



Quick Start Guide

The Web-based Hydrologic Information Portal



San Pedro Web-based
Hydrologic
Information Portal

Draft Prepared for the Upper San Pedro Partnership

January 2022

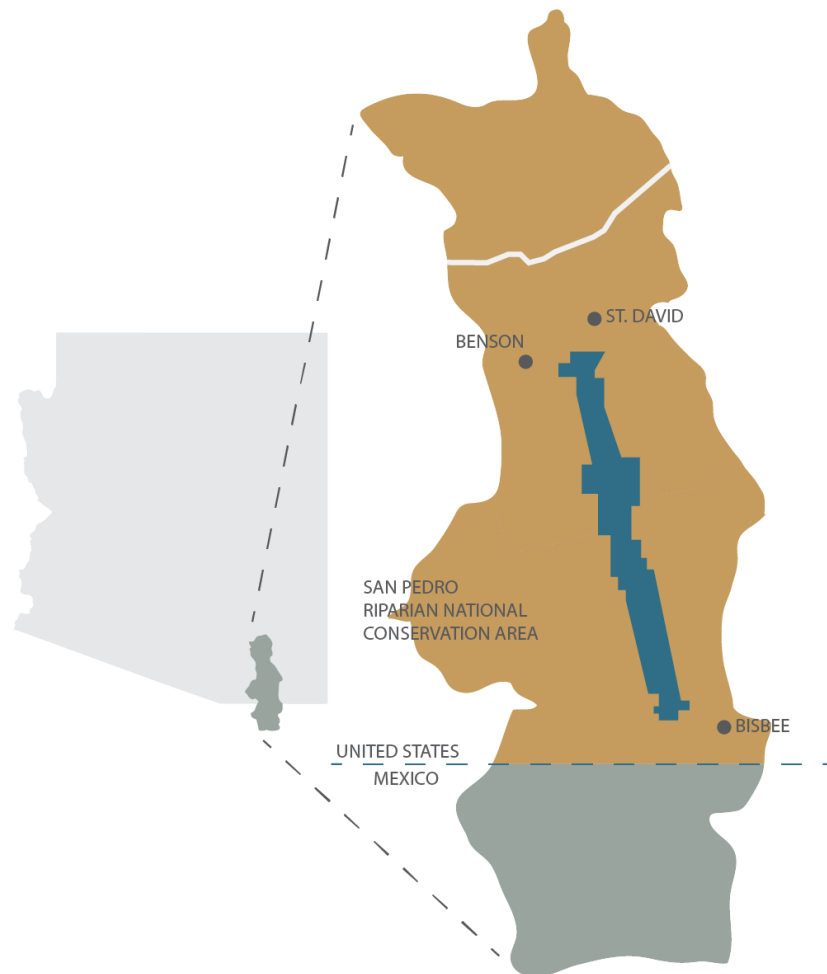
Submitted by Blue Raster

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1. Introduction

The Web-based Hydrologic Information Portal (WHIP) delivers a wealth of water information gathered from the Upper San Pedro Basin of southeast Arizona by local, state, and federal agencies and organizations since 1904. The San Pedro River flows through the center of this basin. It is a river teeming with life and located where the Sierra Madre to the south meets the Rocky Mountains to the north, and where the Sonoran Desert to the west meets the Chihuahuan Desert to the east. The river provides an important oasis for the diversity of wildlife living or passing through this arid region.



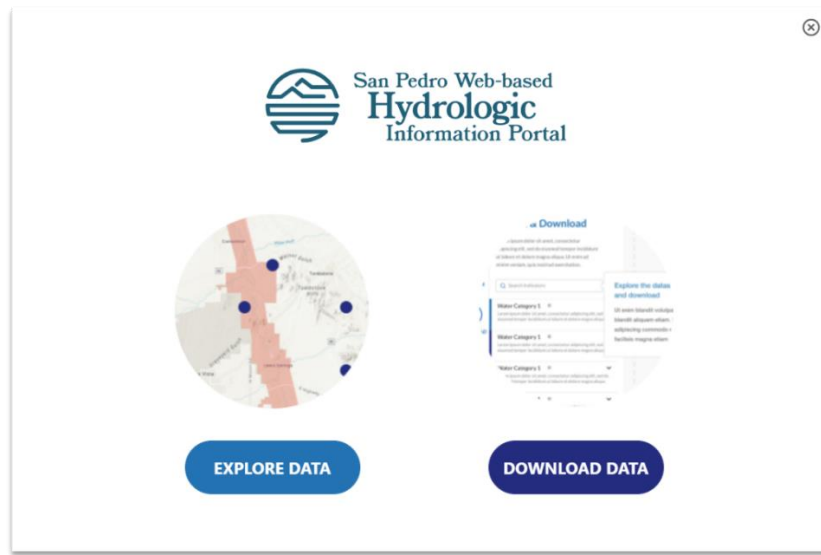
The human communities within the Upper San Pedro Basin depend on the same groundwater resources that feed the river. Careful planning and water management are needed so the aquifers (where the groundwater is naturally stored) remain a sustainable source for all the regional and near-stream alluvial life that depends upon them. The WHIP provides much of this information in readily accessible and useful formats needed by project managers, scientists, elected officials, and the general public for essential water management and decision-making in the region.

