

Background & Purpose

Since 2006, EPA has supported the use of the Recovery Potential Screening (RPS) Tool for prioritizing watershed restoration and protection. The RPS Tool offers a systematic method to compare watersheds and evaluate their relative potential for successful watershed management. The RPS Tool has been applied by state and federal Clean Water Act programs and partners to identify priority watersheds for a variety of initiatives, including the development of Total Maximum Daily Loads (TMDLs) and implementation of nonpoint source (NPS) management practices.

This document introduces the RPS Scenario Fact Sheet Series. The RPS Scenario Fact Sheet Series was developed for beginner RPS Tool users who have a basic understanding of RPS concepts but are uncertain about how to begin their own screening. Each fact sheet provides a starting point for a specific screening scenario (e.g., prioritizing watersheds for nutrient management) by briefly describing methods to identify relevant watersheds and highlighting example indicator selections.

The Fact Sheet Series was created to augment, not replace, other RPS training materials. Readers who have not yet reviewed the [RPS website](#), [RPS Tool User Manual](#), and [RPS Tool Training Videos](#) should access these resources prior to consulting the Fact Sheet Series.

RPS Screening Process

Watersheds have ecological, stressor, and social characteristics that may affect their suitability for management initiatives and that influence the potential for successful management outcomes. The RPS Tool and screening process (Figure 1) provide users with an understanding of relevant watershed characteristics that can help planners make deliberate and informed decisions about where to allocate limited resources. The main steps in the RPS screening process are described briefly below (refer to the [RPS Methodology](#) website for more detailed information on the screening process):

- **Step 1 - Define the Screening Objective.** A screening objective establishes the purpose for using the RPS Tool and guides subsequent screening decisions. A screening objective should be more specific than simply “compare my watersheds” and can reflect the motivation for prioritizing watersheds, a geographic area of interest, the desired output, or management goals for the priority watersheds.
- **Step 2 - Select Watersheds and Indicators.** Within the RPS Tool, users set up a screening by choosing a group of watersheds to screen and selecting indicators that are relevant to the selected watersheds and which align with the screening objective.
- **Step 3 - Run Screening and Review Results.** The RPS Tool calculates index scores and ranks for the user-selected watersheds and populates tables, charts, and maps with the screening results. Users review these results to determine if the initial screening is adequate or if adjustments to watershed or indicator selections are needed. Iterative adjustments can be made to a screening to add or remove watersheds or indicators to evaluate how changes in these settings affect the results.
- **Step 4 - Select Optimal Screening.** Adjustments can be made to the screening settings until an optimal screening is identified that best meets user needs. Users then apply the results of the optimal screening to guide priority watershed selection. Alternatively, users may find that two or more screenings each provide useful information for priority-setting and may incorporate results from multiple optimal screenings into priority watershed decisions.
- **Step 5 - Document Findings.** Users can prepare written documentation of the screening methods and findings using tables, plots, and maps from the RPS Tool.

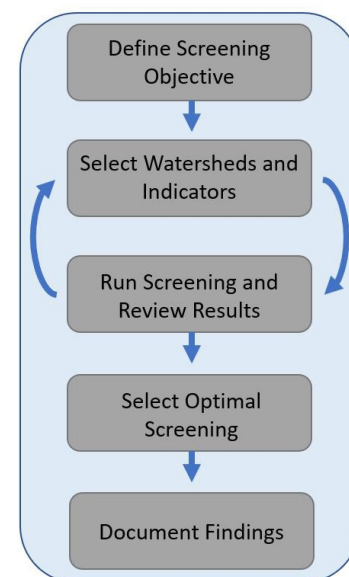


Figure 1. Process for applying the RPS Tool to identify priority watersheds.

The RPS Scenario Fact Sheet Series was specifically developed to support **Step 2 - Select Watersheds and Indicators**. The following sections introduce key concepts for watershed and indicator selection and describe how to apply the information presented within the RPS Tool.

Select Watersheds

RPS Tool files for contiguous US states are pre-loaded with indicator data for HUC12 subwatersheds.^{1,2} Although a screening can include all HUC12s in a state or river basin, it is often better to select a targeted group of HUC12s to compare within the RPS Tool. The step of selecting a group of HUC12s for a screening is termed “subsetting.” Subsetting can help distinguish differences within the group of HUC12s that may otherwise be obscured in a statewide screening that includes several hundred or thousands of HUC12s.

