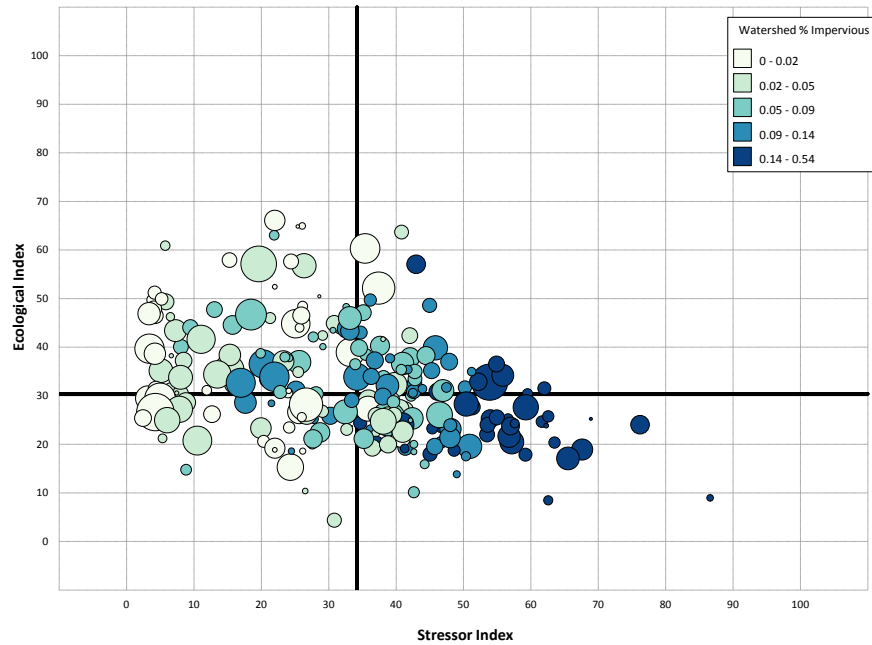


USER GUIDE FOR THE RECOVERY POTENTIAL SCREENING (RPS)



SCORING SPREADSHEET TOOL

January 2017

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1. Introduction & Background

1.1. RPS Overview

Recovery Potential Screening (RPS) is a systematic method for comparing watersheds based on characteristics that may influence the relative likelihood of successful watershed restoration or protection. RPS was developed to provide states and other planners with a flexible screening tool to guide prioritization of watersheds according to differences in key environmental and social factors affecting prospects for restoration and protection success.

RPS involves identifying a group of watersheds to be compared and a specific purpose for comparison, selecting appropriate indicators of recovery potential in three categories (Ecological, Stressor, and Social; Figure 1), and calculating recovery potential index scores for the watersheds. Index scores include the Ecological Index, Stressor Index, and Social Index and are calculated by combining indicators from each category. For example, the Ecological Index is calculated from all ecological indicators while the Stressor Index is calculated from all stressor indicators. In addition, an overall Recovery Potential Integrated (RPI) Index score is calculated by combining the Ecological Index, Stressor Index, and Social Index.

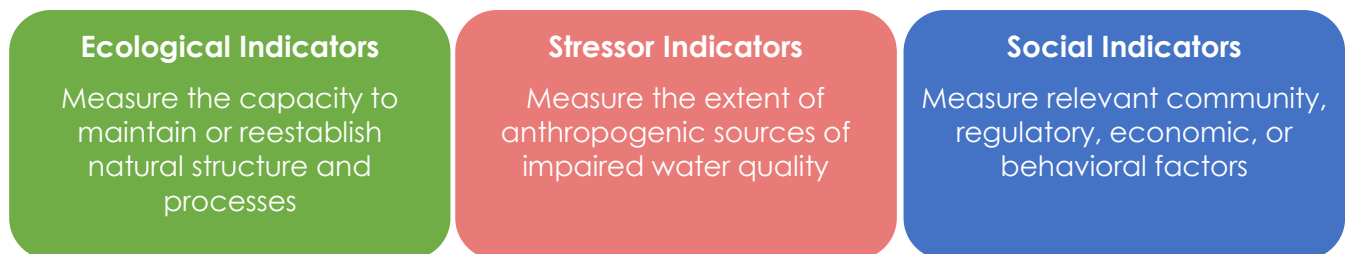


Figure 1. RPS uses three categories of recovery potential indicators to compare watersheds.

1.2. RPS Scoring Spreadsheet Tool

The RPS Scoring Spreadsheet Tool (RPS Tool) is a custom-coded Microsoft Excel workbook designed to facilitate setting up an RPS screening run, perform all recovery potential index calculations, and display results. The State RPS Tool series was first released in July 2014 and updated in June 2016 as a set of ready-to-use RPS spreadsheet tools for each of the lower 48 States. Each RPS Tool has pre-calculated indicator data already embedded for all 12-digit hydrologic unit (HUC12) subwatersheds of the National Watershed Boundary Dataset that are wholly or partially within the State's boundary. In addition to storing pre-calculated indicator data, each State RPS Tool:

- Contains a user-friendly interface for setting up a screening;
- Automatically calculates RPS index scores and ranks for the HUC12 subwatersheds of interest;
- Displays results in customizable table, plot, and map form;
- Can be readily updated with user-generated indicator data; and
- Can export data and screening results for use in other geospatial tools, documents and presentations.

The RPS Tool is designed for use by anyone with basic familiarity with Microsoft Excel. Instructions for each step are contained within the RPS Tool and this User Guide provides more detailed directions on tool use.

1.3. User Guide Organization

The RPS Tool is made up of several worksheets within a Microsoft Excel workbook. Some worksheets contain interactive menus and buttons while others store data for viewing and use in RPS calculations.

Each section of this User Guide describes a worksheet in the RPS Tool. Worksheet contents are summarized and step-by-step instructions are provided for interactive features within the worksheet. For some worksheets and features, a set of advanced tips are also provided for users that have become proficient in basic use of the tool.

2. Instructions Worksheet

Please make it a habit to **re-name and save your RPS tool file** before you begin a new screening, in order to ensure that you will know what topic is addressed in each screening run and a separate, unused tool copy always remains available.

The **Instructions** worksheet provides an abridged set of instructions for using the RPS Tool. Green-shaded areas within other worksheets also provide more specific instructions. The **Instructions** worksheet and other green-shaded areas are intended to serve as a built-in reference for users of the RPS Tool. They do not supplant the more detailed instructions presented in this User Guide.

Listed at the top of the **Instructions** are three key pieces of information for the tool file you are working with:

- **Project Area** – The state, river basin, or other geographic area that the RPS Tool file is designed for. Each tool file comes with a table of pre-calculated indicator data for all watersheds in the Project Area at one or more watershed scales (defined below). Users can decide to screen all watersheds within the Project Area or only a subset of watersheds of interest.
- **Watershed Scales** – The watershed scales that the RPS Tool file is able to screen. The term “watershed scale” refers to pre-defined watershed delineations. A typical tool file is able to screen, at minimum, 12-digit hydrologic units (HUC12s) of the National Watershed Boundary Dataset (WBD). Tool files for some Project Areas are able to screen additional watershed scales such as 8-digit hydrologic units (HUC8s).
- **Version Date** – The date the RPS Tool file was last updated to add new user features or modify existing features.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Scoring Spreadsheet for Recovery Potential Screening												
2	Project Area: Tennessee												
3	Watershed Scales: HUC8, HUC12												
4	Version Date: July 28, 2016												
5													
6	TROUBLESHOOTING NOTE: In December 2014, Microsoft released Office updates that affect the functionality of Excel macros and controls (drop-down menus, buttons, etc.). This tool file contains a patch to address these issues, but the file must be opened twice for the patch to be fully implemented. If this is your first time opening the file, please close and re-open a second time before proceeding. If you continue to receive error messages while using the Setup worksheet, you will need to download and run the Administrator level Microsoft Fix it solution (#51031) from http://support.microsoft.com/kb/3025036/EN-US .												
7													
8													
9													
10													
11													
12	This MS Excel file is specially coded to perform Recovery Potential Screening (RPS) calculations for the project area and watershed scales listed above using indicator data stored in this file. This procedure supports the assessment and comparison of relative restorability of impaired waters or watersheds by measuring ecological, stressor, and social indicators and calculating summary indices. This file should function properly in Excel 2003, 2007, 2010, or 2013.												
13													
14													
15													
16	Each of the worksheets in this spreadsheet file (see tabs along the bottom of the screen) begins with instructions and a summary of its contents. Below is an overview of all the steps involved to perform Recovery Potential Screening from this spreadsheet tool. For general background information about Recovery Potential Screening, please visit www.epa.gov/recoverypotential/ .												
17													
18	Print a copy of this <i>Instructions</i> worksheet, if desired, for reference when using other worksheets.												
19													
20	1. ENABLE THE MACROS THAT RUN THIS FILE. If the message “Security warning – macros have been disabled” appears -- click on <i>Options</i> and select <i>Enable this Content</i> . If any other message appears regarding security, click on <i>Enable Macros</i> or <i>Enable this Content</i> . The message may vary with different versions of Excel. You should only need to do this step once to activate all of the tool's functions.												
21													
22													
23	2. REVIEW INDICATOR DATA AND DESCRIPTIONS. Click on the <i>HUC_Data</i> tab for the watershed scale of interest (e.g., <i>HUC12_Data</i>).												
24	There will be one worksheet for each watershed scale included in this file. Each worksheet stores the complete data table of raw indicator values for all indicators measured and for all watersheds in the project area at a given scale.												
25													
26													
27	Indicator data (values of specific attributes for every watershed, in a data table) have been pre-loaded to this file. Some pre-loaded indicators are measured from the in-state portion of each watershed only. Other indicators are measured from the entire watershed area (including the out-of-state portion). Indicators that consider in-state conditions only contain "(INSTATE)" in their names.												
28													
29													
	<div> <div>INSTRUCTIONS</div> <div>Notes</div> <div>Setup</div> <div>Results</div> <div>Bubble_Plot</div> <div>Bubble_Plot_Options</div> <div>HUC8_Map</div> </div>												

3. Setup Worksheet

3.1. Overview

Basics

The **Setup** worksheet is your “home base” for configuring and running a Recovery Potential Screening. It is the first worksheet you should use after opening the tool file, reviewing instructions, and planning your Recovery Potential Screening run. The **Setup** worksheet is the only worksheet where you can choose (and change) the watersheds and indicators that are used in your screening run.

The screenshot shows the 'Setup Worksheet' interface. At the top, there are two tabs: 'RUN SCREENING' and 'RESET SCREENING'. Below these are four main sections, each with a title, instructions, a 'Select' button, a 'Clear' button, and a table.

- Select Watersheds:** Instructions: "Select watersheds to include in the screening by clicking the Select Watersheds button below. To clear your selections, click the Clear Watershed Selections button." Buttons: "HUC8", "HUC12". Table: "HUC12 ID" (10 rows).
- Select Ecological Indicators:** Instructions: "Select ecological indicators to include in the screening by clicking the Select Ecological Indicators button below. To clear your selections, click the Clear Ecological Indicator Selections button." Buttons: "Select Ecological Indicators", "Clear Ecological Indicator Selections". Table: "Ecological Indicator" (10 rows), "Weight" (10 rows).
- Select Stressor Indicators:** Instructions: "Select stressor indicators to include in the screening by clicking the Select Stressor Indicators button below. To clear your selections, click the Clear Stressor Indicator Selections button." Buttons: "Select Stressor Indicators", "Clear Stressor Indicator Selections". Table: "Stressor Indicator" (10 rows), "Weight" (10 rows).
- Select Social Indicators:** Instructions: "Select social indicators to include in the screening by clicking the Select Social Indicators button below. To clear your selections, click the Clear Social Indicator Selections button." Buttons: "Select Social Indicators", "Clear Social Indicator Selections". Table: "Social Indicator" (10 rows), "Weight" (10 rows).

At the bottom, there is a navigation bar with tabs: "INSTRUCTIONS", "Notes", "Setup" (highlighted with a red box), "Results", "Bubble_Plot", "Bubble_Plot_Options", and "HUC8_Map".

The **Setup** worksheet is organized into four sections:

- In the **Select Watersheds** section you will specify which watersheds will be included in the screening.
- In the **Select Ecological Indicators** section you will specify which ecological indicators will be used in the screening and how those ecological indicators will be weighted.
- In the **Select Stressor Indicators** section you will specify which stressor indicators will be used in the screening and how those stressor indicators will be weighted.
- In the **Select Social Indicators** section you will specify which social indicators will be used in the screening and how those social indicators will be weighted.

After selecting watersheds, indicators, and weights, you will click the **RUN SCREENING** button to populate other worksheets in the tool with screening results. The **Setup** worksheet also includes a **RESET SCREENING** button to clear the current watershed/indicator selections from the **Setup** worksheet and screening results from other worksheets so that a new screening run can be configured from scratch.

The following sections of this guide provide step-by-step instructions for how to:

- **Choose a Watershed Scale**
- **Select Watersheds to Screen**
- **Select Indicators and Assign Weights**
- **Use the Run Screening Button**
- **Respond to Warning Messages**
- **Use the Reset Button**

Advanced Tips

- Completing the setup process is far easier if you have already planned out your screening by identifying the screening purpose, watersheds of interest, and relevant indicators (from the full list available) beforehand.
- The process of selecting watersheds and indicators to screen can be streamlined by copying and pasting watershed IDs, indicator names, and indicator weights that have already been compiled in other spreadsheets. This is faster than typing or selecting individually from popup menus on the **Setup** worksheet. Instructions for copying and pasting watersheds and indicators into the **Setup** worksheet are provided in the following sections.
- After setting up and running a screening, you may want to make minor adjustments to your screening by adding or removing watersheds, adding or removing indicators, or adjusting indicator weights. Do not click the **RESET SCREENING** button on the **Setup** worksheet if you want to make minor adjustments to an existing screening (e.g., remove or add selected indicators, change their weights, or change watersheds) since clicking the **RESET SCREENING** button will clear **all** selections from the **Setup** worksheet. Instead, to adjust an existing screening, simply make the desired changes on the **Setup** worksheet and then re-click the **RUN SCREENING** button. This will update results stored on other worksheets to reflect the changes made to watershed and indicator selections on the **Setup** worksheet.
- Save completed screening runs and change the file name before beginning a new run with different watersheds or indicators, or before using **RESET SCREENING**.