This Quick Start Guide provides instructions on how to use the WHIP.

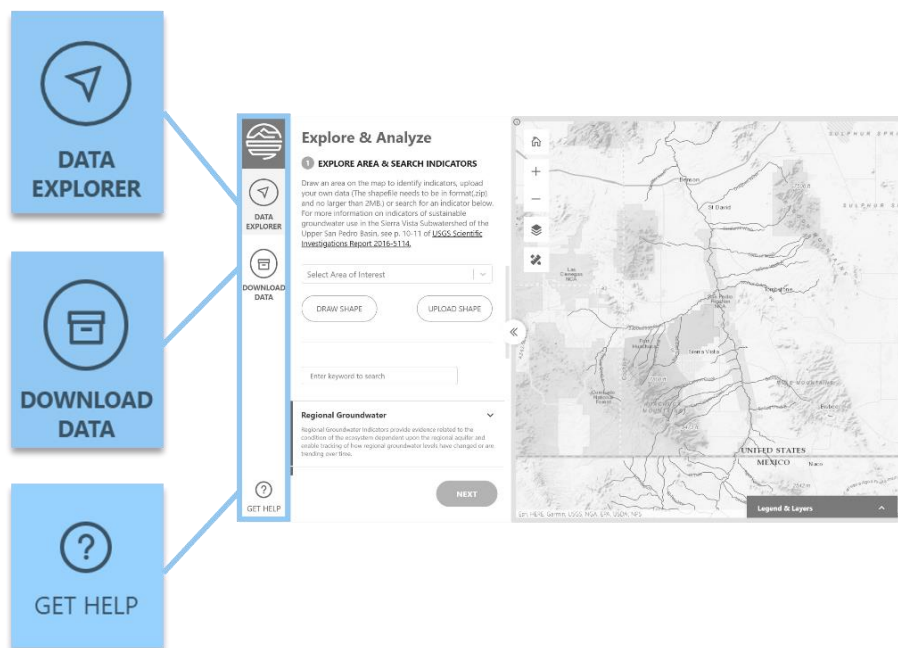
2. Getting Started

The WHIP website enables end users to explore and download water information for the Upper San Pedro Basin. Users can view various datasets of their choice on an interactive map as well as download datasets of interest.

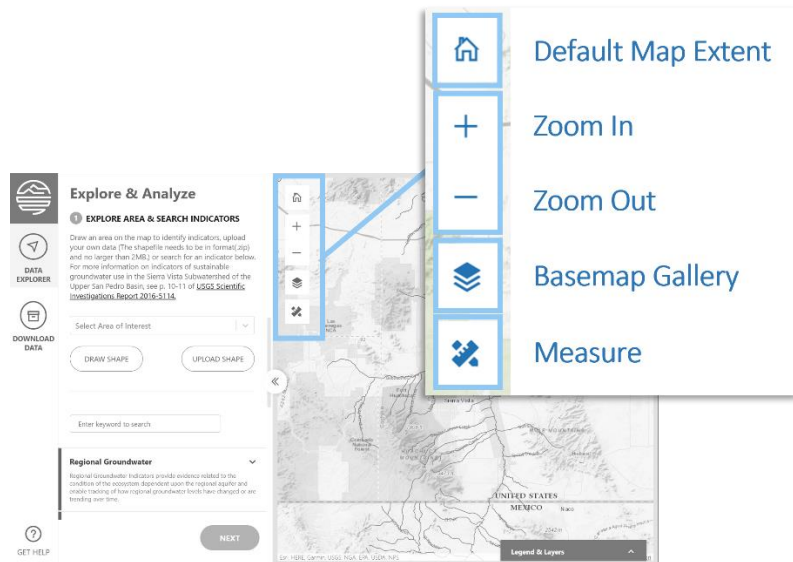
2.1 There are two ways to get started when you enter the application. You can choose to 1) explore the data through an interactive map and charts, or 2) directly download the data.



