,489.80	15.672	$35.71	17.44	$32.09
Riparian Herbaceous Cover	150004573_28810_2	1,636,609,554	$401.66	0.00	$5,020,750,000.00	11.183	$35.92	8.33	$48.19
Riparian Herbaceous Cover	150008094_42265_2	64,625,379	$375.32	0.00	$559,903.33	10.373	$36.18	42.69	$8.79
Saturated Buffer	170000484_534551_3	1,129,671	$101.40	4.68	$21.67	2.786	$36.39	0.00	$51,472,081.22
Saturated Buffer	170000563_539277_3	3,125,298	$76.05	0.89	$85.05	2.089	$36.41	0.00	Infinity
Saturated Buffer	170000340_527154_3	3,541,861	$67.60	0.64	$105.72	1.827	$37.00	0.00	Infinity
Saturated Buffer	170000705_546410_3	3,400,585	$101.40	0.75	$135.49	2.697	$37.60	0.00	Infinity

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Riparian Herbaceous Cover	150005279_308 64_2	40,141,274	$381.90	0.00	$105,096.88	9.922	$38.49	46.60	$8.20
Riparian Herbaceous Cover	150001093_502 0_2	1,716,567,840	$401.66	0.00	$2,362,705,882.35	10.230	$39.26	10.35	$38.82
Saturated Buffer	170000239_523 455_3	2,845,706	$76.05	2.79	$27.29	1.936	$39.29	0.00	Infinity
Farm Pond	100019706_541 851_1	672,475	$95.31	1.12	$85.11	2.411	$39.53	48.22	$1.98
Saturated Buffer	170000465_533 258_3	776,346	$67.60	1.68	$40.21	1.707	$39.60	44.33	$1.52
Riparian Herbaceous Cover	150006518_362 02_2	166,190,041	$362.15	0.00	$10,937,783.15	9.076	$39.90	18.76	$19.30
Riparian Herbaceous Cover	150006239_354 91_2	154,509,326	$526.76	0.00	$2,799,532.31	13.028	$40.43	39.19	$13.44
Riparian Herbaceous Cover	150005900_338 44_2	883,018,151	$566.27	0.00	$304,446,236.56	13.570	$41.73	19.83	$28.55
Riparian Herbaceous Cover	150005514_317 87_2	10,864,004	$355.57	0.07	$5,378.61	8.216	$43.28	62.96	$5.65
No Till	260014293_320 93_6	281,745	$62.55	0.96	$65.35	1.417	$44.16	26.75	$2.34
No Till	260013889_530 960_6	120,017	$56.56	1.41	$40.21	1.279	$44.23	24.15	$2.34
No Till	260013753_530 960_6	596,589	$73.45	2.39	$30.75	1.659	$44.26	31.34	$2.34
No Till	260013594_531 800_6	245,148	$95.74	1.29	$74.13	2.154	$44.44	40.69	$2.35

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
No Till	260013158_529 859_6	2,507,451	$174.91	5.15	$33.99	3.933	$44.47	74.27	$2.36
Grand Total from BMPs in Selection			$9,793.00	57.01		327.476		1157.15	

Disclaimer: Practices shown are from raw results created using PTMApp-Desktop and uploaded to the web. Users should review actual locations for practicability to implement. Cost-Effectiveness values may vary slightly from actual calculation based on number of significant digits shown. The number of practices printed is based on selection criteria but is limited to 40, or up to 3 pages.

6.10 Action Report Example 13

PTMApp-Web Targeted BMP Action Report

Report Details

PTMApp-Web User: Nathaniel Baeumler

Watershed: Redeye River - Redeye River (huc07010107)

Location Point Number: 5

Report Generation Date: 2021-03-24

Selection Criteria

Parameter: Total Nitrogen

Treatment Group(s): Conservation Cover, Cover Crop, Critical Area Planting, Denitrifying Bioreactor, Farm Pond, Fi