The RPS Tool includes a built-in subsetting function on the *HUC Subsets* tab. Criteria for selecting the HUC12s to include in a subset are defined using the indicator data stored in the RPS Tool. Selection criteria can be set to specific values of an indicator (e.g., all HUC12s with a certain impairment status) or to a range of indicator values (e.g., all HUC12s with at least 30% agricultural cover).

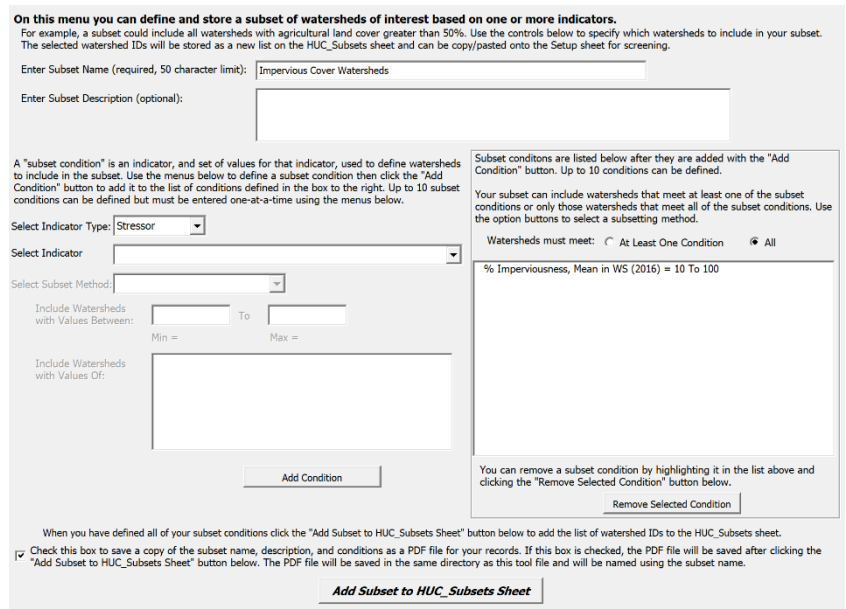
When using an RPS Scenario Fact Sheet to guide HUC12 selection, go to the *HUC Subsets* tab of the RPS Tool, click the **Create a New Watershed Subset** button to launch the interactive menu, and enter criteria for subsetting HUC12s (Figure 2). Each RPS Scenario Fact Sheet offers potential selection criteria that can be input to the RPS Tool using the interactive menu. Refer also to the [RPS User Manual](#) for step-by-step instructions for using the subsetting menu.

Users may choose to enter the selection criteria exactly as presented in an RPS Scenario Fact Sheet for an initial screening but can customize the criteria in subsequent screening iterations based on user-specific objectives and initial results. For example, the selection criteria presented in an RPS Scenario Fact Sheet may omit key HUC12s of interest to a user or may result in too many HUC12s to identify distinct priorities. In these cases, users can refine the HUC12 subset by adding, removing, or adjusting the indicators and values that define the subset. When evaluating a HUC12 subset, understand that there is no “one-size-fits-all” number of HUC12s to include in a screening. The ideal number of HUC12s depends on user needs and, ultimately, on the ability of screening results to provide meaningful information for watershed prioritization.

Select Indicators

The indicators selected for a screening in the RPS Tool serve as the basis for watershed comparison and prioritization. The RPS Tool uses three categories of indicators to compare watersheds: **Ecological**, **Stressor**, and **Social**. A screening can use as few as one indicator per category but typically no more than 10 indicators per category.

Indicator selections are important decisions that reflect the screening objective and the intended use of results. Including too many indicators can confound distinctions between watersheds (e.g., watersheds have very similar RPS index scores). Meanwhile, too few indicators can skew the results by neglecting relevant information.



On this menu you can define and store a subset of watersheds of interest based on one or more indicators.
For example, a subset could include all watersheds with agricultural land cover greater than 50%. Use the controls below to specify which watersheds to include in your subset. The selected watershed IDs will be stored as a new list on the HUC_Subsets sheet and can be copy/pasted onto the Setup sheet for screening.