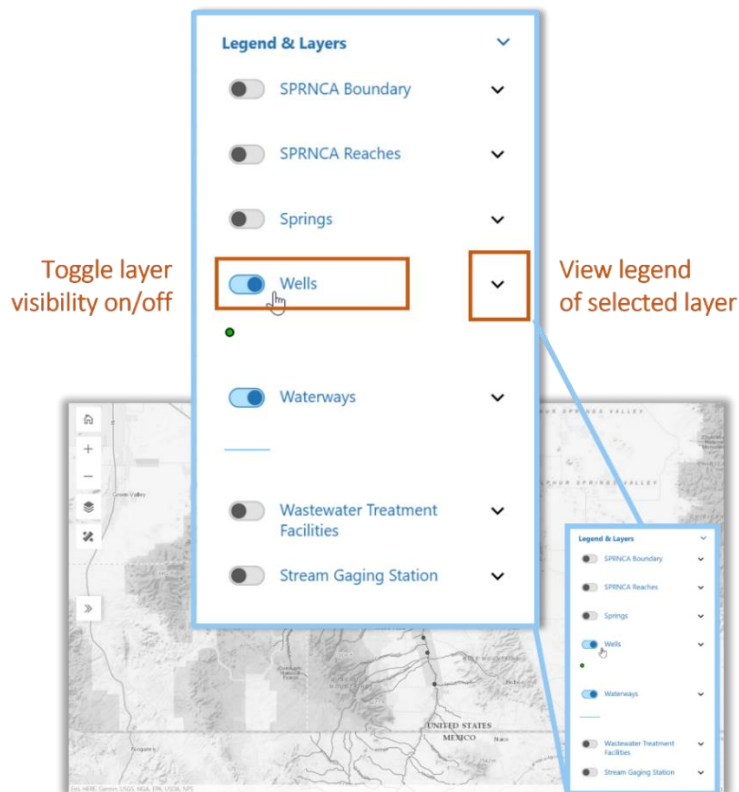
2.2 Along the left-side panel of the site, there is a navigation bar with three tool links: [Data Explorer](#), [Download Data](#), and [Get Help](#). This menu allows you to navigate between the interactive mapping page, the data download page, and accessing the Help Guide for the site.



2.3 Along the left side of the map in the Data Explorer, there are interactive map widgets that aid in map navigation: Zoom-In, Zoom-Out, Basemap Gallery, and a Measure.



2.4 At the bottom right of the map in the Data Explorer, there is a Legend & Layers panel that allows you to adjust visibility of available map layers, as well as view layer symbology. The symbology of a layer is its visual appearance on the map.



3. Browser Compatibility

3.1 Supported Browsers and Devices

To ensure best performance, we recommend using a desktop computer with the 64-bit version of the latest modern, standard-based browsers: Chrome, Firefox, Microsoft Edge. As such, the WHIP runs only in the mentioned browsers. Internet Explorer 11, mobile devices, and iPads are not supported.

To access information about your desktop, navigate to your computer settings. For Windows 8 or 10, go to the Settings app. Hit *Windows + I* to open the *Settings* app, and then click the *System* icon. On the System page, switch to the *About* tab on the left. For macOS, go to *Apple menu > About This Mac*. This opens an overview of your Mac, including your Mac model, processor, memory, serial number, and version of macOS.

3.2 Hardware requirements

For desktop browsers, it is recommended to have at least 8 GB system memory and modern graphics hardware. Minimum requirements are a high-performance graphics card with at least 512 MB of video memory. For the best performance, it is recommended that you have a graphics card with at least 1 GB of video memory, especially for working with larger or more memory-intensive datasets such as June wet-dry status. High-performance, stand-alone graphics cards typically have better performance than integrated graphics cards.

4. Map Navigation Tools

Map widgets enable you to curate a unique view of the map. You can navigate to an area of interest as well as adjust the basemap which provides a background of geographical context for the layers you want to display on a map .

Default map view

resets the map view to the full extent of the Upper San Pedro Basin in the United States



Zoom in / Zoom out

adjusts the map view to “look” closer in or further out



Basemap Gallery

changes the basemap to add context to your data (imagery, roads, etc.)



Measure tool

allows you to measure by clicking in the map to place your first point, then double-click on the map to finish measuring



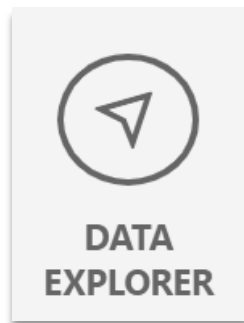
Time Slider widget

allows you to filter historical data according to defined time intervals; use time intervals to view data chronologically



5. Explore & Analyze Data

The Explore & Analyze features in the **Data Explorer** view allows you to search data for the Upper San Pedro Basin area and interact with it through an interactive map. The data include indicators for sustainable groundwater use.



a) About the Indicators

The indicators can be explored on the map and downloaded. They include:

- **Regional Groundwater**

Regional Groundwater indicators provide information related to the condition and trends of the groundwater in the regional aquifer that will eventually affect the groundwater and surface water conditions in the San Pedro riparian area and river. They track how regional groundwater levels and volumes have changed or are trending over time.

- Regional-aquifer water levels
- Horizontal hydraulic gradients (regional-aquifer wells)
- Aquifer-storage change measured with microgravity
- Groundwater budget balance

- **Near Stream Groundwater**

Near-stream Groundwater indicators provide evidence related to the condition of the ecosystem along the San Pedro River and enable tracking of how it has changed or is trending over time.

- Near-stream alluvial-aquifer water levels
- Near-stream vertical gradients
- Annual fluctuation of near-stream alluvial-aquifer water levels

- **River Flow**

River Flow indicators provide evidence related to the condition of the riverine ecosystem and enable tracking of how river flows have changed or are trending over time.