3.2. Choose Watershed Scale

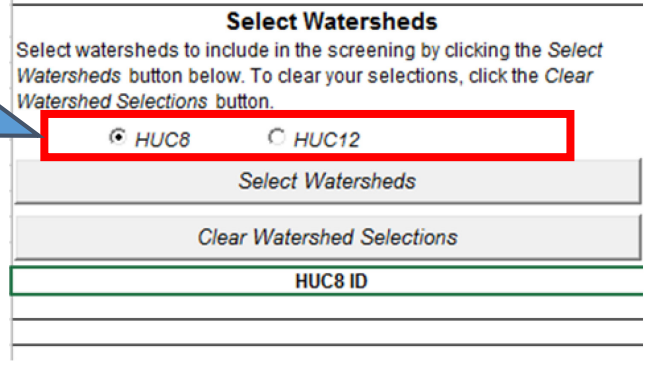
Basics

Some RPS Tool files are designed to screen watersheds at a single scale (e.g., HUC12 subwatersheds only) and offer no choice of scales. Others allow users to select between multiple watershed scales for screening (e.g., either HUC8 watersheds or HUC12 subwatersheds). If your tool file includes multiple watershed scales, you must specify which scale your screening will consider on the **Setup** worksheet.

Watershed scale options are displayed right below the **Select Watersheds** section title on the **Setup** worksheet.

To select a watershed scale, click the option button next to the watershed scale name.

If your RPS tool contains watershed data at one scale only, there will be no options buttons visible.



Select Watersheds

Select watersheds to include in the screening by clicking the **Select Watersheds** button below. To clear your selections, click the **Clear Watershed Selections** button.

☒ HUC8 ☐ HUC12

Select Watersheds

Clear Watershed Selections

HUC8 ID

Advanced Tips

- Users must select only **one** watershed scale per screening run (i.e., you cannot screen watersheds from multiple scales in a single screening run).
- Clicking a watershed scale button will prepare the watershed and indicator popup menus on the **Setup** worksheet for next steps. For example, clicking the HUC12 option button will add HUC12 IDs to the popup menu displayed when the **Select Watersheds** button is clicked.
- Be aware that changing to a different watershed scale will reset the **Setup** worksheet by clearing any selected watersheds, indicators, and weights. If you have begun to setup your screening run by entering watersheds, indicators, or weights on the **Setup** worksheet then those entries will be deleted if you click a different watershed scale button and will not be recovered by returning to the original scale.

3.3. Select Watersheds to Screen

Basics

A Recovery Potential Screening run can include all watersheds in the Project Area that the RPS Tool is designed for or a smaller subset of watersheds of interest. Users must decide which watersheds to screen based on the purpose and goals of their screening.

In the **Select Watersheds** section of the **Setup** worksheet, you will specify which watersheds to include in the screening by entering a list of watershed IDs (one ID per row). Three options are available for entering watersheds IDs:

Select Watersheds to Screen Option 1 – Add All Watersheds

Click the **Select Watersheds** button. A popup menu will display with a list of all watershed IDs in the Project Area covered by the RPS Tool

Click the **Add All Watersheds** button in the popup menu. This will add all watersheds in the Project Area to the list of watershed IDs selected for screening.

Select Watersheds

Select watersheds to include in the screening by clicking the **Select Watersheds** button below. To clear your selections, click the **Clear Watershed Selections** button.

☒ HUC8 ☐ HUC12

Select Watersheds

Clear Watershed Selections

HUC8 ID

Select Watersheds...

Select watersheds to include in your screening by highlighting their names in the box below and clicking the **Add Selected Watersheds** button.

Or click the **Add All Watersheds** button to select all watersheds for your screening.

03150101 (Conasauga)

05110002 (Barren)

05130101 (Upper Cumberland)

05130103 (Upper Cumberland-Lake Cumberland)

05130104 (South Fork Cumberland)

05130105 (Obey)

05130106 (Upper Cumberland-Cordell Hull)

05130107 (Collins)

05130108 (Caney)

05130201 (Lower Cumberland-Old Hickory Lake)

05130202 (Lower Cumberland-Sycamore)

05130203 (Stones)

05130204 (Harpeth)

05130205 (Lower Cumberland)

05130206 (Red)

06010101 (North Fork Holston)

06010102 (South Fork Holston)

06010103 (Watauga)

Add Selected Watersheds

Add All Watersheds

Exit

Select Watersheds

Select watersheds to include in the screening by clicking the **Select Watersheds** button below. To clear your selections, click the **Clear Watershed Selections** button.

☒ HUC8 ☐ HUC12

Select Watersheds

Clear Watershed Selections

HUC8 ID
03150101 (Conasauga)
05110002 (Barren)
05130101 (Upper Cumberland)
05130103 (Upper Cumberland-Lake Cumberland)
05130104 (South Fork Cumberland)

Select Watersheds to Screen Option 2 – Select Watersheds Individually

Click the **Select Watersheds** button. This will display a popup menu with a list of all watershed IDs in the Project Area covered by the RPS Tool.

In the popup menu, highlight the watersheds you would like to include in your screening by clicking on their IDs/names.

Multiple watersheds can be highlighted by dragging the mouse cursor down or by holding the Ctrl key and then clicking on each watershed ID individually.

Click the **Add Selected Watersheds** button to add the highlighted watersheds to the list of watershed IDs for screening.

You still have the opportunity to select additional watersheds after clicking the **Add Selected Watersheds** button. Repeat the previous step until all watersheds of interest have been selected for the screening, then click the **Exit** button to close the popup menu.

Select Watersheds

Select watersheds to include in the screening by clicking the **Select Watersheds** button below. To clear your selections, click the **Clear Watershed Selections** button.

☒ HUC8 ☐ HUC12

Select Watersheds

Clear Watershed Selections

HUC8 ID

Select Watersheds...

Select watersheds to include in your screening by highlighting their names in the box below and clicking the **Add Selected Watersheds** button.

Or click the **Add All Watersheds** button to select all watersheds for your screening.

06010207 (Lower Clinch)
06010208 (Emory)
06020001 (Middle Tennessee-Chickamauga)
06020002 (Hiwassee)
06020003 (Ocoee)
06020004 (Sequatchie)
06030001 (Guntersville Lake)
06030002 (Wheeler Lake)
06030003 (Upper Elk)
06030004 (Lower Elk)
06030005 (Pickwick Lake)
06040001 (Lower Tennessee-Beech)
06040002 (Upper Duck)
06040003 (Lower Duck)
06040004 (Buffalo)

Add Selected Watersheds

Add All Watersheds

Exit

Select Watersheds

Select watersheds to include in the screening by clicking the **Select Watersheds** button below. To clear your selections, click the **Clear Watershed Selections** button.

☒ HUC8 ☐ HUC12

Select Watersheds

Clear Watershed Selections

HUC8 ID

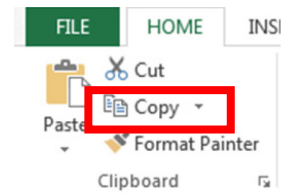
06020001 (Middle Tennessee-Chickamauga)
06020002 (Hiwassee)
06020003 (Ocoee)
06020004 (Sequatchie)
06030001 (Guntersville Lake)
06030002 (Wheeler Lake)
06030003 (Upper Elk)
06030004 (Lower Elk)
06030005 (Pickwick Lake)

Select Watersheds to Screen Option 3 – Copy and Paste Watershed IDs

To use this option you must already have a pre-existing list of watershed IDs to screen in a separate worksheet. The list of watershed IDs must be formatted with one ID per row.

Open the worksheet containing the pre-existing list of watershed IDs to screen. Select the list and click “Copy” on the Excel menu.

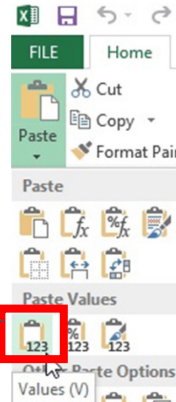
10260006
10260007
10260008
10260009
10260010
10260011
10260012
10260013
10260014
10260015
10270101



Select Watersheds	
14	Select watersheds to include in the screening by clicking the <i>Select Watersheds</i> button below. To clear your selections, click the <i>Clear Watershed Selections</i> button.
17	<input checked="" type="radio"/> HUC8 <input type="radio"/> HUC12
19	Select Watersheds
21	Clear Watershed Selections
23	HUC8 ID
24	
25	

Go back to the **Setup** worksheet and set the cursor to cell A24 (the first cell of the watershed ID list in the **Select Watersheds** section).

Select “Paste Values” from the Excel menu to paste the watershed IDs into the **Select Watersheds** section.



Select Watersheds	
14	Select watersheds to include in the screening by clicking the <i>Select Watersheds</i> button below. To clear your selections, click the <i>Clear Watershed Selections</i> button.
17	<input checked="" type="radio"/> HUC8 <input type="radio"/> HUC12
19	Select Watersheds
21	Clear Watershed Selections
23	HUC8 ID
24	10260006
25	10260007
26	10260008
27	10260009
28	10260010
29	10260011
30	10260012
31	10260013
32	10260014
33	10260015
34	10270101

Advanced Tips

- The watershed ID list in the **Select Watersheds** section must begin in cell A24 of the **Setup** worksheet and must contain one watershed ID per row.
- Watershed names alone cannot be added to the watershed ID list. Watershed names can be included in the text but must occur after the watershed ID. For example, the Jacks River HUC12 (HUC12 ID 031501010102) can be entered as “031501010102” or “031501010102 (Jacks River)” but not “Jacks River”.
- When manually typing watershed IDs or copying and pasting from another worksheet, be sure that all IDs are present in column A of the **Indicator Data** worksheet for the watershed scale you are screening (e.g., the **HUC12_Data** worksheet HUC12 subwatersheds are being screened). The tool cannot screen watersheds that are not present in the **Indicator Data** worksheet.
- Use the **HUC Subsets** worksheet to store lists of watershed IDs that will be of interest for future screenings. For example, you can use the **HUC Subsets** worksheet to store lists of HUC12 IDs within each HUC8 in the Project Area. You can then copy and paste a group of HUC12s from the **HUC Subsets** worksheet to the **Setup** worksheet for a screening run.
- Do not omit leading zeros from watershed IDs (e.g., “04030001” cannot be entered as “4030001”). Omitting leading zeros will cause errors in the screening run.
- If HUC8 watersheds are being screened, the first 8 characters in each watershed ID are used to extract indicator values from the indicator data worksheet. Any text after the eighth character is ignored.
- If HUC12 subwatersheds are being screened, only the first 12 characters in each watershed ID are used to extract indicator values from the indicator data sheet. Any text after the twelfth character is ignored.

3.4. Select Indicators and Weights

RPS index scores and ranks are calculated for each watershed included in a screening using ecological, stressor, and social indicators. The choice of which indicators to use for a screening depends on the purpose of the screening and the nature of the watersheds being screened. Thus, users should review the full list of indicators and their definitions in the **Indicator Info** worksheet before selecting indicators on the **Setup** worksheet.

Basics

At least one ecological indicator, one stressor indicator, and one social indicator must be selected in order to perform a Recovery Potential Screening run. Neutral indicator values are available in each category if one or more categories are not of interest. In general, three to ten indicators per category are recommended. If too few indicators are selected, index scores will not adequately reflect the factors influencing recovery potential. If too many indicators are selected, index scores will reflect random noise in the indicator data rather than true patterns in recovery potential.

Indicator weights determine the relative influence of each indicator on index scores. Weights must be numeric but any set of numeric values can be used. A typical approach is to select a certain number of weight categories (e.g., 3 = high; 2 = medium; 1 = low) and assign weights to indicators based on their relevance to the purpose of the screening and data quality considerations.

Two options are available for selecting indicators and weights on the **Setup** worksheet. Step-by-step instructions for each option are provided on the following pages.

Select Indicators and Weights Option 1 – Select from Popup Menu

Click on the **Select Ecological Indicators** button. A popup menu will display with a list of ecological indicators that can be selected for screening.

In the popup menu, highlight the indicators you would like to include in your screening by clicking on their name.

Double-clicking an indicator name will display a popup box with its description.

Click the **Add Selected Indicators** button to add the highlighted indicators to the list of indicators selected for screening.

You still have the opportunity to select additional indicators after clicking the **Add Selected Indicators** button. Repeat the previous step until all indicators of interest have been selected for the screening then click the **Exit** button to close the popup menu.

Select Ecological Indicators
Select ecological indicators to include in the screening by clicking the **Select Ecological Indicators** button below. To clear your selections, click the **Clear Ecological Indicator Selections** button.

Select Ecological Indicators

Clear Ecological Indicator Selections

Ecological Indicator	Weight

Select Ecological Indicators...

Select ecological indicators to include in your screening by highlighting their names in the box below and clicking the **Add Selected Indicators** button.

Double-click any indicator name in the box to view its description.

- % Woody Vegetation (2006) in Riparian Zone
- % Natural Cover, N-index1 (2006) in Watershed
- % Natural Cover, N-index2 (2006) in Watershed
- % Natural Cover, N-index1 (2006) in HCZ
- % Natural Cover, N-index 2 (2006) in HCZ
- % Natural Cover, N-index (2006) in Riparian Zone
- % Natural Cover, N-index 2 (2006) in Riparian Zone
- % National Ecological Framework (NEF) in WS (2001)
- NFHAP Habitat Condition Index
- Ratio of Natural to Recycled N Inputs
- Ratio of Natural to New N Inputs

Add Selected Indicators

Exit

Select Ecological Indicators
Select ecological indicators to include in the screening by clicking the **Select Ecological Indicators** button below. To clear your selections, click the **Clear Ecological Indicator Selections** button.

Select Ecological Indicators

Clear Ecological Indicator Selections

Ecological Indicator	Weight
% Woody Vegetation (2006) in Riparian Zone	1
% Natural Cover, N-index1 (2006) in Watershed	1
NFHAP Habitat Condition Index	1

Select Ecological Indicators
Select ecological indicators to include in the screening by clicking the **Select Ecological Indicators** button below. To clear your selections, click the **Clear Ecological Indicator Selections** button.

Select Ecological Indicators

Clear Ecological Indicator Selections

Ecological Indicator	Weight
% Woody Vegetation (2006) in Riparian Zone	2
% Natural Cover, N-index1 (2006) in Watershed	1
NFHAP Habitat Condition Index	1

By default, indicators selected from the popup menu will be assigned a weight of 1.

Indicator weights can be adjusted by placing the cursor on the cell containing the weight and typing in a new weight.

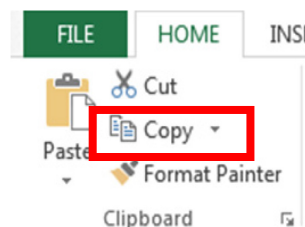
Repeat these steps in the **Select Stressor Indicators** section to select stressor indicators and weights and in the **Select Social Indicators** section to select social indicators and weights.

Select Indicators and Weights Option 2 – Copy and Paste Indicator List

To use this option you must already have a pre-existing list of ecological indicator names and weights stored in a separate worksheet. The pre-existing indicator list must be formatted with one indicator per row with the indicator name in the first column and indicator weight in the second column.

Open the worksheet with the pre-existing indicator list. Select the indicator names and weights and click “Copy” on the Excel menu.