Basis for Practice Selection: Load Reduction

Scale and Storm Event: Watershed Outlet, 2 - Year

Method Used to Select BMPs: Less than Maximum Cost-Effectiveness

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Large Wetland Restoration	140000388_284 31_1	67,927,475	$115,156.59	134.97	$853.17	13.300	$8,658.10	1472.31	$78.22
Multi-stage Ditch (open channel)	200000389_813 3_4	105,907,896	$24,537.41	33.43	$734.02	7.002	$3,504.18	1311.60	$18.71
Multi-stage Ditch (open channel)	200000551_971 1_4	142,968,542	$31,220.36	40.42	$772.45	3.359	$9,293.17	1225.68	$25.47
Multi-stage Ditch (open channel)	200001655_284 31_4	68,472,935	$25,534.87	173.64	$147.06	3.560	$7,173.45	1125.88	$22.68
Multi-stage Ditch (open channel)	200001294_564 306_4	97,329,875	$15,186.26	163.59	$92.83	1.726	$8,797.66	767.70	$19.78
Multi-stage Ditch (open channel)	200001101_220 11_4	855,922,186	$2,643.26	695.14	$3.80	0.065	$40,679.23	725.32	$3.64
Multi-stage Ditch (open channel)	200000278_728 9_4	91,564,999	$27,754.20	23.01	$1,206.11	1.500	$18,496.93	619.21	$44.82
Multi-stage Ditch (open channel)	200000326_783 6_4	97,774,155	$51,144.54	25.80	$1,982.05	1.311	$39,015.47	608.91	$83.99
Multi-stage Ditch (open channel)	200001875_326 98_4	69,870,628	$49,274.31	35.11	$1,403.29	2.158	$22,832.46	598.00	$82.40
Multi-stage Ditch (open channel)	200000829_163 59_4	65,217,125	$2,493.64	11.53	$216.36	0.942	$2,646.04	565.71	$4.41
Multi-stage Ditch (open channel)	200001625_281 57_4	70,230,142	$14,238.68	157.86	$90.20	0.563	$25,270.00	540.38	$26.35
Multi-stage Ditch (open channel)	200001559_272 35_4	140,104,806	$9,051.91	59.62	$151.83	0.599	$15,110.17	536.09	$16.89
Farm Pond	100002213_295 8_1	16,735,981	$2,739.04	2.64	$1,038.46	29.342	$93.35	525.35	$5.21
Multi-stage Ditch (open channel)	200001534_272 35_4	140,849,668	$3,890.08	58.92	$66.02	0.506	$7,686.12	501.68	$7.75
No Till	260015746_535 142_6	5,308,486	$1,092.75	31.92	$34.24	22.961	$47.59	433.61	$2.52

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Multi-stage Ditch (open channel)	200001484_259 33_4	56,033,096	$8,154.20	61.46	$132.68	0.609	$13,392.72	433.27	$18.82
Cover Crop	270015746_535 142_6	5,308,486	$3,320.85	28.28	$117.43	20.512	$161.90	414.75	$8.01
No Till	260011462_525 898_6	4,159,709	$1,148.97	7.96	$144.31	21.081	$54.50	398.10	$2.89
No Till	260012961_529 635_6	3,971,341	$961.58	26.14	$36.78	20.555	$46.78	388.17	$2.48
Multi-stage Ditch (open channel)	200001604_279 01_4	72,823,165	$8,827.48	153.74	$57.42	0.235	$37,576.36	386.83	$22.82
No Till	260012829_529 013_6	3,725,117	$974.60	23.02	$42.33	20.463	$47.63	386.44	$2.52
Cover Crop	270011462_525 898_6	4,159,709	$3,491.69	7.05	$494.96	18.832	$185.41	380.79	$9.17
No Till	260018486_539 851_6	5,116,082	$1,295.53	8.47	$152.93	20.029	$64.68	378.24	$3.43
No Till	260018322_539 429_6	5,376,837	$1,351.61	9.03	$149.72	19.939	$67.79	376.54	$3.59
Cover Crop	270012961_529 635_6	3,971,341	$2,922.23	23.16	$126.16	18.363	$159.14	371.29	$7.87
No Till	260010377_524 130_6	3,807,999	$1,143.58	8.45	$135.31	19.600	$58.34	370.14	$3.09
Cover Crop	270012829_529 013_6	3,725,117	$2,961.78	20.40	$145.18	18.281	$162.02	369.63	$8.01
Multi-stage Ditch (open channel)	200001689_286 64_4	60,128,491	$2,543.51	81.99	$31.02	0.292	$8,712.69	365.61	$6.96
Cover Crop	270018486_539 851_6	5,116,082	$3,937.10	7.51	$524.50	17.893	$220.04	361.79	$10.88
Cover Crop	270018322_539 429_6	5,376,837	$4,107.53	8.00	$513.49	17.812	$230.60	360.17	$11.40