- Streamflow permanence
- Base flow discharge on San Pedro and Babocomari Rivers isotope analysis
- June wet-dry status
- San Pedro River quality
- San Pedro and Babocomari Rivers isotope analysis

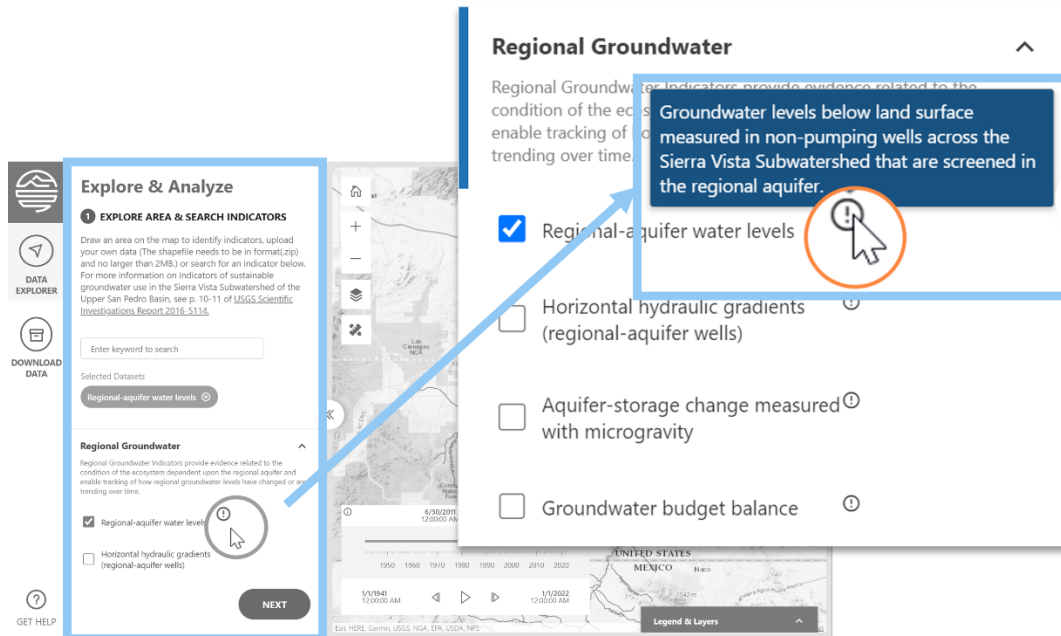
- **Springs**

Springs indicators provide evidence related to the condition of water available to springs and enable tracking of how springs are trending over time.

- Springs discharge
- Springs water quality

b) Accessing indicator descriptions through the Indicator Panel

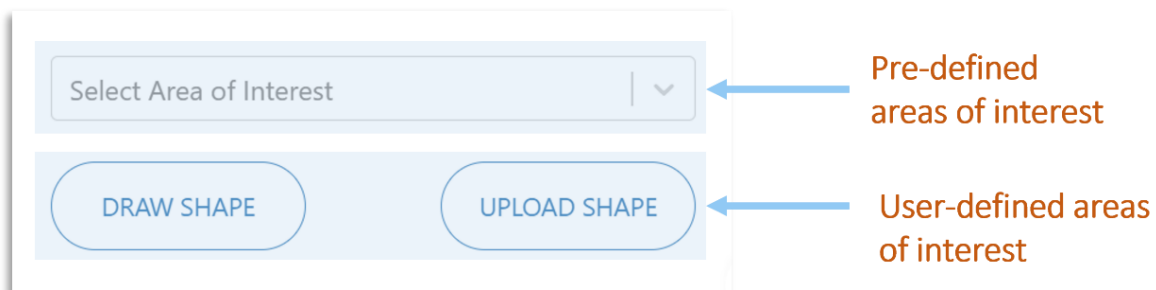
The application provides an informational description for each indicator via the left-hand panel. Find your indicator(s) of interest. Then on the right-side of the indicator name click the circular icon with a “!”. Click on the icon to view a description of the given indicator layer.