Enter Subset Name (required, 50 character limit):

Enter Subset Description (optional):

A "subset condition" is an indicator, and set of values for that indicator, used to define watersheds to include in the subset. Use the menus below to define a subset condition then click the "Add Condition" button to add it to the list of conditions defined in the box to the right. Up to 10 subset conditions can be defined but must be entered one-at-a-time using the menus below.

Select Indicator Type:

Select Indicator:

Select Subset Method:

Include Watersheds with Values Between: Min = To Max =

Include Watersheds with Values Of:

Watersheds must meet: At Least One Condition All

% Imperviousness, Mean in WS (2016) = 10 To 100

You can remove a subset condition by highlighting it in the list above and clicking the "Remove Selected Condition" button below.

When you have defined all of your subset conditions click the "Add Subset to HUC_Subsets Sheet" button below to add the list of watershed IDs to the HUC_Subsets sheet.

Check this box to save a copy of the subset name, description, and conditions as a PDF file for your records. If this box is checked, the PDF file will be saved after clicking the "Add Subset to HUC_Subsets Sheet" button below. The PDF file will be saved in the same directory as this tool file and will be named using the subset name.

Figure 2. The Define Watershed Subset menu of the RPS Tool. The menu is accessed from the *HUC Subsets* tab by clicking the **Create a New Watershed Subset** button.

¹ HUC12s are subwatershed delineations in the [National Watershed Boundary Dataset](#). HUC12s are referenced by their 12-digit Hydrologic Unit Code.

²The RPS Tool files available on the RPS website are configured for single states, however, RPS Tool files can be customized for river basins or other regions of interest. Email us at HWP-Team@epa.gov for more information on developing a custom RPS Tool.

RPS Tools are pre-loaded with hundreds of watershed indicators. While the wide variety of indicators provides flexibility for users with different screening objectives, identifying relevant indicators for an initial screening can be challenging. To support this step, each RPS Scenario Fact Sheet points readers to example indicators that are relevant to the topic addressed by the Fact Sheet. To add these indicators to a screening, go to the *Setup* tab of the RPS Tool. Click the **Select Ecological Indicators**, **Select Stressor Indicators**, and **Select Social Indicators** buttons to launch menus containing a list of indicators available for the screening (Figure 3). Double-clicking an indicator name on the list displays a description of the indicator and data sources. Readers can add the indicators described in an RPS Scenario Fact Sheet to the RPS Tool by choosing each indicator name from the indicator selection menu or by copying and pasting the indicator names from the RPS Scenario Fact Sheet into the *Setup* tab.

Users may choose to use the exact group of indicators presented in an RPS Scenario Fact Sheet for an initial screening and then customize the indicator selections during subsequent screening runs based on user-specific needs and initial results. For example, a user's screening objective may include unique goals that are not reflected in the RPS Scenario Fact Sheet. These goals may require the inclusion of additional indicators. Alternatively, the RPS Scenario Fact Sheet may highlight indicators that are not appropriate for a user's geographic location (e.g., all watersheds display very low indicator values) which can be omitted from a screening. The **Explore Indicator Data** button described in the next section can be used to review such data characteristics.

Indicator Data Exploration

The RPS Tool includes a built-in feature for exploring data to facilitate indicator selection. Through data exploration, users can better understand indicator values and evaluate potential data issues. Each data sheet in the RPS Tool (e.g., *HUC12_Data*) has an **Explore Indicator Data** button. Clicking the **Explore Indicator Data** button will display a pop-up menu with several features for interpreting and visualizing the indicator values (Figure 4). A basic review of indicator data can be completed by examining the summary statistics, histogram, and correlation tabs of the menu to:

- **Evaluate the range of indicator values.** If the difference between the minimum and maximum values of an indicator is very small, then all watersheds have similar values and the indicator may not be helpful for distinguishing priority watersheds. A threshold for describing the data range as "too small" for meaningful comparisons will depend on the specific indicator.
- **Check for outliers.** Outlier watersheds have very different values of an indicator compared to the rest of the group. Outliers can skew RPS results. For example, a screening may result in high Stressor Index scores for a small group of watersheds with very extreme values of stressor indicators and low Stressor Index scores for all other watersheds. Because of the outliers, watersheds with high (but not extreme) stressor indicator values could be misinterpreted as