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Multi-stage Ditch (open channel)	200000535_9178_4	52,239,090	$16,632.57	19.91	$835.30	1.173	$14,184.08	359.15	$46.31
No Till	260013234_529652_6	3,099,734	$883.83	19.34	$45.70	18.898	$46.77	356.87	$2.48
No Till	260015099_533635_6	4,975,882	$1,182.90	9.06	$130.51	18.884	$62.64	356.61	$3.32
Cover Crop	270010377_524130_6	3,807,999	$3,475.33	7.49	$464.06	17.510	$198.48	354.04	$9.82
Multi-stage Ditch (open channel)	200001123_23061_4	55,022,097	$9,101.78	17.27	$527.10	0.242	$37,538.76	342.02	$26.61
Cover Crop	270013234_529652_6	3,099,734	$2,685.96	17.14	$156.72	16.882	$159.10	341.35	$7.87
Cover Crop	270015099_533635_6	4,975,882	$3,594.81	8.03	$447.60	16.870	$213.09	341.10	$10.54
Reduced Till	280015746_535142_6	5,308,486	$1,092.75	24.64	$44.34	16.838	$64.90	339.34	$3.22
Multi-stage Ditch (open channel)	200001606_26507_4	82,405,458	$6,408.65	71.55	$89.57	0.193	$33,122.18	334.53	$19.16
No Till	260012765_528869_6	2,931,548	$807.66	20.66	$39.10	17.472	$46.23	329.95	$2.45
Grand Total from BMPs in Selection			$468,966.00	2337.36		448.357		20754.15	

Disclaimer: Practices shown are from raw results created using PTMApp-Desktop and uploaded to the web. Users should review actual locations for practicability to implement. Cost-Effectiveness values may vary slightly from actual calculation based on number of significant digits shown. The number of practices printed is based on selection criteria but is limited to 40, or up to 3 pages.

6.11 Action Report Example 14 with NRCS Practices

PTMApp-Web Targeted BMP Action Report

Report Details

PTMApp-Web User: Nathaniel Baeumler

Watershed: Bois de Sioux - Mustinka Rivers (huc09020101)

Location Point Number: 31

Report Generation Date: 2021-02-19

Selection Criteria

Parameter: Total Nitrogen

Treatment Group(s):   Denitrifying Bioreactor, Nutrient Management (Nitrogen)

Basis for Practice Selection: Cost-Effectiveness (lowest $/mass)

Scale and Storm Event: Watershed Outlet, 2 - Year

Method Used to Select BMPs: Number of Highest Ranked Practices

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Nutrient Management (Nitrogen)	330052992_608768_6	1,649,837	$208.49	15.99	$13.04	0.000	Infinity	31.66	$6.59
Nutrient Management (Nitrogen)	330052756_607874_6	577,483	$154.06	9.02	$17.07	0.000	Infinity	23.28	$6.62
Nutrient Management (Nitrogen)	330052454_607493_6	633,725	$83.79	9.71	$8.63	0.000	Infinity	12.63	$6.63
Nutrient Management (Nitrogen)	330052090_606915_6	521,242	$87.05	5.43	$16.03	0.000	Infinity	13.10	$6.65
Nutrient Management (Nitrogen)	330051683_605885_6	399,879	$74.20	9.28	$8.00	0.000	Infinity	11.14	$6.66
Nutrient Management (Nitrogen)	330051502_105769_6	269,367	$80.20	14.57	$5.50	0.000	Infinity	12.04	$6.66
Nutrient Management (Nitrogen)	330051714_106590_6	32,399,339	$134.20	15.26	$8.79	0.000	Infinity	20.04	$6.70
Nutrient Management (Nitrogen)	330051217_605122_6	3,150,324	$500.47	45.85	$10.92	0.000	Infinity	74.72	$6.70
Nutrient Management (Nitrogen)	330050525_604094_6	653,907	$268.62	17.28	$15.54	0.000	Infinity	40.09	$6.70
Nutrient Management (Nitrogen)	330050906_604402_6	784,419	$134.71	7.99	$16.86	0.000	Infinity	20.10	$6.70
Nutrient Management (Nitrogen)	330049855_603434_6	2,094,655	$343.41	25.52	$13.45	0.000	Infinity	51.21	$6.71