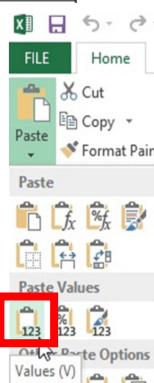
% N-Index1 in WS (2011)	2
Soil Stability, Mean in WS	1
% National Ecological Framework (NEF) in WS (2001)	1



	C	D
13	Select Ecological Indicators	
14	Select ecological indicators to include in the screening by clicking the	
15	Select Ecological Indicators button below. To clear your selections, click	
16	the Clear Ecological Indicator Selections button.	
17		
18		
19	Select Ecological Indicators	
20		
21	Clear Ecological Indicator Selections	
22		
23	Ecological Indicator	Weight
24		
25		
26		

Go back to the **Setup** worksheet and set the cursor to cell C24 (the first cell of the indicator list in the **Ecological Indicators** section).

Select “Paste Values” from the Excel menu to paste the ecological indicators and weights into the **Select Ecological Indicators** section.



	C	D
13	Select Ecological Indicators	
14	Select ecological indicators to include in the screening by clicking the	
15	Select Ecological Indicators button below. To clear your selections, click	
16	the Clear Ecological Indicator Selections button.	
17		
18		
19	Select Ecological Indicators	
20		
21	Clear Ecological Indicator Selections	
22		
23	Ecological Indicator	Weight
24	% N-Index1 in WS (2011)	2
25	Soil Stability, Mean in WS	1
26	% National Ecological Framework (NEF) in WS (2001)	1
27		
28		

Repeat these steps in the **Select Stressor Indicators** section to select stressor indicators and weights and in the **Select Social Indicators** section to select social indicators and weights.

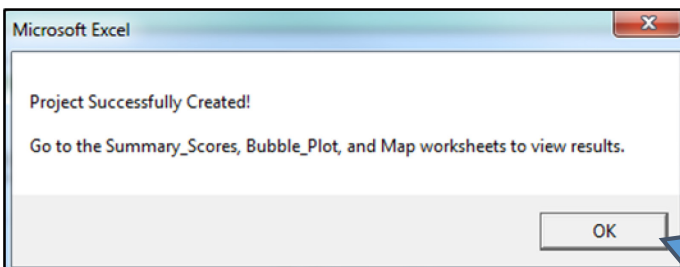
Advanced Tips

- The Ecological Indicator list must begin in cell C24 of the **Setup** worksheet and must contain one indicator per row.
- The Stressor Indicator list must begin in cell G24 of the **Setup** worksheet and must contain one indicator per row.
- The Social Indicator list must begin in cell K24 of the **Setup** worksheet and must contain one indicator per row.
- The Ecological, Stressor, and Social Indicator lists must be continuous (no blank rows). If blank rows are present, any indicators below the first blank row will not be included in the screening.
- When copying and pasting from another worksheet, be sure that indicator names exactly match names in the header row (row 7) of the **Indicator Data** worksheet for the selected watershed scale (e.g., the **HUC12_Data** worksheet if HUC12 subwatersheds are being screened). Any differences in indicator spelling, capitalization, or whitespace will result in errors when the screening is run.
- Indicator weights can be set to zero. A weight of zero means that the indicator has no effect on index scores.
- Indicator weights can be set to negative values. A negative weight will reverse the directional effect of the indicator on index scores. The standard directionality is for larger indicator values to increase Ecological Index, Stressor, and Social Index scores. A negative weight will reverse directionality so that smaller values increase Ecological Index, Stressor, and Social Index scores.
- For ecological and social, higher numbers indicate watershed health, in stressor, higher numbers indicate watershed stress.
- Indicator selections within each category (Ecological, Stressor, and Social) should be topically diverse. A diverse set of indicators will reflect a range of factors relevant to recovery potential rather than one single topic.
- Users may want to consider numeric redundancy as part of the indicator selection process. Non-redundant indicators can be identified by examining correlation coefficients between indicator pairs.
- Up to 20 indicators can be selected in each category.

After selecting watersheds, indicators, and weights for your screening, use the **RUN SCREENING** button to auto-calculate Ecological Index, Stressor Index, Social Index, and Recovery Potential Integrated (RPI) Index scores for each watershed. Clicking the **RUN SCREENING** button will populate other worksheets in the RPS Tool with screening results. Any results from previous screenings will be cleared from other worksheets in the RPS Tool when the **RUN SCREENING** button is clicked.

If no data issues are found, index scores will be automatically calculated and screening results will be added to other worksheets in table, plot, and map form. If indicators data issues are identified, a warning message will appear. Indicator data warnings are described in the next section.

RUN SCREENING		RESET SCREENING											
Select Watersheds Select watersheds to include in the screening by clicking the Select Watersheds button below. To clear your selections, click the Clear Watershed Selections button. <div> <input type="radio"/> HUC8 <input checked="" type="radio"/> HUC12 </div> <div> <input type="button" value="Select Watersheds"/> <input type="button" value="Clear Watershed Selections"/> </div>		Select Ecological Indicators Select ecological indicators to include in the screening by clicking the Select Ecological Indicators button below. To clear your selections, click the Clear Ecological Indicator Selections button. <div> <input type="button" value="Select Ecological Indicators"/> <input type="button" value="Clear Ecological Indicator Selections"/> </div>		Select Stressor Indicators Select stressor indicators to include in the screening by clicking the Select Stressor Indicators button below. To clear your selections, click the Clear Stressor Indicator Selections button. <div> <input type="button" value="Select Stressor Indicators"/> <input type="button" value="Clear Stressor Indicator Selections"/> </div>		Select Social Indicators Select social indicators to include in the screening by clicking the Select Social Indicators button below. To clear your selections, click the Clear Social Indicator Selections button. <div> <input type="button" value="Select Social Indicators"/> <input type="button" value="Clear Social Indicator Selections"/> </div>							
HUC12 ID 031501010101 (Headwaters Conasauga River) 031501010102 (Jacks River) 031501010103 (Ball Play Creek-Conasauga River) 031501010104 (Old Fort Creek-Mill Creek) 031501010105 (Perry Creek-Conasauga River) 031501010106 (Sugar Creek) 031501010301 (Coahuilla Creek Headwaters) 031501010302 (Mills Creek) 031501010303 (Coahuilla Creek) 050500010102 (Big Laurel Creek) 050500010103 (Headwaters North Fork New River) 050500010105 (Big Horse Creek) 051100020101 (Little Trace Creek-Line Creek) 051100020102 (Trace Creek-Line Creek) 051100020105 (Long Fork) 051100020106 (Salt Lick Creek) 051100020108 (Puncheon Creek) 051100020109 (Sunset Creek-Barren River)		Ecological Indicator % Woody Vegetation in RZ (2011) % N-Index2 in HCU (2011) Habitat Condition Index WS (2015) Soil Stability, Mean in HCU		Weight 3 2 3 2		Stressor Indicator % Developed, Low Intensity in RZ (2011) % Agriculture in WS (2011) % Streamlength Near \geq 15% Impervious Cover (2011) Synthetic N Fertilizer Application in WS Watershed Urban 303d-Listed Causes Count (2015) % Streamlength 303d-Listed Nutrients (2015)		Weight 2 2 2 3 3 3		Social Indicator % GAP Status 1 and 2 % Streamlength Assessed (2015) % Waterbody Area Assessed (2015) Count Ratio TMDLs to Impairments (2015) Watershed Groups (INSTATE) Jurisdictional Complexity (INSTATE)		Weight 1 1 1 2 3	
<input type="button" value="Notes"/> <input type="button" value="Setup"/> <input type="button" value="Results"/> <input type="button" value="Bubble Plot"/> <input type="button" value="Bubble Plot Options"/> <input type="button" value="HUC8_Map"/> <input type="button" value="HUC12_Map"/>		<input type="button" value="HUC8_Data"/> <input type="button" value="HUC12_Data"/> <input type="button" value="Indicator_Info"/> <input type="button" value="HUC.Subsets"/>		<input type="button" value="Add_Indicators"/> <input type="button" value="Summary_All"/> <input type="button" value="+"/>									



Click **OK** and then proceed to other worksheets to review screening results.

Advanced Tips

- After clicking the **RUN SCREENING** button an error message may appear. A screening will not successfully run to completion and an error message will be displayed if any of the following errors occur:
 - Watersheds, indicators, and/or weights are not specified.
 - One or more watershed IDs entered in the **Select Watersheds** section do not have an exact match in column A of the **Indicator Data** worksheet for the watershed scale you are screening (e.g., the **HUC12_Data** worksheet if HUC12 subwatersheds are being screened).
 - One or more indicator names entered in the **Select Ecological Indicators**, **Select Stressor Indicators**, or **Select Social Indicators** sections do not have an exact match in the header row of the **Indicator Data** worksheet (e.g., the **HUC12_Data** worksheet if HUC12 subwatersheds are being screened).
 - One or more of the indicators selected for screening contain non-numeric data in the **Indicator Data** worksheet. Indicator data must be numeric (blank cells are allowed for missing data).

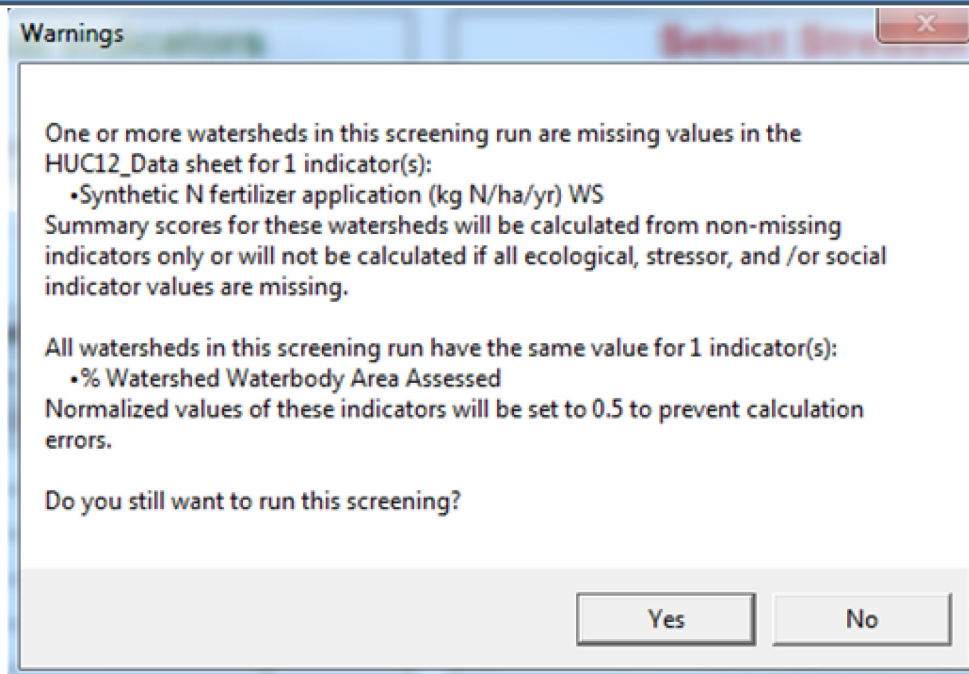
3.6. Respond to Warning Messages

Basics

After clicking the **RUN SCREENING** button on the **Setup** worksheet, the tool will automatically check for potential issues with indicator data, including:

- **Missing indicator values.** In most cases, each indicator will have a numeric value for every watershed selected for screening in the **Indicator Data** worksheet. However, indicator values may be missing for one or more watersheds. The user is given an opportunity to decide whether they will accept the data gap or terminate the screening. Missing indicator values are denoted as blank cells in the **Indicator Data** worksheet. If a watershed is missing indicator values, then RPS index scores for that watershed will be calculated from non-missing indicators only. In rare cases, a watershed will be missing values of all ecological, stressor, and social indicators selected for the screening. If a watershed is missing values for all indicators, RPS index scores cannot be calculated for that watershed.
- **Equal-value indicators.** Equal value indicators are indicators that have the same exact value for every watershed selected for screening. Equal value indicators therefore provide no information on recovery potential differences between watersheds. RPS index calculations are based on the assumption that indicator values vary between watersheds and cannot be applied to equal value indicators. An equal-value indicator can be included in a screening but normalized values of the equal-value indicator are set to 0.5 for all watersheds to prevent index calculation errors. As above, the user is given an opportunity to decide whether they will continue including the equal-value indicator or terminate the screening.

After clicking the **RUN SCREENING** button, a message box will appear if the tool finds any indicator data issues. The warning message will notify users if missing indicator data or equal-value indicators were found and will list the names of indicators with issues. Users have the option to continue the screening by clicking **Yes** on the message box or to stop the screening to adjust indicator selections by clicking **No**.



Advanced Tips

- Users can remove indicators with missing values or equal-value indicators by clicking **No** on the warning message box and deleting the names of indicators from the **Select Ecological Indicators**, **Select Stressor Indicators**, and/or the **Select Social Indicators** sections.
- Decisions on whether to remove indicators with missing values can be based on the number of watersheds with missing data. Missing indicator values are denoted as blank cells on the indicator data worksheet. As the number of watersheds with missing data increases, the value of the indicator for describing recovery potential differences between watersheds decreases. If most of the watersheds selected for screening are missing values of an indicator, it is likely advantageous to remove that indicator from the screening, particularly if it can be replaced with another indicator with a more complete record that describes a similar watershed characteristic. However, an argument can sometimes be made for using an indicator with values for few watersheds if it is especially relevant to a screening purpose that involves targeting or prioritizing a small proportion of watersheds.
- Equal-value indicators should be removed from a screening since they provide no information on recovery potential differences between watersheds. The exception is when a user intentionally selects an equal-value indicator as the only indicator for one of the Ecological, Stressor, or Social groups to evaluate the effect on RPI index scores. For example, selecting an equal-value indicator as the only Social indicator will nullify the effect of Social Index scores on the RPI Index since all watersheds will receive an equal Social Index score. There are equal-value “neutral variables” added to the ecological, stressor, and social indicator categories specifically for this purpose.

3.7. Reset Screening Button

The **RESET SCREENING** button on the **Setup** worksheet can be used to produce a “clean slate” version of the RPS Tool. Do not click the **RESET SCREENING** button unless you have saved the current screening setup and results under a separate filename or you are sure you do not want to store the current screening setup and results for future use.

Clicking the **RESET SCREENING** button will clear all watershed and indicator selections from the **Setup** worksheet and any screening results stored on other worksheets. The only worksheets not affected are the **Indicator Data** worksheets (e.g., **HUC12 Data**).

[illegible]

4. Notes Worksheet

The **Notes** worksheet provides users with a space to document information related to their screening run, including a screening run name, screening objectives, watershed scale screened, and notes on indicator selection and weighting.

