

Background & Purpose

Since 2006, the U.S. Environmental Protection Agency (EPA) has supported the use of the Restoration and Protection Screening (RPS) Tool and its predecessors to support strategic planning to prioritize waters and watersheds. The RPS Tool offers a systematic method to compare watersheds and evaluate their relative potential for achieving desired watershed management goals. 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 and implementation of nonpoint source 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](#) or [user guides](#) should access these resources prior to consulting the Fact Sheet Series. The RPS Tool is available as both a web application (the Web RPS Tool) and an Excel-based version (the Excel RPS Tool). Readers can apply the concepts described in the Fact Sheet Series using either version of the RPS Tool.

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. Then, users select indicators that are relevant to the selected watersheds and 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.

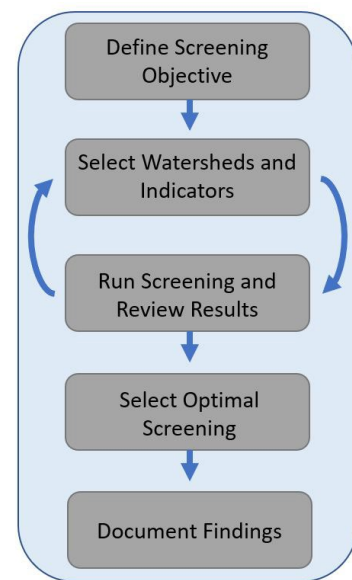


Figure 1. Process for applying the RPS Tool to identify priority watersheds.

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 using either the Web RPS Tool or the Excel RPS Tool.

Select Watersheds

The RPS Tool provides access to indicator data for roughly 83,000 HUC12 subwatersheds across the contiguous U.S.^{1,2} Although a screening can include all HUC12s in a state, river basin, or other large geographic area it is often recommended to select a targeted group of HUC12s to compare within the Tool. The step of selecting a group of HUC12s for a screening is termed “subsetting.” Subsetting can help distinguish differences between HUC12s that may otherwise be obscured in a screening that includes several hundred or thousands of HUC12s.

In both the web and Excel versions of the RPS Tool, users can define criteria for selecting which HUC12s to include in a subset using indicator data. 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). Both versions of the RPS Tool include a built-in subsetting menu.

- In the Web RPS Tool, subsetting is completed on the **Subset HUC12s** subtab of the **Select HUC12s** tab. Click the **Add a Filter** button to launch the interactive menu to specify criteria for subsetting HUC12s (Figure 2; top).
- In the Excel RPS Tool, subsetting is completed in the **HUC Subsets** tab. Click the **Create a New Watershed Subset** button to launch the interactive menu to specify criteria for subsetting HUC12s (Figure 2; bottom).

Refer also to the [RPS Tool User Guides](#) for step-by-step instructions for using the subsetting menu.

Each RPS Scenario Fact Sheet recommends potential indicators and criteria for creating a HUC12 subset that is relevant to the topic described in the Fact Sheet. Users may choose to enter the selection criteria exactly as presented in the RPS Scenario Fact Sheet for an initial screening or can select alternative criteria specific to their application. 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

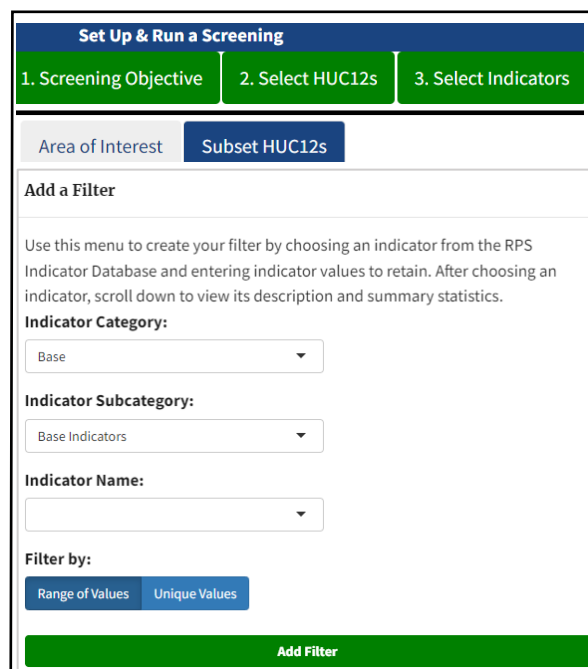
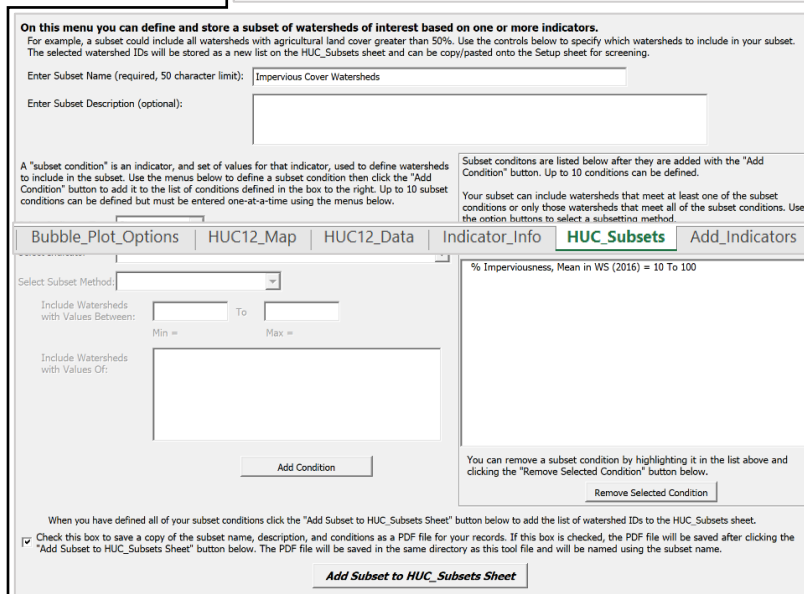