c) Step-by-Step: Exploring Indicator Data

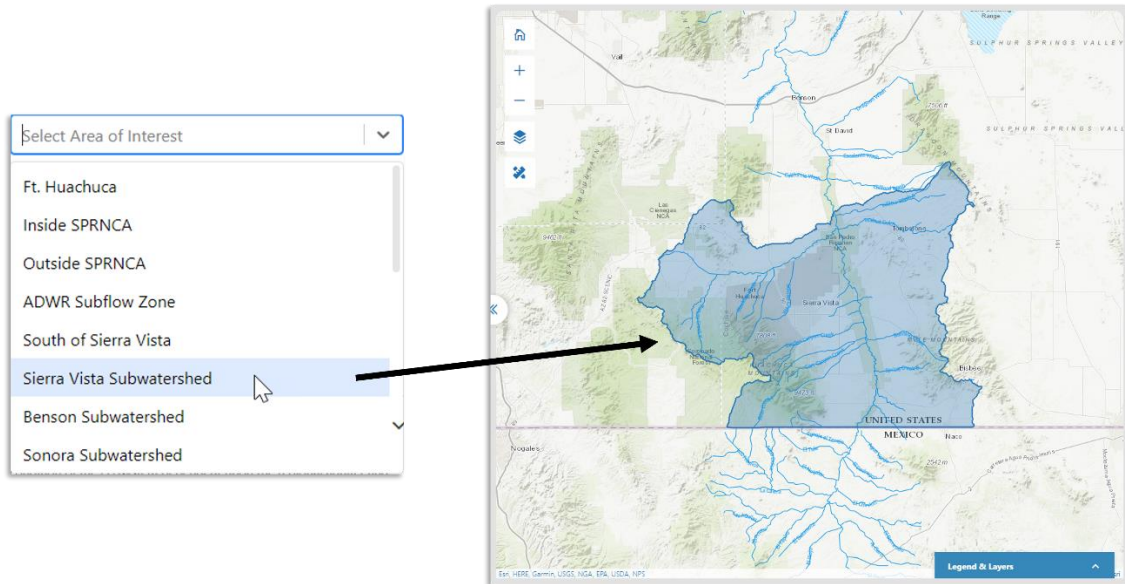
1. Define your area of interest

Begin by defining the area on the map in which you'd like to explore the indicator data, if needed. On the left-hand panel, there are three options to define your area of interest: A drop-down menu of predefined areas, you can draw a custom area on the map, or upload a local shapefile (.shp). If you are interested in exploring the whole extent of the Upper San Pedro Basin, you can skip this step.



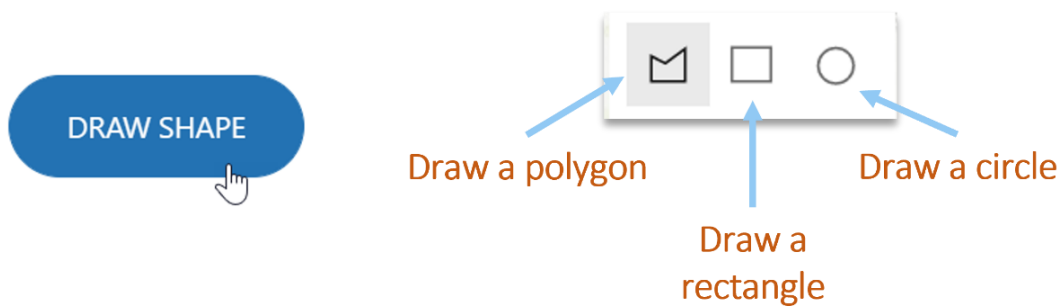
Select Area of Interest

Click on the drop-down menu and select your area of interest. The area will appear outlined on the map, with the map extent centered on this area.



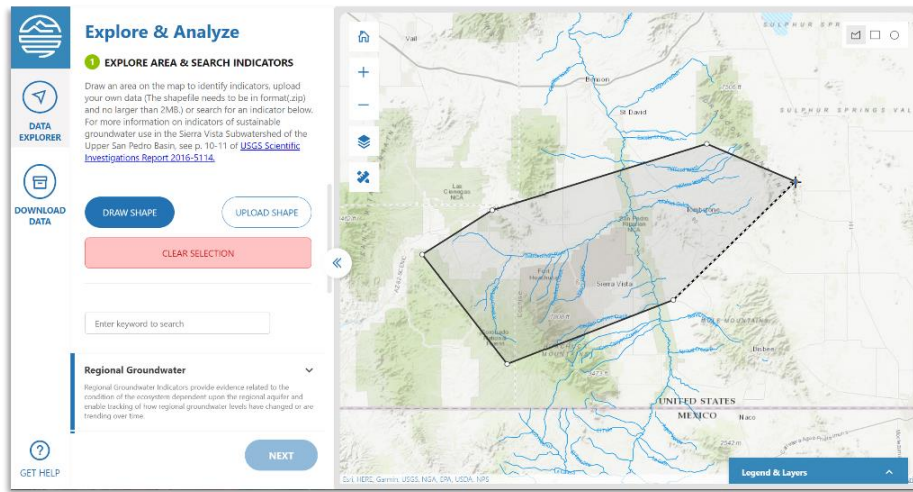
Draw Shape

Define your own area of interest by *drawing* it on the map. To activate the map drawing tool, click on the **“Draw Shape”** button on the left-hand panel. Use the shape selection tool on the upper-right corner of the map to draw a polygon, rectangle, or circle. To begin drawing, click on the map to initiate drawing.