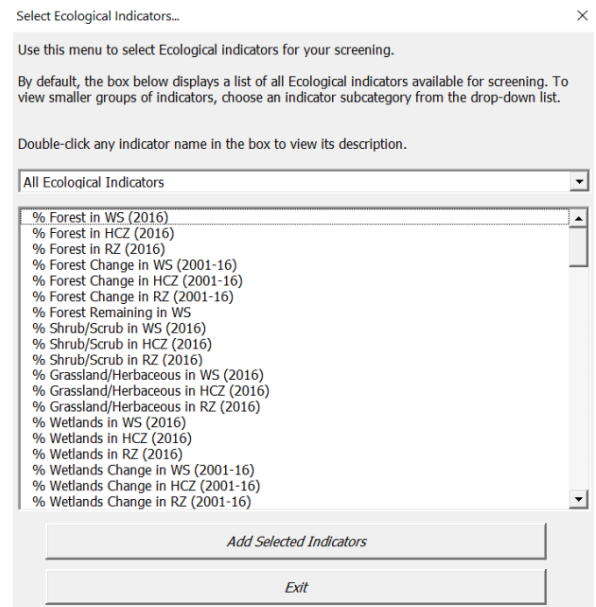


Figure 3. The *Setup* tab contains popup menus to choose indicators for a screening. The **Select Ecological Indicators** menu is displayed here.

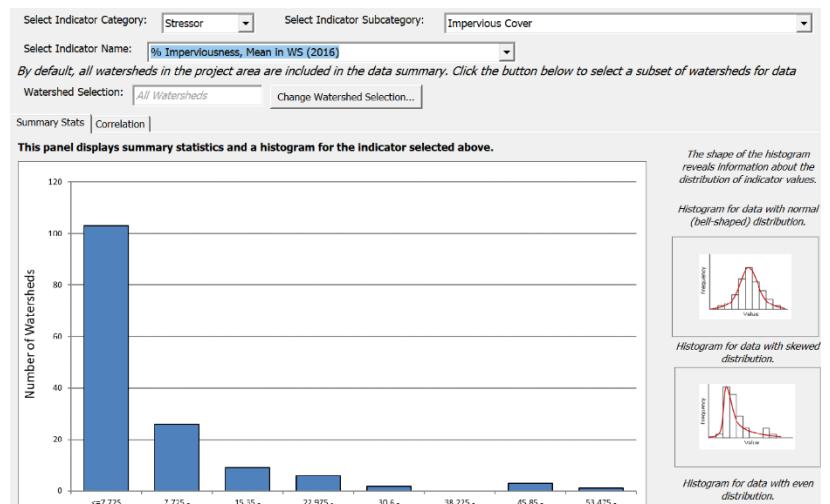


Figure 4. The *Explore Indicator Data* menu. The menu is accessed from the *HUC12_Data* tab by clicking the **Explore Indicator Data** button.

having minimal stressor presence. Look for outliers in histograms by reviewing the low and high ends of the chart to determine if extreme values are present.

- Evaluate the number of blanks. When indicator data are not available for a watershed, the RPS Tool stores a blank cell for the watershed in the indicator data table. If the proportion of watersheds with blank values of an indicator is high, users may elect to remove the indicator from the screening and find indicators with better coverage.
- Consider indicator correlation. Correlation is a measure of the similarity between two indicators. Highly correlated indicators may introduce redundancy and bias to RPS results. RPS users can consider correlation when choosing between two or more indicators to include in a screening. When the correlation statistics (e.g. coefficient of determination, or R squared) displayed on the correlation tab of the data exploration menu are very high, users may choose to only use one indicator for the screening in order to streamline indicator selections and reduce redundancy.

Refer to the [RPS User Manual](#) for more information on the features of the Explore Indicator Data menu.

Contact Us

The RPS Scenario Fact Sheet series is an ongoing effort of the EPA Office of Water. For questions about the RPS Scenario Fact Sheets or to request additional topics, email us at HWP-Team@epa.gov.