Figure 2. Menus for defining a HUC12 subset in the Web RPS Tool (top) and the Excel RPS Tool (bottom).

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

² The Excel RPS Tool files available on the RPS website are configured for single states, however, Excel 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 custom RPS Tools.

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 which HUC12s to include, 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 may have very similar RPS index scores). Meanwhile, too few indicators can skew the results by neglecting relevant information.

The RPS Tool provides access to 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.

- In the Web RPS Tool, users can add the indicators described in a Fact Sheet on the **Preset Scenarios** subtab of the **Select Indicators** tab (Figure 3; top). Simply choose a topic of interest from the **Choose a Scenario** drop-down menu, then click the **Proceed to Next Step** button. The example indicators for the selected topic will automatically be added to the screening on the **Ecological**, **Stressor** and **Social** subtabs.
- In the Excel RPS Tool, users can add the indicators described in a Fact Sheet on the **Setup** tab. 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; bottom). Double-clicking an indicator name on the list displays a description of the indicator and data sources. Users 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.

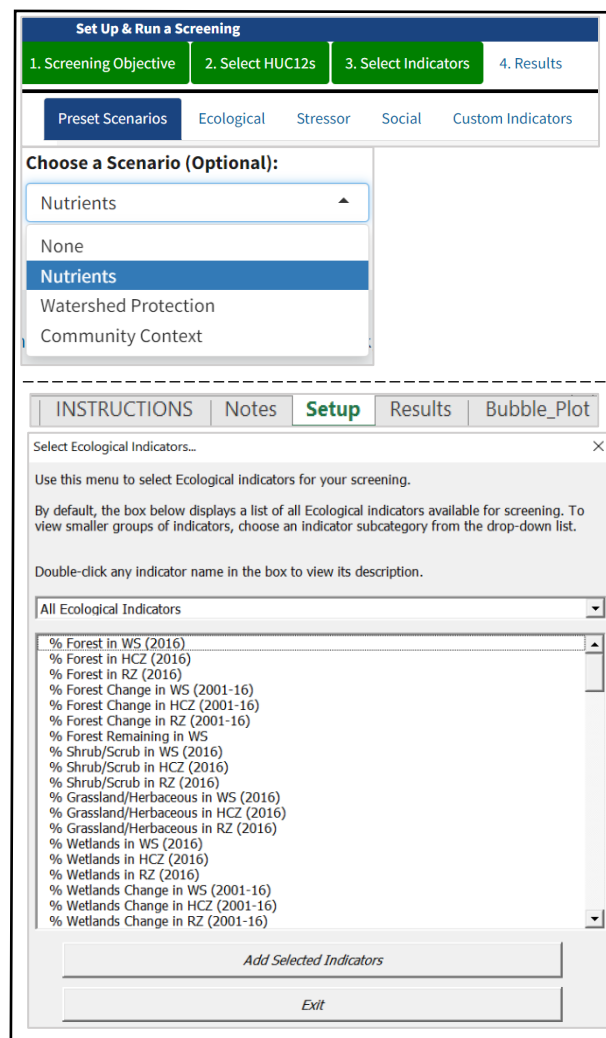


Figure 3. The Web RPS Tool includes a scenario drop-down menu for automatically adding example indicators from a fact sheet to a screening (top). In the Excel RPS Tool, the **Setup** tab contains popup menus to choose indicators for a screening. The **Select Ecological Indicators** menu is shown here (bottom).