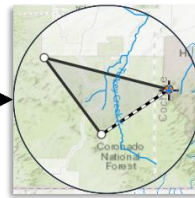


Example: Draw a Polygon

Draw a polygon



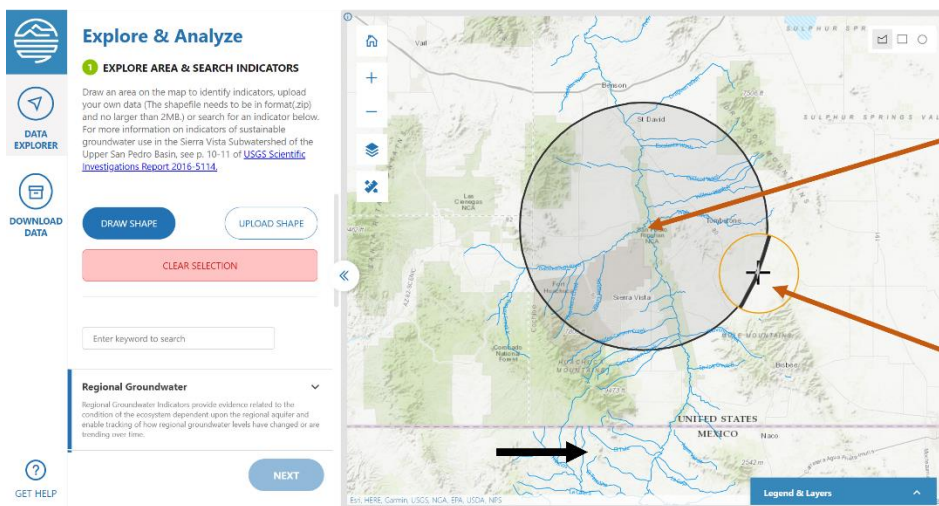
The draw tool will appear as the cursor on the map. Click on the map to begin drawing.



Define the polygon shape by clicking on the map to create vertices. Double click when shape is complete.

Example: Draw a Circle

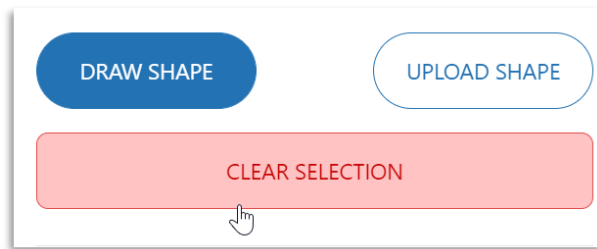
Draw a circle



Begin drawing by clicking on the location where the center of the circle will be.

Move the cursor outward until the circle size covers your area of interest. Double click to finalize the shape.

To **clear the selection** applied on the map, simply click on the **“Clear Selection”** button on the left-hand panel. This removes the shape you have drawn.



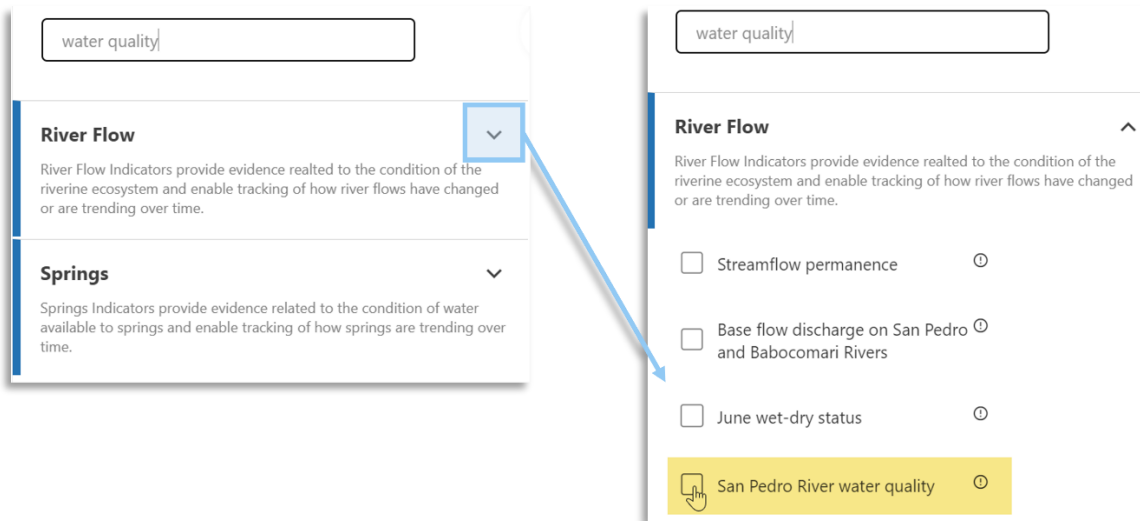
Upload Shape

You can upload a pre-defined area of interest from your local files. On the left-hand panel, click on the **“Upload Shape”** button. Navigate to your file (.shp), select, and upload. The area will appear on the map.