Filling the **Notes** worksheet is optional, its contents are not used in any of the auto-calculation methods in the RPS Tool.

5		
6	Screening Run Name:	Tennessee Urban/Suburban Nutrient Screening
7		
8	Objectives:	Identify Tennessee HUC12s with significant urban/suburban sources of nutrients that are restoration priorities.
9		
10	Watershed Scale:	HUC12
11		
12	Indicator Selection Notes:	Focus is on indicators relevant to recovery from urban/suburban sources of nutrients.
13		
14		
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27		

< > ... INSTRUCTIONS **Notes** Setup Results Bubble_Plot Bubble_Plot_Options HUC8_Map

5. Results Worksheet

5.1. Overview

Basics

The **Results** worksheet displays a table of Ecological Index, Stressor Index, Social Index, and Recovery Potential Integrated (RPI) Index scores and ranks for each watershed selected for screening. Also displayed are values of the ecological, stressor, and social indicators selected for the screening. All base indicator values are also displayed to allow for sorting or filtering according to base indicator values.

Index scores and ranks are automatically calculated and added to the **Results** worksheet after clicking the **RUN SCREENING** button on the **Setup** worksheet. Watersheds are displayed in the same order as they are entered in the **Select Watersheds** section of the **Setup** worksheet.

Ecological Index, Stressor Index, and Social Index scores are calculated as the average of weight-adjusted, normalized indicator values. RPI scores are calculated from Ecological Index, Stressor Index, and Social Index scores. Index scores can be interpreted using the following guidelines:

- **Higher** Ecological Index scores correspond to **higher** recovery potential.
- **Lower** Stressor Index scores correspond to **higher** recovery potential.
- **Higher** Social Index scores correspond to **higher** recovery potential.
- **Higher** RPI Index scores correspond to **higher** recovery potential.

Watershed ID	Watershed Name	Ecological Index	Ecological Rank	Stressor Index	Stressor Rank	Social Index	Social Rank	RPI Score	RPI Rank
031501010101	Wadwaters Conasuaga River	53.98	78	2.10	93	19.38	743	57.09	177
031501010102	Jacks River	53.17	84	0.01	7	43.97	58	65.71	7
031501010103	Ball Play Creek-Conasauga River	50.06	160	3.13	156	39.44	125	62.13	42
031501010104	Old Fort Creek-Mill Creek	41.22	582	21.81	917	38.87	131	52.76	451
031501010105	Perry Creek-Conasuaga River	43.14	481	11.60	599	31.48	287	54.34	333
031501010106	Sugar Creek	45.38	362	13.53	671	21.59	652	51.15	598
031501010301	Coahulla Creek Headwaters	42.16	537	14.59	717	26.53	471	51.37	573
031501010302	Mills Creek	37.20	812	13.53	671	21.37	662	48.35	809
031501010303	Coahulla Creek	44.65	408	9.14	475	15.52	897	50.34	672
050500010102	Big Laurel Creek	51.47	118	4.44	235	7.50	1103	51.51	560
050500010103	Headwaters North Fork New River	46.73	292	4.08	212	14.83	928	52.49	471
050500010105	Big Horse Creek	49.44	173	6.26	311	7.73	1099	50.30	675
051100020101	Little Trace Creek-Line Creek	35.39	910	14.89	730	22.32	629	47.61	842
051100020102	Trace Creek-Line Creek	35.82	885	14.94	732	22.94	602	47.94	826
051100020105	Long Fork	39.16	705	25.14	979	15.63	891	43.22	1005
051100020106	Salt Lick Creek	40.38	631	15.10	737	19.82	729	48.37	806
051100020108	Puncheon Creek	36.82	833	15.30	747	18.29	789	46.60	901
051100020109	Sugar Creek-Barren River	41.01	597	15.37	750	2.98	1139	42.87	1020
051100020201	Upper Long Creek	36.27	863	16.23	787	16.23	875	45.42	942
051100020203	Pinchgut Creek-Barren River	40.81	606	13.25	656	22.58	620	50.05	696
051100020501	Headwaters Trans...	37.29	804	19.23	863	28.57	394	48.88	767

Advanced Tips

- The formula used to calculate each weight-adjusted normalized indicator value is:

$$Ind_{Norm} = Weight * \frac{(Ind - Ind_{Min})}{(Ind_{Max} - Ind_{Min})}$$

where Ind_{Norm} is the weight-adjusted normalized indicator value, $weight$ is the indicator weight, Ind is the raw indicator value, Ind_{Min} is the minimum indicator value for watersheds selected for screening, and Ind_{Max} maximum indicator value for watersheds selected for screening.

- RPI scores are calculated from Ecological Index, Stressor Index, and Social Index scores using the formula:

$$RPI = \frac{[Ecological\ Index + Social\ Index + (100 - Stressor\ Index)]}{3}$$

- Ecological Index, Social Index, and RPI Index ranks are determined by sorting index scores from highest to lowest (i.e., the watershed with the highest Ecological Index score receives a rank of 1).
- Stressor Index ranks are determined by sorting index scores from lowest to highest (i.e., the watershed with the lowest Stressor Index score receives a rank of 1). This ensures that the #1 rank for any index is consistently 'good'.

5.2. Sort and Filter

By default, the **Results** table displays indicator data and index scores for all watersheds included in the screening and sorted by watershed ID. Users can sort the **Results** table based on values in any column in the table (e.g., from highest to lowest Ecological Index score). Users can also filter the **Results** table to only display watersheds that meet certain criteria (e.g., watersheds within a particular ecoregion).

To sort the **Results** table, right-click on the name of the column that you would like to use for sorting. Scroll to **Sort** in the popup menu and select a sorting option.

% Riparian Zone (RZ) in Watershed	% Hydrologically Connected
67705639	
75266778	
56091445	
58351704	
63491534	
06067519	
03809443	
60551596	
23969159	
23682768	
60131782	
55719195	
61391447	
08013937	
43142814	

Cut
 Copy
 Paste Options:
 Paste Special...
 Insert...
 Delete...
 Clear Contents
 Quick Analysis
 Filter
Sort
 Insert Comment
 Format Cells...
 Pick From Drop-down List...
 Define Name...
 Hyperlink...

Sort A to Z
 Sort Z to A
 Put Selected Cell Color On Top
 Put Selected Font Color On Top
 Put Selected Cell Icon On Top
 Custom Sort...

EcoRegion (2010) Level 3, 1st Code (Largest Area)

Sort Smallest to Largest
 Sort Largest to Smallest
 Sort by Color
 Clear Filter From "EcoRegion (2010) ..."
 Filter by Color
 Number Filters

Search
☒ (Select All)
☒ 65
☒ 66
☒ 67
☒ 68
☒ 69
☒ 71
☒ 73
☒ 74

OK
 Cancel

To filter the **Results** table, click the drop-down arrow next to the column you would like to use to filter and select a filter option.

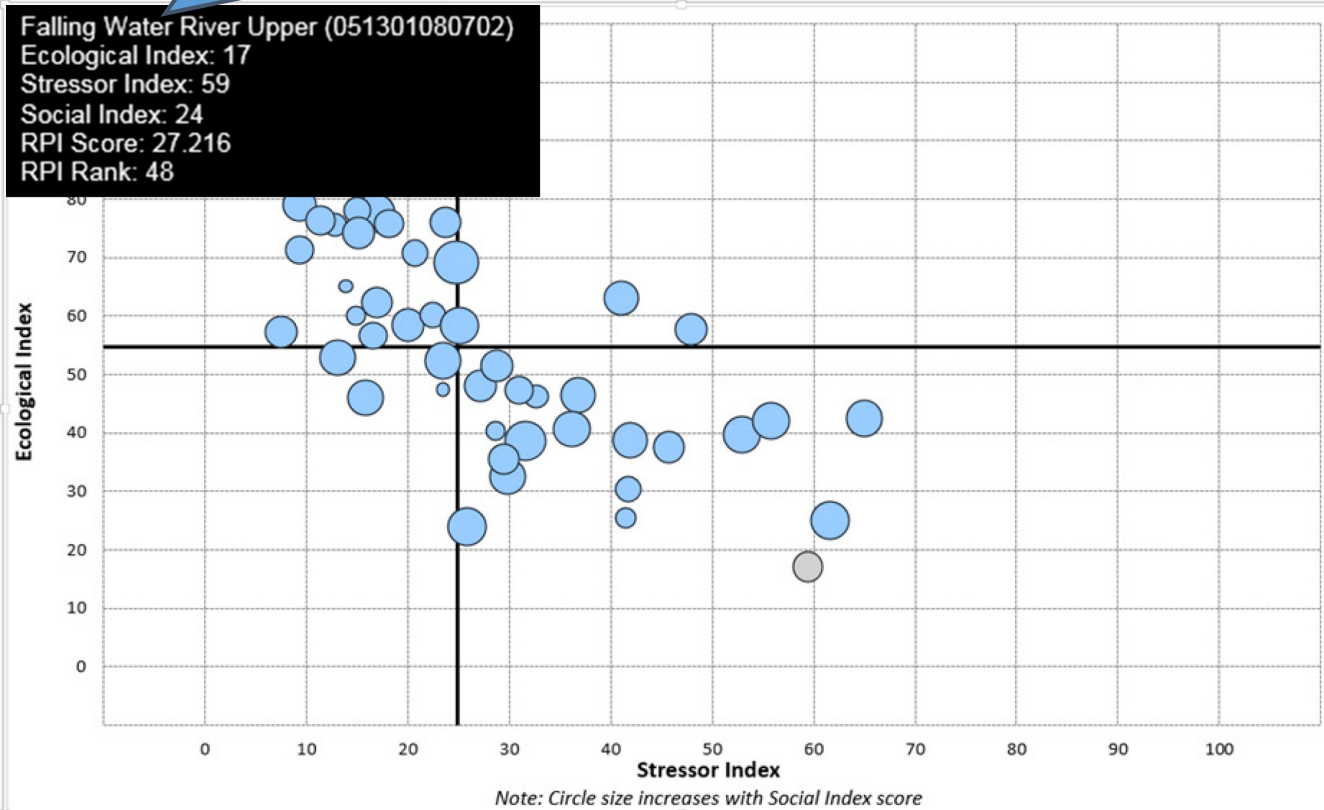
6. Bubble Plot Worksheet

The **Bubble Plot** worksheet contains a bubble plot that displays RPS results. The worksheet displays no bubbles until a screening has been successfully run.

The **Bubble Plot** is automatically created when the **RUN SCREENING** button is clicked on the **Setup** worksheet. It contains one “bubble” for each watershed selected for screening, with the Stressor Index score plotted on the horizontal (x) axis, Ecological Index score plotted on the vertical (y) axis, and Social Index plotted as the bubble size. Larger bubbles have higher Social Index scores relative to smaller bubbles. Secondary horizontal and vertical axes also appear at the median values of the Stressor Index and Ecological Index scores, respectively.

The bubble plot can be customized using controls on the **Bubble Plot Options** worksheet.

The bubble plot displays Ecological Index, Stressor Index, and Social Index scores for watersheds included in your screening. Hover over any bubble with your mouse cursor to view a popup information box with index scores and ranks for that watershed.



Navigation tabs: Setup | Results | **Bubble_Plot** | Bubble_Plot_Options | HUC12_Map | HUC8_Data | HUC12_Data

7. Bubble Plot Options Worksheet

7.1. Overview

The **Bubble Plot Options** worksheet provides users the ability to customize the **Bubble Plot** worksheet that displays screening results.

The screenshot displays the **Bubble Plot Options** worksheet interface, which is organized into several functional panels:

- REPOSITION AXES:** This panel allows users to reposition the axes. It includes a dropdown menu for "(a) User-Defined Percentiles" and input fields for "Enter a new Stressor Index percentile for the y-axis (0-100):" and "Enter a new Ecological Index percentile for the x-axis (0-100):". Buttons for "REPOSITION AXES" and "RESET AXES" are provided.
- ADD LABELS TO BUBBLES:** This panel enables labeling of bubbles. It features a dropdown for "Watershed Name" and a button "ADD ALL LABELS". A note states: "Note: To highlight the watershed, the box above must be checked BEFORE selecting from the drop-down list." There is also a checkbox for "Highlight Selected Watershed" and a button "REMOVE LABELS".
- EDIT BUBBLE SIZES:** This panel allows editing bubble sizes. It includes an input field for "Enter a bubble size (1 - 300):" and a button "RESIZE BUBBLES". A button "RESET BUBBLE SIZES" is also present.
- EDIT BUBBLE COLORS:** This panel allows editing bubble colors. It includes a dropdown for "Select the indicator that will determine bubble colors:", a dropdown for "Select a classification method:", a dropdown for "Select the number of classes:", and a dropdown for "Select a color scheme:". Buttons for "UPDATE BUBBLE COLORS" and "RESET BUBBLE COLORS" are provided.

At the bottom of the interface is a navigation bar with tabs for "Setup", "Results", "Bubble_Plot", "Bubble_Plot_Options" (highlighted with a red box), "HUC12_Map", "HUC8_Data", and "HUC12_Data".

The following sections provide step-by-step instructions for how to use the **Bubble Plot Options** worksheet to:

- **Reposition Plot Axes**
- **Toggle Between Plotting a Subset Only Screening or an All Watersheds Screening**
- **Add Labels to Bubbles**
- **Edit Bubble Sizes**
- **Edit Bubble Colors**
- **Save an Image File of the Bubble Plot**

7.2. Reposition Secondary Axes

The secondary (median) horizontal axis and vertical axis of the **Bubble Plot** can be set to any user-defined position.

By default, the horizontal axis is positioned at the median of Ecological Index scores for the active screening and the vertical axis is positioned at the median of Stressor Index scores.

Users have two options for repositioning **Bubble Plot** axes:

- Reposition to new index percentiles – Under this option, users can reposition axes to any desired percentile of Ecological Index and Stressor Index scores (25th percentile, 75th percentile, etc.);
- Reposition to specific index scores – Under this option, users can reposition axes to any desired Ecological and Stressor Index score (e.g., index scores of 50).

Reposition Axes Option 1 – Reposition to New Percentiles

To reposition axes to new percentiles, select the “User-Defined Percentiles” option from the drop-down menu in the **Reposition Axes** section of the **Bubble Plot Options** worksheet.

Then enter new a new Stressor Index percentile for the vertical axis and a new Ecological Index percentile for the horizontal axis in the designated cells.

REPOSITION AXES

By default, axes cross at the median of Ecological Index (horizontal axis) and Stressor Index (vertical axis) scores listed in the Summary_Scores sheet. Axes can be repositioned to:

(a) User-Defined Percentiles

This option will position axes to percentiles entered below.