Users may choose to use the exact group of indicators presented in an RPS Scenario Fact Sheet or customize the indicator selections based on user-specific needs. 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 data

exploration features of the RPS Tool, described in the next section, can be used to review such indicator data characteristics.

Indicator Data Exploration

The RPS Tool includes built-in features for exploring data to facilitate indicator selection. Through data exploration, users can better understand indicator values and evaluate potential data issues.

- In the Web RPS tool, indicator data can be evaluated on the **Ecological**, **Stressor** and **Social** subtabs of the **Select Indicators** tab. Each subtab displays a histogram, plot and summary statistics for any indicator, and a correlation matrix for each pair of indicators selected for the screening (Figure 4; top).
- In the Excel RPS Tool, users can click the **Explore Indicator Data** button on the **HUC12_Data** sheet to display a pop-up menu that displays a histogram plot and summary statistics for any indicator and a correlation plot for a pair of indicators (Figure 4; bottom).

A basic evaluation of indicator data can be completed by examining the summary statistics, histogram plot, and correlation coefficients displayed in the RPS Tool:

- 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 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.

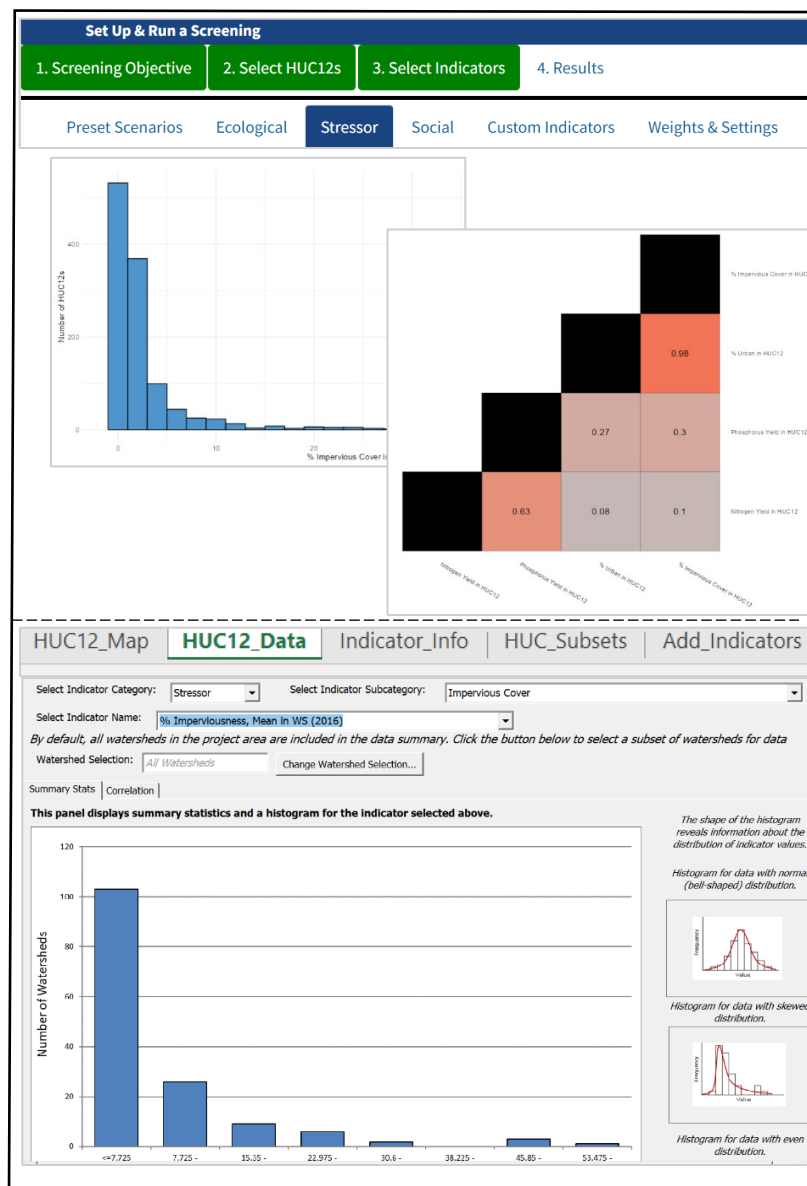


Figure 4. Indicator data exploration features of the Web RPS Tool (top) and the Excel RPS Tool (bottom).

- 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 Tool User Guides](#) for more information on the data exploration features.

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.