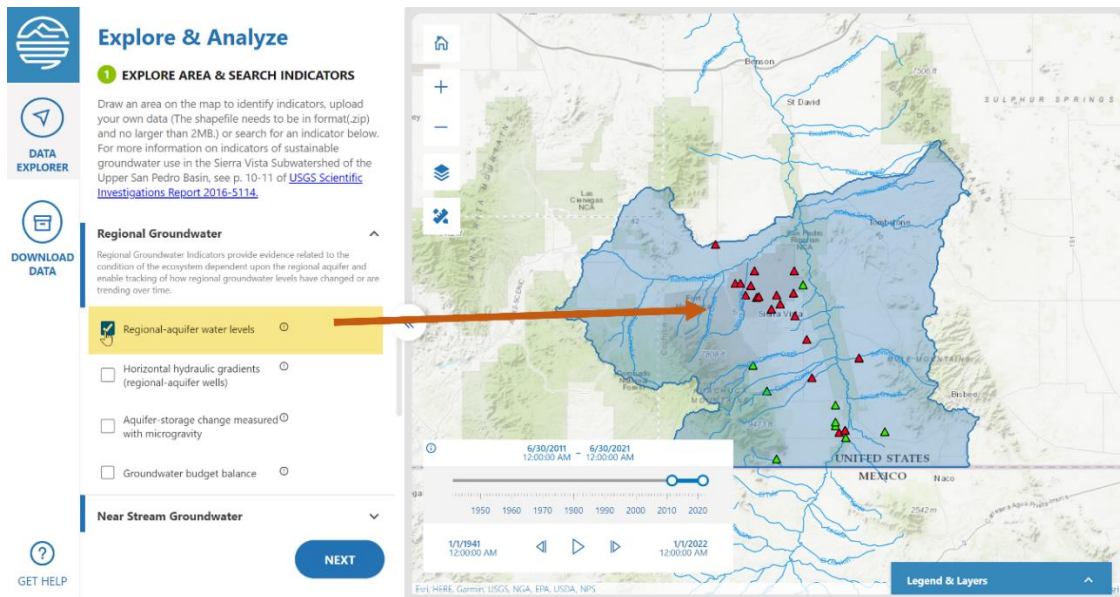
2. Select indicator(s) of interest

Next, after defining your area of interest in the step above, select one or multiple indicators to view on the map. Manually browse through the different indicators nested under each indicator group. Alternatively, search for an indicator by typing in a *key word*. The search results will narrow down the available indicators that match the key word.



View selected indicator(s) on the map

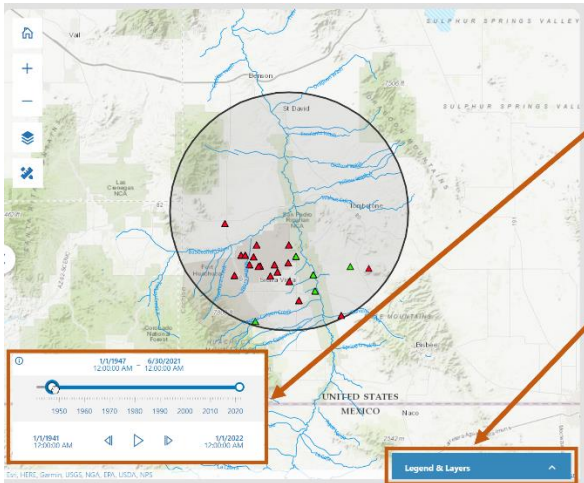
On the left-hand panel, turn the layer visibility *on* by clicking on the radio button on the left-side of the indicator name. If you defined an area of interest in the previous step, the indicator data will appear *within* that region only. Otherwise, the data will appear across the full extent of the Upper San Pedro Basin.



Leverage the Time-Slider to view historical data

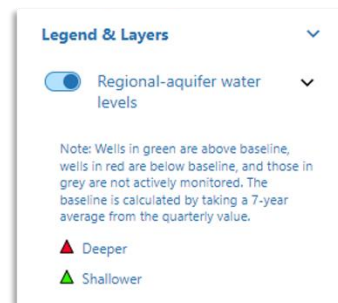
A time-slider widget will appear on the map upon selection of Indicators where historical data is available. When the time-slider appears, it means that the selected indicator data has historical records to explore across time.

i.

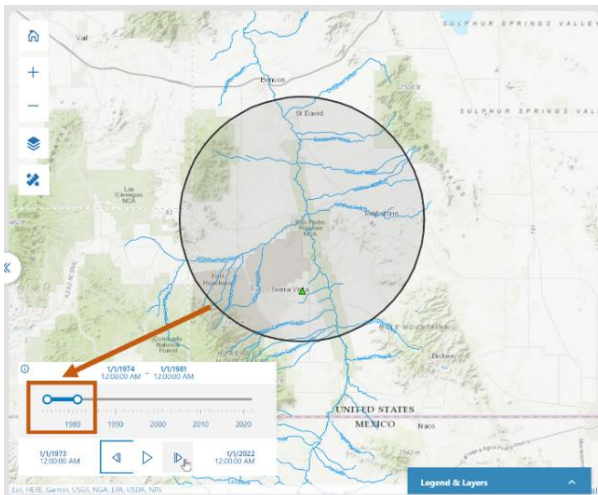


A Time Slider will appear when time-enabled data is selected. This tool allows you to explore historical data through user-defined date ranges, or “windows” of time.

Use the *Legend & Layers* widget to aid in the interpretation of the data you are exploring.



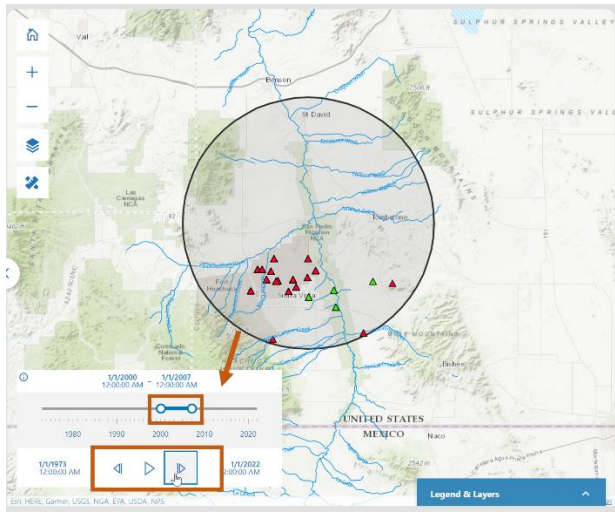
ii.