Enter a new Stressor Index percentile for the y-axis (0-100):

Enter a new Ecological Index percentile for the x-axis (0-100):

REPOSITION AXES **RESET AXES**

Enter a new Stressor Index percentile for the y-axis (0-100):

75

Enter a new Ecological Index percentile for the x-axis (0-100):

75

Reposition Axes Option 2 – Reposition to Specific Index Scores

To reposition axes to specific index scores, select the “User-Defined Index Scores” option from the drop-down menu in the **Reposition Axes** section of the **Bubble Plot Options** worksheet.

Then enter new Stressor Index score for the vertical axis and a new Ecological Index score for the horizontal axis in the designated cells.

REPOSITION AXES

By default, axes cross at the median of Ecological Index (horizontal axis) and Stressor Index (vertical axis) scores listed in the Summary_Scores sheet. Axes can be repositioned to:

(b) User-Defined Index Scores

This option will position axes to Index Scores entered below.

Enter a new Stressor Index score for the y-axis (0-100):

Enter a new Ecological Index score for the x-axis (0-100):

REPOSITION AXES **RESET AXES**

Enter a new Stressor Index score for the y-axis (0-100):

40

Enter a new Ecological Index score for the x-axis (0-100):

60

After entering new index percentiles or scores, click the **REPOSITION AXES** button.

Axes on the **Bubble Plot** will be automatically moved to the new index percentiles or scores.

REPOSITION AXES

RESET AXES

To move **Bubble Plot** axes back to their default position, click the **RESET AXES** button.

7.3. Toggle Screening to Plot

By default, the **Bubble Plot** displays Ecological Index, Stressor Index, and Social Index scores listed in the **Summary Scores** worksheet. These scores are derived from indicators that are normalized to minimum and maximum values for the subset of watersheds included in the screening. Index scores are therefore relative rather than absolute, they depend on the subset of watersheds selected for screening. A given watershed will have two different sets of index scores for two screenings that include different groups of watersheds.

Users may be interested in how the subset of watersheds selected for screening compares to all other watersheds in the Project Area. For example, users may want to know whether ecological conditions in the screened subset are above- or below-average for the Project Area as a whole. Such questions can be answered by running the same screening on all watersheds in the Project Area and then reviewing the resulting index scores for the watershed subset of interest. To streamline this process, the RPS Tool allows users to view an alternate version of the bubble plot with index scores that result from a screening that includes all watersheds in the Project Area. This can be done on-the-fly in the **Select Screening to Plot** section of the **Bubble Plot Options** worksheet without adjusting settings on the **Setup** worksheet or creating a new file.

The **Select Screening to Plot** section contains option buttons to toggle between a “Subset Only” screening or an “All Watersheds” screening. A “Subset Only” screening includes only those watersheds selected for screening on the **Setup** worksheet. An “All Watersheds” screening includes all watersheds in the Project Area. Note that if you selected all watersheds in the Project Area on the **Setup** worksheet then there is no difference between the two options.

SELECT SCREENING TO PLOT

If your screening focuses on a subset of watersheds from the project area, you may want to know if Ecological and Stressor Index scores for your subset are generally above or below average for the project area. Clicking the "ALL WATERSHEDS SCREENING" option below will plot scores from a screening that includes all watersheds in the project area, with axes set to the median of all Ecological and Stressor Index scores. Clicking the "SUBSET ONLY SCREENING" option will return to the default option of plotting scores from the screening that only includes those watersheds selected on the Setup sheet.

☒ **SUBSET ONLY SCREENING**
☐ **ALL WATERSHEDS SCREENING**

By default, the **Bubble Plot** displays index scores resulting from “Subset Only” screening.

Click the **ALL WATERSHEDS SCREENING** option button to view index scores resulting from a screening that includes all watersheds in the Project Area. The **Bubble Plot** worksheet will automatically update with new index scores for the “All Watersheds” screening.

If you have viewed bubble plot for the “All Watersheds” screening and want to return to the “Subset Only” screening bubble plot, click the **SUBSET ONLY SCREENING** button. The **Bubble Plot** worksheet will automatically update with index scores for the “Subset Only” screening.

7.4. Label Bubbles

Bubbles in the **Bubble Plot** worksheet can be labeled to identify one or more watersheds. Bubbles can be labeled with the watershed name or the watershed ID. Users also have the option to highlight labeled bubbles to make them stand out from other unlabeled bubbles.

Basics

To label bubbles, first select a label option from the drop-down menu in the **Add Labels to Bubbles** section of the **Bubble Plot Options** worksheet.

Users can choose to have labels display watershed names or watershed IDs.

ADD LABELS TO BUBBLES

Select a watershed identifier for labeling:

Watershed Name

Click the button below to label all bubbles:

ADD ALL LABELS

Or, select watersheds individually from the list below (repeat to label multiple watersheds):

☐ Highlight Selected Watershed

Note: To highlight the watershed, the box above must be checked *BEFORE* selecting from the drop-down list.

Label locations can be changed by clicking on the label in the bubble plot and dragging to the desired location.

Click the button below to remove labels and highlighting:

REMOVE LABELS

Add Labels Option 1 – Label All Bubbles

If you would like to add labels to all bubbles on the **Bubble Plot** worksheet, click the **ADD ALL LABELS** button. Labeling all bubbles is generally not recommended if your screening includes more than 20 watersheds.

Click the button below to label all bubbles:

ADD ALL LABELS

Add Labels Option 2 – Label Bubbles Individually

To label individual bubbles in the **Bubble Plot**, select the watershed to label from the drop-down menu in the **Add Labels to Bubbles** section of the **Bubble Plot Options** worksheet. Watersheds names are displayed in the drop-down menu alphabetically from A to Z. Watershed IDs are displayed in ascending numerical order.

To highlight the labeled bubble, check the **Highlight Selected Watershed** box before selecting a watershed from the drop-down menu.

Or, select watersheds individually from the list below (repeat to label multiple watersheds):

Fall Creek

Falling Water River Headwaters

Falling Water River Lower

Falling Water River Middle

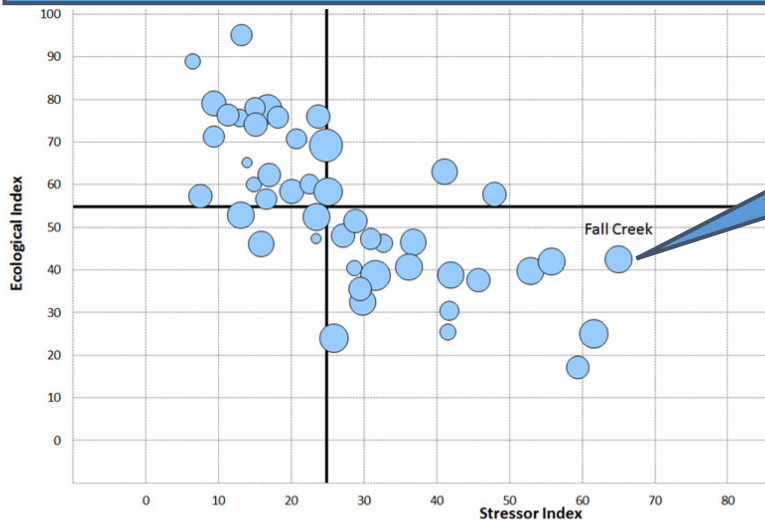
Falling Water River Upper

Glade Creek

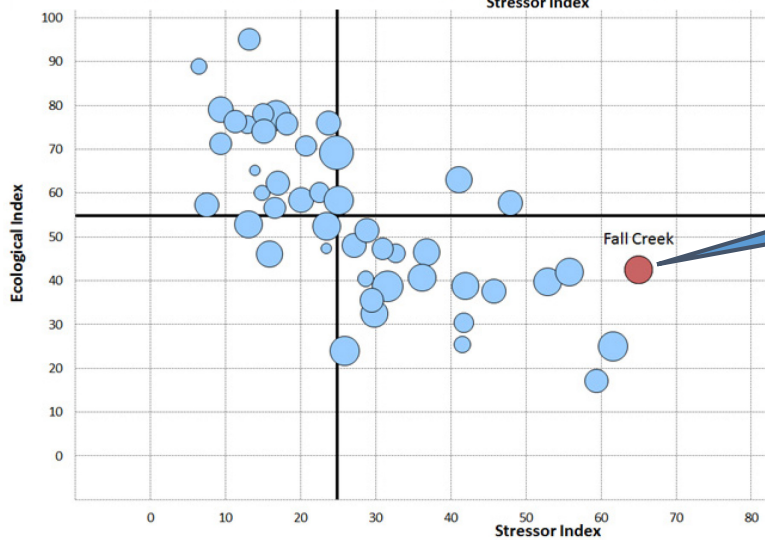
Hickman Creek

Indian Creek

☒ **Highlight Selected Watershed**



A label will be automatically added to the bubble for the selected watershed.



The labeled bubble will also be highlighted if the **Highlight Selected Watershed** box is checked when selecting the watershed from the drop-down menu.

To remove labels from the **Bubble Plot**, click the **REMOVE LABELS** button. This will also remove any highlighting from labeled bubbles.

REMOVE LABELS

Advanced Tips

- Label text, formatting, and position can be edited manually after labels are added.
- To edit label text, click on the label in the **Bubble Plot** worksheet and revise the text as desired
- To edit label formatting (font size, color, etc.) click on the label in the **Bubble Plot** worksheet and use Excel's font formatting menu.
- To edit the position of a label, click on the label in the **Bubble Plot** worksheet and drag it to the desired location.

7.5. Edit Bubble Sizes

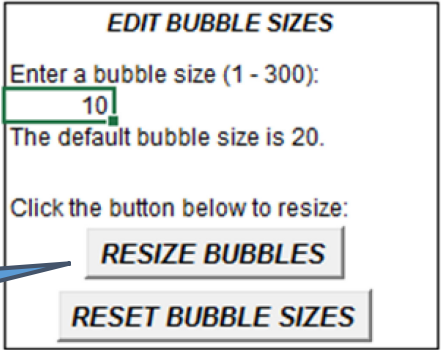
The size of each bubble in the **Bubble Plot** is based on the Social Index score for the corresponding watershed (i.e., bubbles for watersheds with higher Social Index scores are larger than bubbles for watersheds with lower Social Index scores).

While users cannot adjust the size of an individual bubble, they can collectively increase or decrease the size of all bubbles to improve the look of the **Bubble Plot**.

A common reason for editing bubble sizes is to reduce overlap between bubbles with similar Ecological Index and Stressor Index scores.

To adjust bubble sizes, enter a new size in the **Edit Bubble Sizes** section of the **Bubble Plot Options** worksheet.

Bubble sizes can range from 1 (small) to 300 (large). The default bubble size is 20.



EDIT BUBBLE SIZES

Enter a bubble size (1 - 300):

10

The default bubble size is 20.

Click the button below to resize:

RESIZE BUBBLES

RESET BUBBLE SIZES

Click the **RESIZE BUBBLES** button to apply the new bubble size. The Bubble Plot worksheet will automatically be updated with the new bubble sizes.

To return to the default size, click the **RESET BUBBLE SIZES** button.

7.6. Edit Bubble Colors

The **Bubble Plot** worksheet displays three pieces of information for each watershed included in your screening: the Ecological Index score on the y-axis, Stressor Index score on the x-axis, and Social Index score using the bubble size. The **Bubble Plot** worksheet can also display a fourth piece of information by shading bubbles different colors to reflect different values of an indicator. This feature is implemented in the **Edit Bubble Colors** section of the **Bubble Plot Options** worksheet.

To display indicator values using bubble colors, users must select the number of **Classes** to display, a method for defining **Class Breaks**, and a **Color Scheme**. These terms are defined below.

- **Classes** – The number of groups or bins to separate watersheds into. Up to 10 classes can be selected.
- **Class Breaks** – The cutoff indicator values used to define class membership. Three options are available for defining class breaks:
 - *Quantile Breaks* result in classes that have an equal number of watersheds. For example, if four classes are selected then then quantile breaks option would result in each class containing one-quarter of the total number of watersheds using the 25th percentile, 50th percentile, and 75th percentile of indicator values as class breaks.
 - *Equal-Interval Breaks* result in classes that cover an equal range of indicator values. For example, if four classes are selected for an indicator with a minimum value of 0% and a maximum value of 100%, then the equal-interval breaks option would result in each class spanning 25 percentage points use values of 25%, 50%, and 75% as class breaks. Under the equal-interval option, the definition of breaks is independent of the number of watersheds within each class. Depending on the distribution of indicator values, some classes may contain zero watersheds.
 - *User-Defined Breaks* are supplied by the user.
- **Color Scheme** – The primary color(s) used to shade bubbles. Options are blue, green, or blue-green.

To display values of an indicator on the **Bubble Plot** worksheet using bubble colors, first select which indicator you would like to plot from the indicator drop-down menu in the **Edit Bubble Colors** section of the **Bubble Plot Options** worksheet.

Any indicator can be selected for plotting, regardless of whether it was included in your screening or not.

Index scores such as the Recovery Potential Integrated (RPI) Index can also be selected.

EDIT BUBBLE COLORS

Select the indicator that will determine bubble colors:

Select a classification method:

Select the number of classes:

Select a color scheme:

Click the button below to update bubble colors:

UPDATE BUBBLE COLORS

Legend
 % Natural Cover, N-index1 (2006) in Watershed

Click the button below to reset bubble colors:

RESET BUBBLE COLORS

Select a classification method:

Quantile Breaks

Quantile Breaks
Equal-Interval Breaks
User-Defined Breaks

After selecting an indicator, choose a method for defining class breaks (Quantile, Equal-Interval, or User-Defined) from the classification method drop-down menu.

Select the number of classes:

4

3
4
5
6
7
8
9
10

Next, choose the number of classes to use for plotting (between 2 and 10).

If the Quantile or Equal-Interval options are selected for defining class breaks, then break values will be automatically calculated.

If the User-Defined option is selected, a pop-up form will display for you to enter class breaks.

In the class break form, the lower bound of the first class will automatically be set to the minimum value of the selected indicator. The upper bound of the last class will be set to the indicator's maximum value.

Enter break values for each class in the "Upper Bound" column. The lower bound of the next class will be calculated automatically by adding 0.01 to the upper bound you entered for the preceding class.

When all breaks have been entered, click the **OK** button.

Define Class Breaks...

Enter the upper bound for each class below.

Click OK when finished.

	Lower Bound		Upper Bound
Class 1:	26.43	to	40
Class 2:	40.01	to	60
Class 3:	60.01	to	80
Class 4:	80.01	to	93.42
Class 5:		to	
Class 6:		to	
Class 7:		to	
Class 8:		to	
Class 9:		to	
Class 10:		to	

OK

Cancel

Select a color scheme:

Blue-Green

Blue
Green
Blue-Green

Finally, select a color scheme to use for shading bubbles. Options are blue, green, or blue-green.