Practice Type	BMP ID Number	Drainage Area Treated (sq-ft)	PTMApp Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Nutrient Management (Nitrogen)	330049668_601976_6	910,895	$143.08	16.23	$8.82	0.000	Infinity	21.01	$6.81
Nutrient Management (Nitrogen)	330049689_102432_6	53,358,267	$79.40	8.02	$9.90	0.000	Infinity	11.65	$6.82
Nutrient Management (Nitrogen)	330048834_100984_6	106,869,381	$104.50	6.90	$15.15	0.000	Infinity	15.32	$6.82
Nutrient Management (Nitrogen)	330052752_607359_6	1,416,529	$191.37	11.31	$16.91	0.000	Infinity	28.02	$6.83
Nutrient Management (Nitrogen)	330049069_601406_6	4,284,032	$670.93	43.69	$15.36	0.000	Infinity	98.19	$6.83
Nutrient Management (Nitrogen)	330048441_99871_6	106,110,257	$361.03	37.08	$9.74	0.000	Infinity	52.83	$6.83
Nutrient Management (Nitrogen)	330048393_601103_6	2,685,055	$396.90	15.51	$25.60	0.000	Infinity	58.01	$6.84
Grand Total from BMPs in Selection			$8,721.00	636.63		0.000		1291.79	

Disclaimer: Practices shown are from raw results created using PTMApp-Desktop and uploaded to the web. Users should review actual locations for practicability to implement. Cost-Effectiveness values may vary slightly from actual calculation based on number of significant digits shown. The number of practices printed is based on selection criteria but is limited to 40, or up to 3 pages.

Only the first and last pages of the BMP practices are shown here for showing what the user can expect to see in the output.

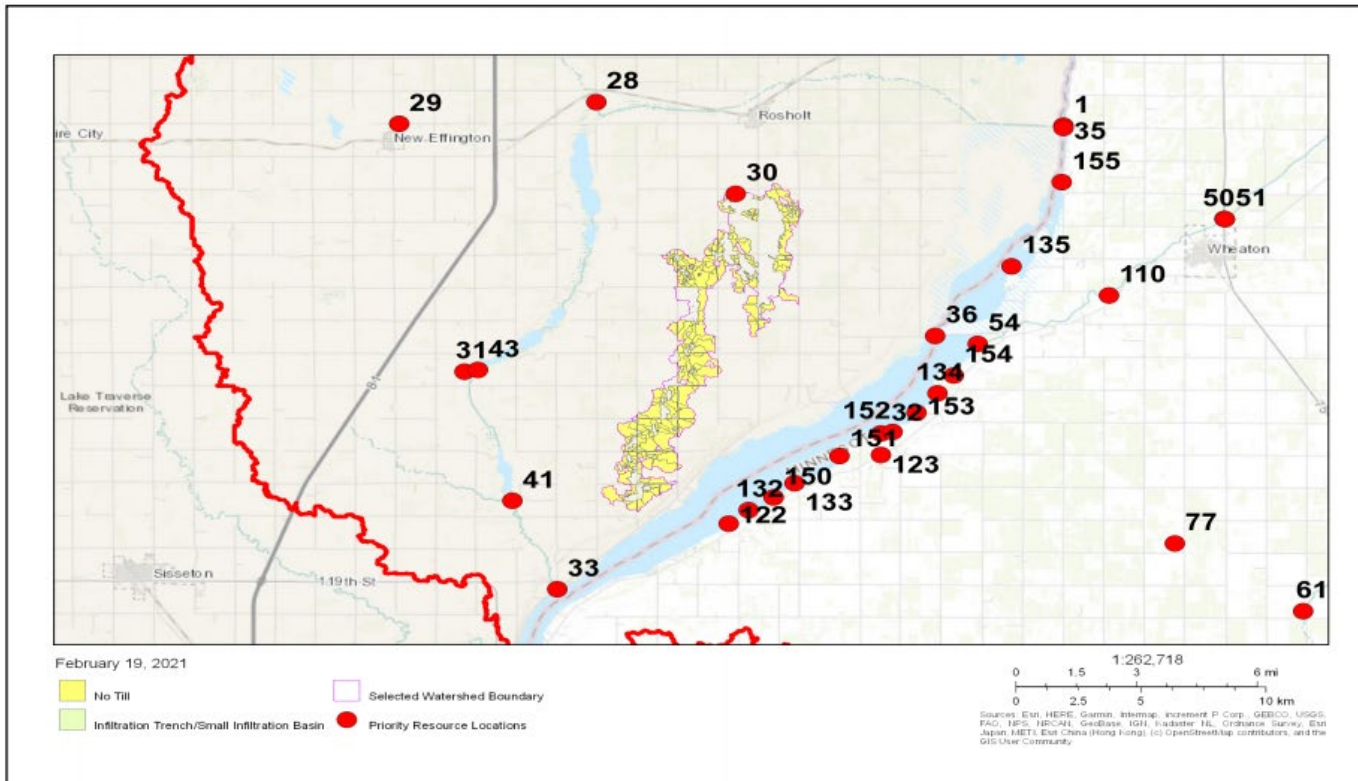## 6.12 Scenario Report Example 15 with NRCS Practices