EDIT BUBBLE COLORS

Select the indicator that will determine bubble colors:

% Natural Cover, N-index1 (2006) in Watershed

Select a classification method: User-Defined Breaks

Select the number of classes: 4

Select a color scheme: Blue-Green

Click the button below to update bubble colors:

UPDATE BUBBLE COLORS

Legend

% Natural Cover, N-index1 (2006) in Watershed

	26.80 - 40
	40.01 - 60
	60.01 - 80
	80.01 - 94.07

After you have selected the indicator to plot, the method for defining class breaks, the number of classes, and the color scheme, a legend will display in the **Edit Bubble Colors** section that illustrates your selections.

Click the **UPDATE BUBBLE COLORS** button to apply the selected settings to the *Bubble Plot* worksheet.

After clicking the **UPDATE BUBBLE COLORS** button the *Bubble Plot* worksheet will automatically update to shade bubbles according to the selected indicator. Users can adjust bubble color settings at any time by revising selections in the **Edit Bubble Colors** section of the *Bubble Plot Options* sheet and clicking the **UPDATE BUBBLE COLORS** button.

Note: Circle size increases with Social Index score

To return to the default bubble plot (all bubbles shaded the same color), click the **RESET BUBBLE COLORS** button.

RESET BUBBLE COLORS

7.7. Save As Image File

A copy of the **Bubble Plot** worksheet can be saved as an image file for use in reports or presentations.

SAVE AS IMAGE FILE

Click the button below to save the bubble plot as an image (.jpg) file:

SAVE BUBBLE PLOT

The **Bubble Plot** can be saved as an image file from the **Save As Image File** section of the **Bubble Plot Options** worksheet.

First, click the **SAVE BUBBLE PLOT** button.

You will then be prompted to enter a filename for the image file.

Type a filename into the space provided and click **OK**.

Chart Export

Please enter a filename.
The plot will be saved in the current directory as filename.jpg

Test

OK Cancel

Microsoft Excel

File saved in current directory as Test.jpg
A record of the Setup and Notes worksheets have also been saved.

OK

A message box will notify you that the image file saved in JPEG format using the filename you provided.

The file will be saved in the same directory that the RPS Tool file is saved in.

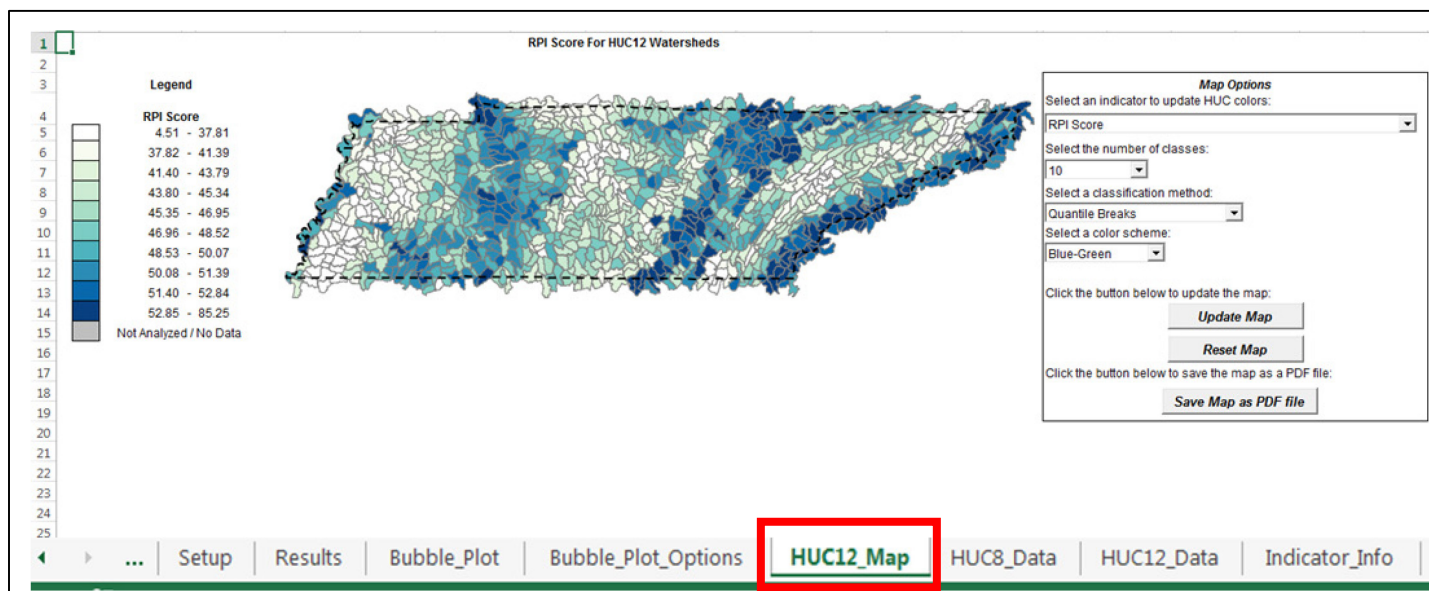
Two PDF files storing the contents of the **Setup** sheet and **Notes** sheet are also saved to provide a record of the screening settings used to produce the **Bubble Plot** image file.

8. Map Worksheet

8.1. Overview

The **Map** worksheet that displays screening results in map form. The **Map** worksheet is automatically created when the **RUN SCREENING** button is clicked on the **Setup** worksheet. By default, the **Map** worksheet displays Recovery Potential Integrated (RPI) index scores.

The name of the **Map** worksheet displayed in the bottom tab of your RPS Tool will reflect the scale of watersheds selected for screening. For example, if you screened HUC12 subwatersheds then the **Map** worksheet will be named **HUC12_Map**. Most RPS tools have a map worksheet for HUC12 subwatersheds and, if the tool is also setup to screen HUC8 watersheds, a map HUC8s. RPS Tools that are setup to screen other watershed scales may not have a map for those additional watershed scales.



The following sections describe how to:

- **Create a Custom Map**
- **Save the Map as a PDF File**

8.2. Create Custom Map

Users can customize the **Map** worksheet to shade watersheds on the map using any indicator or index. To customize the **Map** worksheet, users must select the number of **Classes** to display, a method for defining **Class Breaks**, and a **Color Scheme**. These terms are defined below.

- **Classes** – The number of groups or bins to separate watersheds into. Up to 10 classes can be selected.
- **Class Breaks** – The cutoff indicator values used to define class membership. Three options are available for defining class breaks:
 - *Quantile Breaks* result in classes that have an equal number of watersheds. For example, if four classes are selected then the quantile breaks option would result in each class containing one-quarter of the total number of watersheds using the 25th percentile, 50th percentile, and 75th percentile of indicator values as class breaks.
 - *Equal-Interval Breaks* result in classes that cover an equal range of indicator values. For example, if four classes are selected for an indicator with a minimum value of 0% and a maximum value of 100%, then the equal-interval breaks option would result in each class spanning 25 percentage points using values of 25%, 50%, and 75% as class breaks. Under the equal-interval option, the definition of breaks is independent of the number of watersheds within each class. Depending on the distribution of indicator values, some classes may contain zero watersheds.
 - *User-Defined Breaks* are supplied by the user.
- **Color Scheme** – The primary color(s) used to shade watersheds on the map. Options are blue, green, or blue-green.

Map Options

Select an indicator to update HUC colors:

% Natural Cover, N-index1 (2006) in Watershed

Select the number of classes:

1

Select a classification method:

Equal-Interval Breaks

Select a color scheme:

Blue

Click the button below to update the map:

Update Map

Reset Map

Click the button below to save the map as a PDF file:

Save Map as PDF file

To map an indicator, first select which indicator you would like to plot from the indicator drop-down menu in the **Map Options** section of the **Map** worksheet.

Any indicator can be selected for mapping, regardless of whether it was included in your screening or not.

Index scores such as the Recovery Potential Integrated (RPI) Index can also be selected.

Select the number of classes: 4

Then select the number of classes to use for mapping (between 2 and 10).

Select a classification method: Quantile Breaks

Next, select a method for defining class breaks (Quantile, Equal-Interval, or User-Defined).

If the Quantile or Equal-Interval options are selected for defining class breaks, then break values will be calculated automatically.

If the User-Defined option is selected, a popup form will display for entering class breaks.

In the class break form, the lower bound of the first class will automatically be set to the minimum value of the selected indicator. The upper bound of the last class will be set to the indicator's maximum value.

Enter break values for each class in the "Upper Bound" column. The lower bound of the next class will be calculated automatically by adding 0.01 to the upper bound you entered for the preceding class.

When all breaks have been entered, click the **OK** button.

	Lower Bound		Upper Bound
Class 1:	2.41	to	25
Class 2:	25.01	to	50
Class 3:	50.01	to	75
Class 4:		to	100
Class 5:		to	
Class 6:		to	
Class 7:		to	
Class 8:		to	
Class 9:		to	
Class 10:		to	

Select a color scheme: Blue-Green

Finally, select a color scheme to use for shading watersheds in the map. Options are blue, green, or blue-green.

Map Options

Select an indicator to update HUC colors:

Select the number of classes:

Select a classification method:

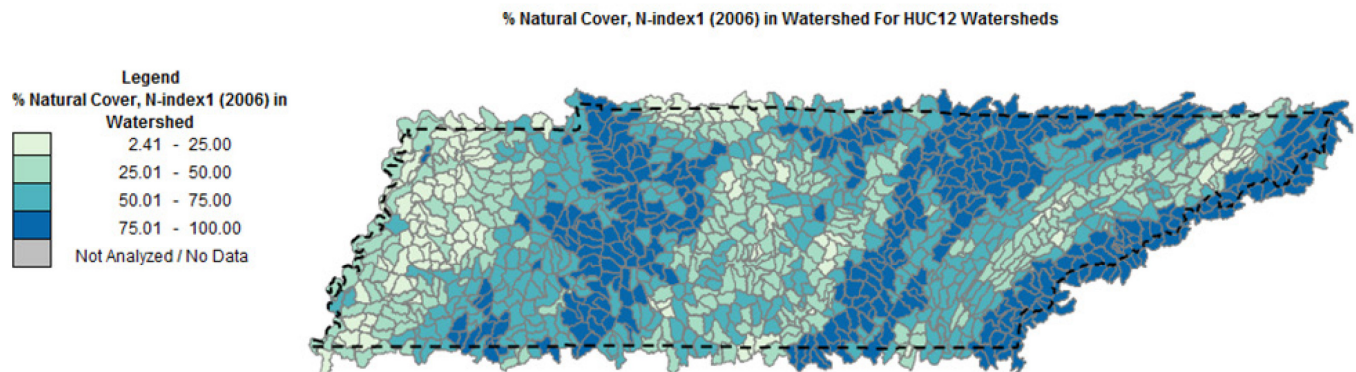
Select a color scheme:

Click the button below to update the map:

Click the button below to save the map as a PDF file:

After you have selected the indicator to map, the number of classes, the method for defining class breaks, and the color scheme click the **UPDATE MAP** button to apply the selected settings to the watershed map.

The **Map** worksheet will automatically update to shade watersheds according to the selected indicator or index. Users can adjust map settings at any time by revising selections in the **Map Options** section of the **Map** worksheet and clicking the **UPDATE MAP** button.

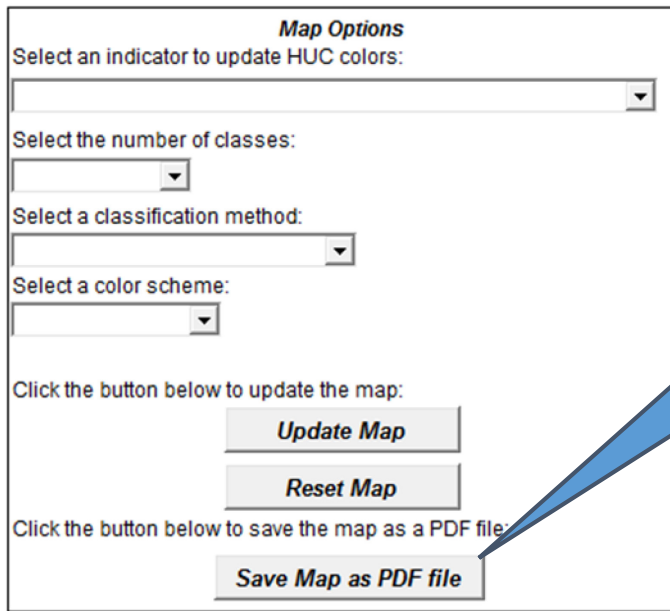


To return to the default map (displaying Recovery Potential Integrated Index scores), click the **RESET MAP** button.

Reset Map

8.3. Save Map as PDF File

The watershed map on the **Map** worksheet can be saved as a PDF file for use in reports or presentations.



Map Options

Select an indicator to update HUC colors:

Select the number of classes:

Select a classification method:

Select a color scheme:

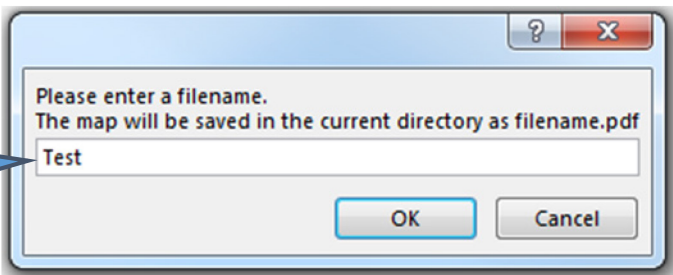
Click the button below to update the map:

Click the button below to save the map as a PDF file:

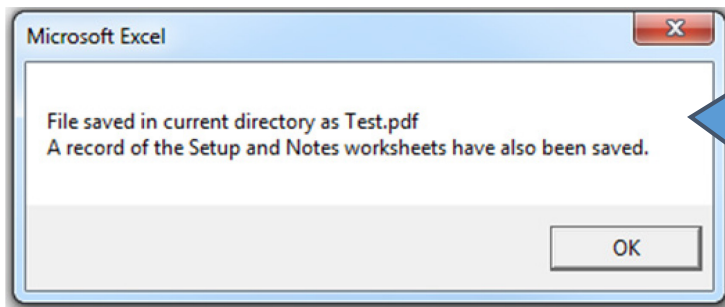
The watershed map can be saved as a PDF by clicking the **SAVE MAP AS PDF FILE** button from the **Map Options** section of the **Map** worksheet.

You will then be prompted to enter a filename for the PDF file.

Type a filename into the space provided and click **OK**.



Please enter a filename.
 The map will be saved in the current directory as filename.pdf



Microsoft Excel

File saved in current directory as Test.pdf
 A record of the Setup and Notes worksheets have also been saved.

A message box will notify you that the PDF file saved using the filename you provided.

The file will be saved in the same directory that the RPS Tool file is saved in.

Two PDF files storing the contents of the **Setup** sheet and **Notes** sheet are also saved to provide a record of the screening settings used to produce the watershed map.

9. Indicator Data Worksheet(s)

The **Indicator Data** worksheet contains a table of indicator values for all watersheds in the Project Area covered by your RPS Tool file.

Indicators are grouped by category in the **Indicator Data** worksheet and are ordered from left-to-right as Base, Ecological, Stressor, and Social indicators. Indicator categories are displayed in row 6. Indicator names are displayed in row 7.

The name of the **Indicator Data** worksheet displayed in the bottom tab of your RPS Tool will reflect the watershed scale of the indicator data it stores. For example, the **Indicator Data** worksheet for HUC12 subwatersheds is named **HUC12_Data**. If your tool file includes multiple watershed scales (e.g., both HUC8 and HUC12) then it will contain multiple **Indicator Data** worksheets, one for each scale (e.g., **HUC8_Data** and **HUC12_Data**).

6 BASE INDICATORS				
7	Hydrologic Unit Code 12-Digit (HUC12)	Name HUC12 Watershed	Area Of Watershed (HUC12) In Square Meters (Grid)	% Riparian Zone (RZ) in Watershed
8	031501010101	Headwaters Conasuaga River	95344200.0000	23.6771
9	031501010102	Jacks River	127184400.0000	21.7527
10	031501010103	Ball Play Creek-Conasauga River	77161500.0000	26.5609
11	031501010104	Old Fort Creek-Milli Creek	63687600.0000	22.5835
12	031501010105	Perry Creek-Conasauga River	54007200.0000	25.6349
13	031501010106	Sugar Creek	52865100.0000	24.0607
14	031501010301	Coahulla Creek Headwaters	117395100.0000	29.0381
15	031501010302	Mills Creek	34851600.0000	23.6055
16	031501010303	Coahulla Creek	67117500.0000	23.2397
17	050500010102	Big Laurel Creek	75533400.0000	24.2368
18	050500010103	Headwaters North Fork New River	107905500.0000	19.6013
19	050500010105	Big Horse Creek	91665000.0000	21.5572
20	051100020101	Little Trace Creek-Line Creek	102894300.0000	19.6139
21	051100020102	Trace Creek-Line Creek	75423600.0000	21.0801
22	051100020105	Long Fork	162519300.0000	22.4314
23	051100020106	Salt Lick Creek	144657000.0000	24.2095
24	051100020108	Puncheon Creek	75887100.0000	18.4098
25	051100020109	Sugar Creek-Barren River	93788100.0000	22.1411
26	051100020201	Upper Long Creek	134667000.0000	17.9656
27	051100020203	Pinchgut Creek-Barren River	75322800.0000	21.8456
28	051100020501	Headwaters Trammel Creek	66985200.0000	20.3203
29	051100020502	Rough Creek-Trammel Creek	62374500.0000	18.6740
30	051100020503	Little Trammel Creek	70362900.0000	19.4088
31	051100020601	West Fork Drakes Creek Headwaters	138340800.0000	19.1800
32	051100020602	Sharps Branch-West Fork Drakes Creek	136977300.0000	14.3689
33	051100020604	Dutch Creek-Middle Fork Drakes Creek	148890600.0000	17.9993
34	051100020605	Sulphur Fork Creek	115533000.0000	16.3613
35	051301010201	Little Yellow Creek-Yellow Creek	145533000.0000	17.8163
<div> Results Bubble_Plot Bubble_Plot_Options HUC12_Map HUC8_Data HUC12_Data Indicator_Info HUC_Subsets </div>				

10. Indicator Info Worksheet

10.1. Overview

The **Indicator Info** worksheet contains a table of indicator information, including the category of each indicator (Base, Ecological, Stressor, or Social), the watershed scale(s) that each indicator is quantified at, and a description of what watershed characteristic the indicator measures.

Indicator Name	Indicator Type	Indicator Scale(s)	Description
Hydrologic Unit Code 8-Digit (HUC8)	Base	HUC8 & HUC12	HUC8 Code (TEXT)
Hydrologic Unit Code 12-Digit (HUC12)	Base	HUC12	HUC12 Code (TEXT)
Name HUC12 Watershed	Base	HUC12	Name of primary stream draining area or description of area bounded by HUC12 polygon. (TEXT)
Name HUC8 Watershed	Base	HUC8 & HUC12	Name of primary stream draining area or description of area bounded by HUC8 polygon. (TEXT)
Area Of Watershed (HUC8) In Acres	Base	HUC8	Total area of the HUC8 watershed. Units Acres.
Area Of Watershed (HUC12) In Square Meters (Grid)	Base	HUC12	Total area of the HUC12 watershed. Value calculated from 30 meter grid of HUC12s. Units Square Meters.
% Riparian Zone (RZ) in Watershed	Base	HUC12	% of HUC12 that is in the Riparian Zone. The Riparian Zone includes the 100-meter buffer on both sides of: (1) water features in the medium-resolution National Hydrography Dataset (NHD); and (2) areas classified as water in the National Land Cover Database (NLCD) 2006 land cover dataset.
% Hydrologically Connected Zone (HCZ) in Watershed	Base	HUC12	% of HUC12 that is in the Hydrologically Connected Zone. The HCZ consists of areas estimated to have high runoff potential based on a topographic wetness index that are contiguous with water.
% Water in Watershed	Base	HUC12	% of HUC12 that is water (NHD CatSeed + 2006 National Land Cover Dataset; 11, 90, 95)
% Land in Watershed	Base	HUC12	% of HUC12 that is land (100 - % Water)
Watershed NHDPlus2 Streamlength	Base	HUC12	Length of NHD stream features in HUC12 (kilometers). Calculated from the "NHDPlus2 NHD Snapshot" dataset. Includes all NHDFlowline features with FTYPE (feature type) equal to StreamRiver, CanalDitch, or Connector. NHDFlowline features with FTYPE equal to ArtificialPath are only included if they pass through a NHDArea feature with FTYPE equal to StreamRiver.
Watershed NHDPlus2 Waterbody Area	Base	HUC12	Area of NHD waterbody features in HUC12 (square kilometers). Calculated from the "NHDPlus2 NHD Snapshot" dataset.
EPA Region	Base	HUC12	EPA Region Codes for all regions containing HUC12. (Comma delimited, TEXT)
Instate Area Of Watershed (HUC8) In Acres	Base	HUC8	Instate area of the HUC8 watershed. Units Acres.
All States in HUC8 (WBD)	Base	HUC8	2-letter state abbreviations for states intersecting HUC8 polygon, ordered alphabetically and comma-separated. From "STATES" field of NHDPlus Version 2 Watershed Boundary Dataset snapshot.
Border HUC	Base	HUC8	Flag indicating whether the HUC boundary intersects the TN border.
All States in HUC12 2014	Base	HUC12	2-letter state abbreviations for states containing at least 1% of HUC12 instate area, ordered alphabetically and comma-separated. Analysis based on NHDPlus2 WBD snapshot HUC12 dataset and 2013 state boundaries dataset from http://www2.census.gov/geo/

Bubble_Plot | Bubble_Plot_Options | HUC12_Map | HUC8_Data | HUC12_Data | **Indicator_Info** | HUC_Subsets | Add_Indicators

The following sections describe how to:

- Filter the Indicator Info Table
- Add Indicator Info

10.2. Filter Table

The indicator information table can be filtered to view information for a specific indicator type (Base, Ecological, Stressor, or Social) or for a specific watershed scale by clicking the drop-down arrow next to the column name and selecting a filter option.

In the example below, the table is filtered to only display information for Ecological indicators.

The top table shows the following indicators:

Indicator Name	Indicator Type	Indicator Scale(s)
Hydrologic Unit Code 8-Digit (HUC8)		HUC8 & HUC12
Hydrologic Unit Code 12-Digit (HUC12)		HUC12
Name HUC12 Watershed		HUC12
Name HUC8 Watershed		HUC8 & HUC12
Area Of Watershed (HUC8) In Acres		HUC8
Area Of Watershed (HUC12) In Square Meters		HUC12
% Riparian Zone (RZ) in Watershed		HUC12
% Hydrologically Connected Zone (HCZ) in W		HUC12
% Water in Watershed		HUC12
% Land in Watershed		HUC12
Watershed NHDPlus2 Streamlength		HUC12
Watershed NHDPlus2 Waterbody Area		HUC12
EPA Region		HUC12
Instate Area Of Watershed (HUC8) In Acres		HUC8
All States in HUC8 (WBD)		HUC8
Border HUC		HUC8

The filter menu shows the following options:

- (Select All)
- ☐ Base
- ☒ Ecological
- ☐ Social
- ☐ Stressor

The bottom table shows the filtered results (Ecological indicators):

Indicator Name	Indicator Type	Indicator Scale(s)
% Deciduous Forest (2006) in Watershed	Ecological	HUC12
% Evergreen Forest (2006) in Watershed	Ecological	HUC12
% Mixed Forest (2006) in Watershed	Ecological	HUC12
% Forest (2006) in Watershed	Ecological	HUC12
% Forest (2006) in HCZ	Ecological	HUC12
% Forest (2006) in Riparian Zone	Ecological	HUC12
% Shrub/Scrub (2006) in Watershed	Ecological	HUC12
% Shrub/Scrub (2006) in HCZ	Ecological	HUC12
% Shrub/Scrub (2006) in Riparian Zone	Ecological	HUC12
% Woody Vegetation (2006) in Watershed	Ecological	HUC12

10.3. Add Indicator Info

The **Indicator Info** worksheet can be updated by users to store information for new indicators added to the **Indicator Data** worksheet(s).

To add indicator information for a new indicator, first insert a row for the new indicator.

Right-click the margin of the **Indicator Info** worksheet (where row numbers are displayed) where you would like to insert the new row.

For example, if you would like to add information for a new Base indicator, right-click the margin of the first Ecological indicator row.

6	Indicator Name	Indicator Type
30	Tribal Lands in HUC12 Flag	Base
31	% Tribal Lands in HUC12	Base
32	HUC12 Adjacent to Tribal HUC12s	Base
33	% Deciduous Forest (2006) in Watershed	Ecological
34	% Evergreen Forest (2006) in Watershed	Ecological
35	% Mixed Forest (2006) in Watershed	Ecological
36	% Forest (2006) in Watershed	Ecological
37	% Forest (2006) in H CZ	Ecological

33	% Deciduous Forest (2006) in Watershed
34	% Evergreen Forest (2006) in Watershed
35	% Mixed Forest (2006) in Watershed
36	% Forest (2006) in Watershed
37	% Forest (2006) in H CZ
38	% Forest (2006) in Riparian Zone
39	% Forest (2006) in Watershed
40	% Forest (2006) in H CZ
41	% Forest (2006) in Riparian Zone
42	% Forest (2006) in Watershed
43	% Forest (2006) in H CZ
44	% Forest (2006) in Riparian Zone
45	% Forest (2006) in Watershed
46	% Forest (2006) in H CZ
47	% Forest (2006) in Riparian Zone
48	% Forest (2006) in Watershed
49	% Forest (2006) in H CZ
50	% Forest (2006) in Riparian Zone
51	% Forest (2006) in Watershed
52	% Forest (2006) in H CZ
53	% Forest (2006) in Riparian Zone
54	% Forest (2006) in Watershed
55	% Forest (2006) in H CZ
56	% Forest (2006) in Riparian Zone
57	% Forest (2006) in Watershed
58	% Forest (2006) in H CZ
59	% Forest (2006) in Riparian Zone
60	% Forest (2006) in Watershed
61	% Forest (2006) in H CZ
62	% Forest (2006) in Riparian Zone
63	% Forest (2006) in Watershed
64	% Forest (2006) in H CZ
65	% Forest (2006) in Riparian Zone
66	% Forest (2006) in Watershed
67	% Forest (2006) in H CZ
68	% Forest (2006) in Riparian Zone
69	% Forest (2006) in Watershed
70	% Forest (2006) in H CZ
71	% Forest (2006) in Riparian Zone
72	% Forest (2006) in Watershed
73	% Forest (2006) in H CZ
74	% Forest (2006) in Riparian Zone
75	% Forest (2006) in Watershed
76	% Forest (2006) in H CZ
77	% Forest (2006) in Riparian Zone
78	% Forest (2006) in Watershed
79	% Forest (2006) in H CZ
80	% Forest (2006) in Riparian Zone
81	% Forest (2006) in Watershed
82	% Forest (2006) in H CZ
83	% Forest (2006) in Riparian Zone
84	% Forest (2006) in Watershed
85	% Forest (2006) in H CZ
86	% Forest (2006) in Riparian Zone
87	% Forest (2006) in Watershed
88	% Forest (2006) in H CZ
89	% Forest (2006) in Riparian Zone
90	% Forest (2006) in Watershed
91	% Forest (2006) in H CZ
92	% Forest (2006) in Riparian Zone
93	% Forest (2006) in Watershed
94	% Forest (2006) in H CZ
95	% Forest (2006) in Riparian Zone
96	% Forest (2006) in Watershed
97	% Forest (2006) in H CZ
98	% Forest (2006) in Riparian Zone
99	% Forest (2006) in Watershed
100	% Forest (2006) in H CZ

After right-clicking, select “Insert” from the Excel popup menu.

A new row will be inserted into the indicator information table.

Type the name of the new indicator in the Indicator Name column.

Indicator Name	Indicator Type
HUC12 Adjacent to Tribal HUC12s	Base
New Base Indicator	
% Deciduous Forest (2006) in Watershed	Ecological
% Evergreen Forest (2006) in Watershed	Ecological
% Mixed Forest (2006) in Watershed	Ecological

Type the category of the new indicator (Base, Ecological, Stressor, or Social) in the Indicator Type column.

6	Indicator Name	Indicator Type
32	HUC12 Adjacent to Tribal HUC12s	Base
33	New Base Indicator	Base
34	% Deciduous Forest (2006) in Watershed	Ecological
35	% Evergreen Forest (2006) in Watershed	Ecological
36	% Mixed Forest (2006) in Watershed	Ecological

Type the watershed scale of the new indicator in the Indicator Scale(s) column. For example, if the indicator is calculated for HUC12s in the Project Area then type "HUC12".

6	Indicator Name	Indicator Type	Indicator Scale(s)
32	HUC12 Adjacent to Tribal HUC12s	Base	HUC12
33	New Base Indicator	Base	HUC12
34	% Deciduous Forest (2006) in Watershed	Ecological	HUC12
35	% Evergreen Forest (2006) in Watershed	Ecological	HUC12

Type a description of the new indicator in the Indicator Description column.