Practice Type	Catch ID	Drainage Area Treated (sq-ft)	Practice Size (acres)	Township	Range	Section	PTMApp Cost ($)	Ann. Useful Life Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
No Till	104566	199,132	5	127	49	26	$246.58	$247.00	4.21	$58.61	1.335	$184.74	25.21	$9.78
No Till	588947	311,884	5	127	48	31	$252.88	$253.00	3.73	$67.79	1.372	$184.27	25.92	$9.76
No Till	618250	155,000	5	126	49	4	$254.64	$255.00	1.75	$145.20	1.379	$184.66	26.04	$9.78
No Till	89220	289,549	6	127	48	31	$256.65	$257.00	1.80	$142.84	1.394	$184.16	26.32	$9.75
No Till	588730	124,592	6	127	48	36	$257.90	$258.00	5.13	$50.24	1.406	$183.39	26.56	$9.71
No Till	602087	5,045,847	6	127	48	18	$257.90	$258.00	3.61	$71.46	1.404	$183.64	26.52	$9.72
No Till	619573	342,561	6	126	49	11	$258.66	$259.00	1.50	$171.89	1.396	$185.29	26.36	$9.81
No Till	95330	54,627	6	127	49	11	$259.91	$260.00	2.81	$92.62	1.418	$183.32	26.77	$9.71
No Till	95228	198,133,529	6	127	49	10	$260.66	$261.00	9.20	$28.33	1.422	$183.34	26.85	$9.71
No Till	587632	115,174	6	127	48	36	$267.90	$268.00	3.81	$70.30	1.469	$182.39	27.74	$9.66
No Till	116770	89,609	6	126	49	4	$287.25	$287.00	2.25	$127.74	1.588	$180.90	29.99	$9.58
No Till	589142	108,177	6	127	48	32	$290.95	$291.00	4.35	$66.95	1.604	$181.41	30.29	$9.61
No Till	589061	297,891	7	127	48	36	$298.07	$298.00	6.60	$45.14	1.660	$179.58	31.35	$9.51
No Till	117593	55,322,948	7	126	49	4	$303.71	$304.00	1.86	$163.43	1.695	$179.18	32.01	$9.49
No Till	594989	146,120	7	127	48	12	$308.35	$308.00	2.74	$112.58	1.722	$179.05	32.52	$9.48
No Till	608108	465,000	7	127	49	26	$312.50	$313.00	5.07	$61.65	1.749	$178.69	33.03	$9.46
No Till	667928	6,705,641	7	127	49	23	$313.48	$313.00	5.98	$52.46	1.753	$178.81	33.11	$9.47
No Till	96356	102,257	7	127	49	11	$322.23	$322.00	4.20	$76.80	1.811	$177.95	34.20	$9.42
No Till	608914	228,733	8	127	48	25	$338.18	$338.00	5.68	$59.54	1.893	$178.65	35.75	$9.46
No Till	608326	213,933	8	127	49	26	$344.43	$344.00	5.70	$60.46	1.954	$176.27	36.90	$9.33
No Till	598640	444,011	8	127	49	11	$346.83	$347.00	4.64	$74.69	1.974	$175.71	37.28	$9.30

Practice Type	Catch ID	Drainage Area Treated (sq-ft)	Practice Size (acres)	Township	Range	Section	PTMApp Cost ($)	Ann. Useful Life Cost ($)	Estimated Annual Sediment Reduction (tons)	Cost-Effectiveness to Treat Sediment ($/ton)	Estimated Annual TP Reduction (lbs)	Cost-Effectiveness to Treat TP ($/lb)	Estimated Annual TN Reduction (lbs)	Cost-Effectiveness to Treat TN ($/lb)
Infiltration Trench/Small Infiltration Basin	596603	1,499,411	0	127	48	12	$44,244.84	$2,212.00	1.89	$1,171.45	0.172	$12,847.80	2.51	$881.86
Infiltration Trench/Small Infiltration Basin	592488	1,516,634	1	127	48	1	$44,498.22	$2,225.00	10.21	$218.02	1.709	$1,302.17	33.01	$67.40
Infiltration Trench/Small Infiltration Basin	602612	1,736,217	1	127	49	23	$47,610.67	$2,381.00	11.48	$207.32	1.513	$1,573.49	29.09	$81.83
Grand Total from BMPs in Selection							$1,975,853.00		3661.25		1443.808		27187.35	

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Only the first and last pages of the BMP practices are shown here for showing what the user can expect to see in the output.