6	Indicator Name	Indicator Type	Indicator Scale(s)	Description
32	HUC12 Adjacent to Tribal HUC12s	Base	HUC12	Reservation Trust Lands, and Census O
33	New Base Indicator	Base	HUC12	Example new Base indicator.
34	% Deciduous Forest (2006) in Watershed	Ecological	HUC12	% of HUC12 with deciduous forest cover
35	% Evergreen Forest (2006) in Watershed	Ecological	HUC12	% of HUC12 with evergreen forest cover

Repeat these steps for each new indicator added to the *Indicator Data* worksheet.

11.2. Enter New Indicator Information

In the **Enter Indicator Information** section of the **Add Indicators** worksheet, you will enter the name and type of each new indicator. This is used to update the indicator menus on the **Setup**, **Bubble Plot Options**, and **Map** worksheets.

Enter New Indicator Information Option 1 – Type New Indicator Names and Types

In the **Enter Indicator Information** section, select cell A11 and type the name of the first new indicator.

Then enter the new indicator type in cell B11. Indicator type must be Ecological, Stressor, Social, or Base.

Repeat until each new indicator name and type has been added.

Enter New Indicator Information Option 2 – Copy and Paste New Indicator Names and Types

To use this option you must already have a pre-existing list of new indicator names and types stored in a separate worksheet. The pre-existing indicator list must be formatted with one indicator per row with the indicator name in the first column and indicator type in the second column.

Open the worksheet with the pre-existing indicator list. Select the indicator names and types and click “Copy” on the Excel menu.

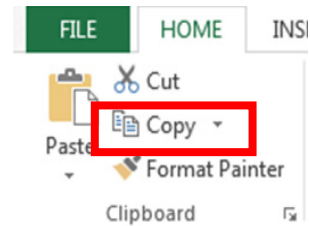
Go back to the **Add Indicators** worksheet and set the cursor to cell A11 in the **Enter Indicator Information** section.

Select “Paste Values” from the Excel menu to paste the new indicator names and types into the **Enter Indicators Information** section.

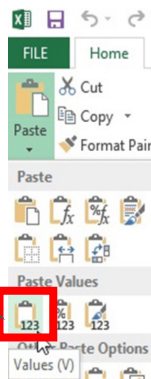
	A	B
8	Enter Indicator Information	
9	Enter new indicator names and types below.	
10	Indicator Name	Indicator Type
11	Index of Biotic Integrity Score	Ecological
12		
13		
14		
15		

	A	B
8	Enter Indicator Information	
9	Enter new indicator names and types below.	
10	Indicator Name	Indicator Type
11	Index of Biotic Integrity Score	Ecological
12	Number of CAFOs in WS	Stressor
13	% MS4 Area	Social
14		
15		

Index of Biotic Integrity Score	Ecological
Number of CAFOs in WS	Stressor
% MS4 Area	Social



	A	B
8	Enter Indicator Information	
9	Enter new indicator names and types below.	
10	Indicator Name	Indicator Type
11		
12		
13		
14		
15		



	A	B
8	Enter Indicator Information	
9	Enter new indicator names and types below.	
10	Indicator Name	Indicator Type
11	Index of Biotic Integrity Score	Ecological
12	Number of CAFOs in WS	Stressor
13	% MS4 Area	Social
14		
15		

11.3. Enter New Indicator Data

In the **Enter Indicator Data** section of the **Add Indicators** worksheet, you will copy and paste a table of new indicator values for watersheds in the Study Area. These values are used to update the indicator data table in the **Indicator Data** worksheet.

To add new indicators, you must first prepare a table of new indicator values in a separate spreadsheet file. An example indicator table is displayed below. Note the following characteristics of the table:

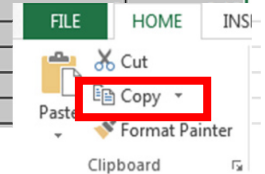
1. The table must have watershed IDs entered in the first column. Your table does not need to have a row for every watershed in the study area. Any watersheds that are missing from your table will have blank cells for the new indicators when added to the **Indicator Data** worksheet. Your table can include extra watersheds that are not in the study area; however, those watersheds will be skipped when updating the **Indicator Data** worksheet. Watersheds can be sorted in any order in your table.
2. The table must have indicator values in subsequent columns.
3. The table must have a header row with indicator names. Names of new indicators cannot match an existing indicator name already in the tool. We recommend limiting indicator names to 50 characters or less to properly display in tool menus.
4. Values of new ecological, stressor, and social indicators in your table should be numeric or blank. Non-numeric values will be skipped when updating the **Indicator Data** worksheet. Non-numeric values are allowed for base indicators.

	A	B	C	D	
1	HUC12	Index of Biotic Integrity Score	Number of CAFOs in WS	% MS4 Area	
2	031501010101	98.50	5	0.00	
3	031501010102	99.35	3	0.00	
4	031501010103	78.42	0	18.02	
5	031501010104		1	7.96	
6	031501010105	47.08	0	5.88	
7	031501010106	53.29	0	9.56	
8	031501010301	46.89	0	4.21	
9	031501010302	50.24	6	4.52	
10	031501010303	57.43	2	9.08	
11	050500010102		1	3.06	
12	050500010103	83.32	1	37.50	
13	050500010105	80.97	0	2.13	
14	051100020101	42.89	0	0.92	
15	051100020102	46.93	0	0.82	
16	051100020105		0	0.41	
17	051100020106	55.19	1	0.69	
18	051100020108	50.26	0	0.00	
19	051100020109	50.61	0	0.34	
20	051100020201		0	0.38	
21	051100020203	54.46	2	0.83	
22	051100020501	53.91	0	0.00	

After you have prepared your indicator data table in a separate spreadsheet file, you will copy and paste the table into the **Enter Indicator Data** section.

Open the spreadsheet file containing your pre-calculated new indicators. Select the cells containing watershed IDs and new indicator values in that file (including the header row) and click “Copy” on the Excel menu.

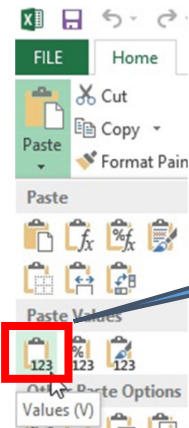
	A	B	C	D
1	HUC12	Index of Biotic Integrity Score	Number of CAFOs in WS	% MS4 Area
2	031501010101	98.50	5	0.00
3	031501010102	99.35	3	0.00
4	031501010103	78.42	0	18.02
5	031501010104		1	7.96
6	031501010105	47.08	0	5.88
7	031501010106	53.29	0	9.56
8	031501010301	46.89	0	4.21
9	031501010302	50.24	6	4.52
10	031501010303	57.43	2	9.08
11	050500010102		1	3.06
12	050500010103	83.32	1	37.50
13	050500010105	80.97		
14	051100020101	42.89		
15	051100020102	46.93		
16	051100020105			
17	051100020106	55.19		



Go back to the **Add Indicators** worksheet and set the cursor to cell D10.

Note that by default cell D10 contains the text “Watershed ID”. This text is included as a placeholder and should be overwritten by your indicator data table.

	D	E	F
8	Enter Indicator Data		
9	Paste your indicator table below. Your table must have watershed IDs		
10	Watershed ID		
11			
12			
13			
14			



Select “Paste Values” from the Excel menu to paste the indicator data table into the **Add Indicators** worksheet.

	D	E	F	G
8	Enter Indicator Data			
9	Paste your indicator table below. Your table must have watershed IDs in column D and indicator valu			
10	HUC12	Index of Biotic Integrity Score	Number of CAFOs	% MS4 Area
11	031501010101	98.49662401	5	0
12	031501010102	99.35390734	3	0
13	031501010103	78.42011275	0	18.02
14	031501010104		1	7.96026228
15	031501010105	47.0843994	0	5.880882549
16	031501010106	53.28558028	0	9.559236623
17	031501010301	46.89142972	0	4.214230407
18	031501010302	50.2423724	6	4.519161244
19	031501010303	57.42810532	2	9.08079115
20	050500010102		1	3.058646903
21	050500010103	83.31772027	1	37.5
22	050500010105	80.97092932	0	2.125675012
23	051100020101	42.88632856	0	0.921042273
24	051100020102	46.93380457	0	0.816190158
25	051100020105		0	0.408689922

11.4. Add Indicators Button

After entering new indicator names, types, and values use the **ADD INDICATORS** button to update the other tool worksheets with new indicators.

Clicking the **ADD INDICATORS** button from the *Add Indicators* worksheet will display a message box listing the requirements for adding new indicators. Review that the requirements are met and click **YES** to continue.

ADD INDICATORS

Enter Indicator Information

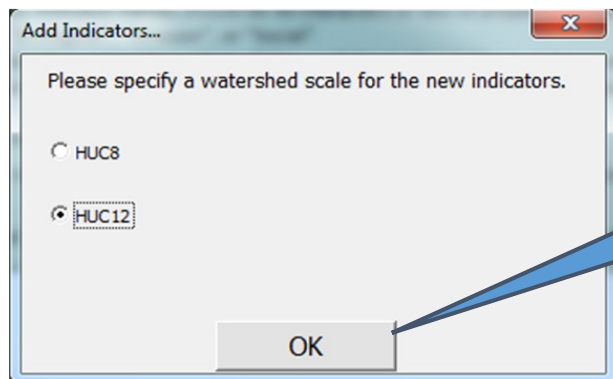
Enter new indicator names and types below.

Indicator Name	Indicator Type
Index of Biotic Integrity Score	Ecological
Number of CAFOs in WS	Stressor
% MS4 Area	Social

Enter Indicator Data

Paste your indicator table below. Your table must have water

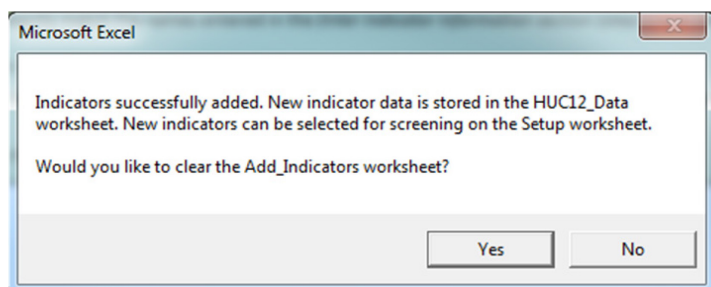
HUC12	Index of Biotic Integrity Score
031501010101	98.49662401
031501010102	99.35390734
031501010103	78.42011275
031501010104	



If your tool file includes multiple watershed scales, a message box will prompt you to specify which scale the new indicators apply to. Select the option button for the appropriate watershed scale and click **OK**.

The tool will then check to verify that indicator names, types, and values have been correctly entered on the *Add Indicators* worksheet. The tool will also look for potential issues with new indicator data.

If no data issues are found, the new indicators will be automatically added as new columns to the *Indicator Data* worksheet and will be added to menus on the *Setup*, *Bubble Plot Options*, and *Map* worksheets. If issues are identified, an error message will appear.



A message box will appear to notify you that your new indicators were successfully added to the tool file.

The message box will prompt you to clear new indicator names, types, and values from the *Add Indicators* worksheet. If you would like to automatically clear the *Add Indicators* worksheet click **YES**. Or click **NO** to clear manually.

It is strongly recommended that you enter information for the new indicators (name, type, scale, and description) to the *Indicator Info* worksheet. Refer to the *Indicator Info* worksheet section of this guide for instructions on inserting information for new indicators.

12. HUC Subsets Worksheet

12.1. Overview

The **HUC Subsets** worksheet is provided to store lists of watershed subsets that can be copied and pasted into the **Select Watersheds** section of the **Setup** worksheet for screening.

Watershed subsets are comprised of only a portion of all watersheds in the Project Area.

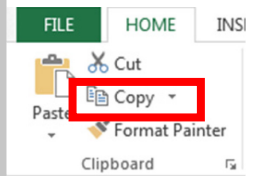
6							
7							
8	Conasauga 03150101 (7)	Barren 05110002 (13)	Upper Cumberland 05130101 (10)	Upper Cumberland-Lake Cumberland 05130103 (3)	South Fork Cumberland 05130104 (27)	Obeys 05130105 (22)	Upper Cumberland-Cordell Hull 05130106 (22)
9	031501010102	051100020101	051301010201	051301030708	051301040101	051301050101	051301060101
10	031501010103	051100020102	051301010501	051301030709	051301040102	051301050102	051301060102
11	031501010104	051100020105	051301010502	051301030710	051301040103	051301050103	051301060103
12	031501010106	051100020106	051301010503		051301040201	051301050104	051301060104
13	031501010301	051100020108	051301010601		051301040202	051301050105	051301060105
14	031501010302	051100020201	051301010602		051301040203	051301050106	051301060201
15	031501010303	051100020203	051301010603		051301040204	051301050107	051301060202
16		051100020501	051301010604		051301040205	051301050108	051301060203
17		051100020503	051301010605		051301040301	051301050109	051301060204
18		051100020601	051301010701		051301040302	051301050201	051301060205
19		051100020602			051301040303	051301050202	051301060206
20		051100020604			051301040304	051301050203	051301060207
21		051100020605			051301040305	051301050301	051301060301
22					051301040306	051301050302	051301060302
23					051301040307	051301050303	051301060303
24					051301040308	051301050401	051301060304
25					051301040401	051301050402	051301060305
26					051301040402	051301050403	051301060306
27					051301040501	051301050406	051301060307
28					051301040502	051301050502	051301060308
29					051301040503	051301050503	051301060309
30					051301040504	051301050504	051301060310
31					051301040505		
32					051301040506		
33					051301040507		
34					051301040508		
35					051301040601		
<div> Bubble_Plot_Options HUC12_Map HUC8_Data HUC12_Data Indicator_Info HUC_Subsets Add_Indicators </div>							

The following section describes how to **Add a Subset List** to the **HUC Subsets** worksheet.

12.2. Add a Subset List

To add a new subset list to the *HUC Subsets* worksheet, select the pre-existing list of watershed IDs from a separate worksheet (formatted with one ID per row) and click “Copy” on the Excel menu.

051301070102
051301070103
051301070201
051301070202
051301070203
051301070204
051301070301
051301070302
051301070303



7	Conasauga 03150101 (7)	Barren 05110002 (13)	Upper Cumberland 05130101 (10)
8	031501010102	051100020101	051301010201
9	031501010103	051100020102	051301010501
10	031501010104	051100020105	051301010502
11	031501010106	051100020106	051301010503
12	031501010301	051100020108	051301010601
13	031501010302	051100020201	051301010602
14	031501010303	051100020203	051301010603
15		051100020501	051301010604
16		051100020503	051301010605
17		051100020601	051301010701
18		051100020602	
19		051100020604	
20		051100020605	

Set the cursor to row 8 in the first open column on the *HUC Subsets* worksheet.

Select “Paste Values” from the Excel menu to paste the watershed IDs into the *HUC Subsets* worksheet.

If desired, type a descriptive header for the subset list in row 7. Save the tool file. The new subset list is now stored for future use in a screening run.