Manually define a time interval and explore historical data by increments of defined intervals.

In this example, “rewind” to the earliest available date (1975). The map will display data available for that time range.

iii.



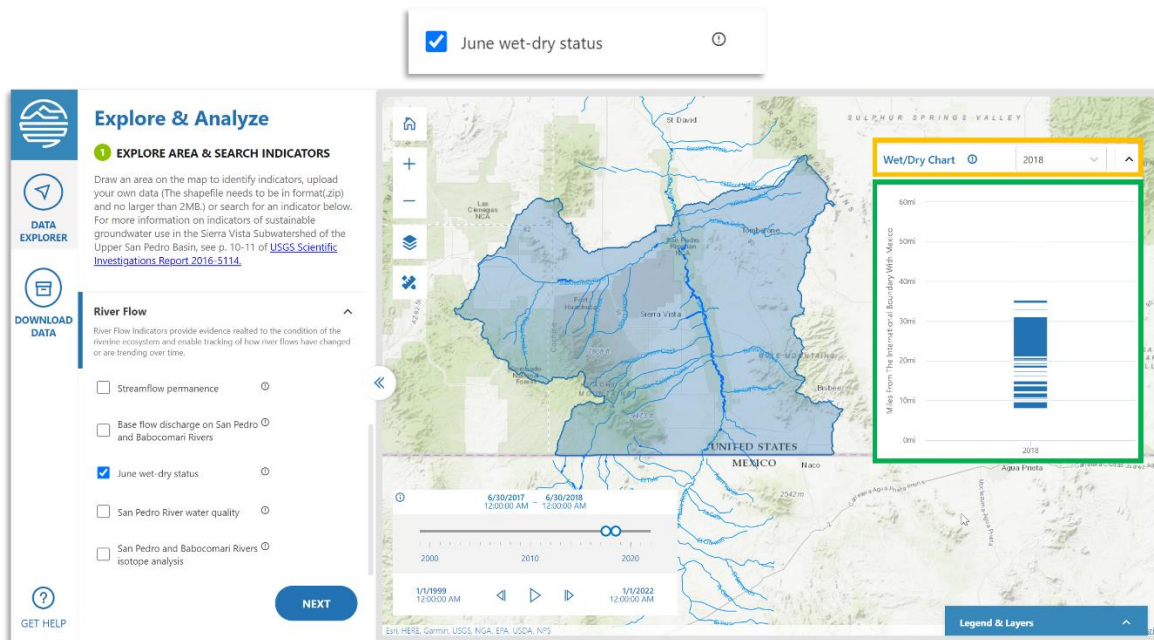
Use the Next or Back buttons to move forward or backward in time intervals. Data on the map will appear for the defined date “steps”.

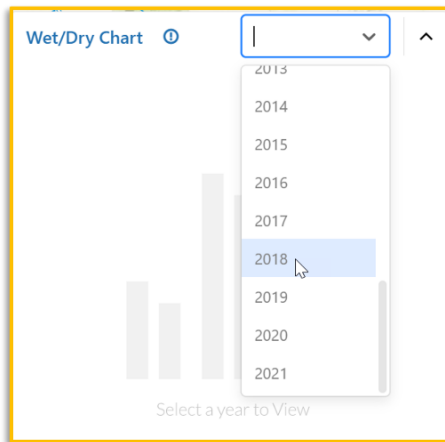
Remember to use the Legend & Layers widget to understand the meaning of the data symbology. In this example, wells in green are *above* the seven-year mean baseline; wells in red are *below* baseline; and grey are not actively monitored.

Interpret an indicator graph – e.g. June wet-dry status

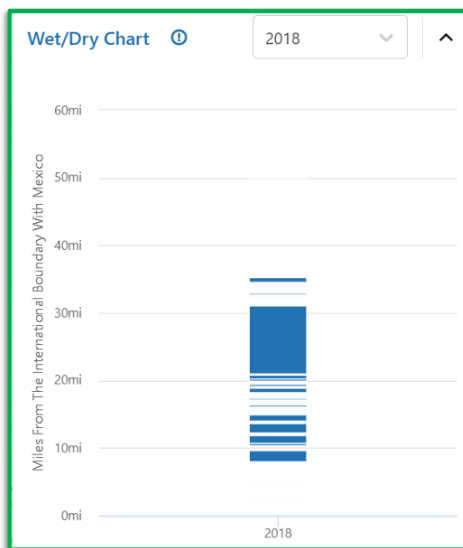
Upon selection, some indicators will have an additional way to *explore the data* through a graph. For example, the June wet-dry status indicator under the “River Flows” group can be graphed based on a selected year. This is a useful tool to explore the data trends by each individual year.

Example graph – June wet-dry status



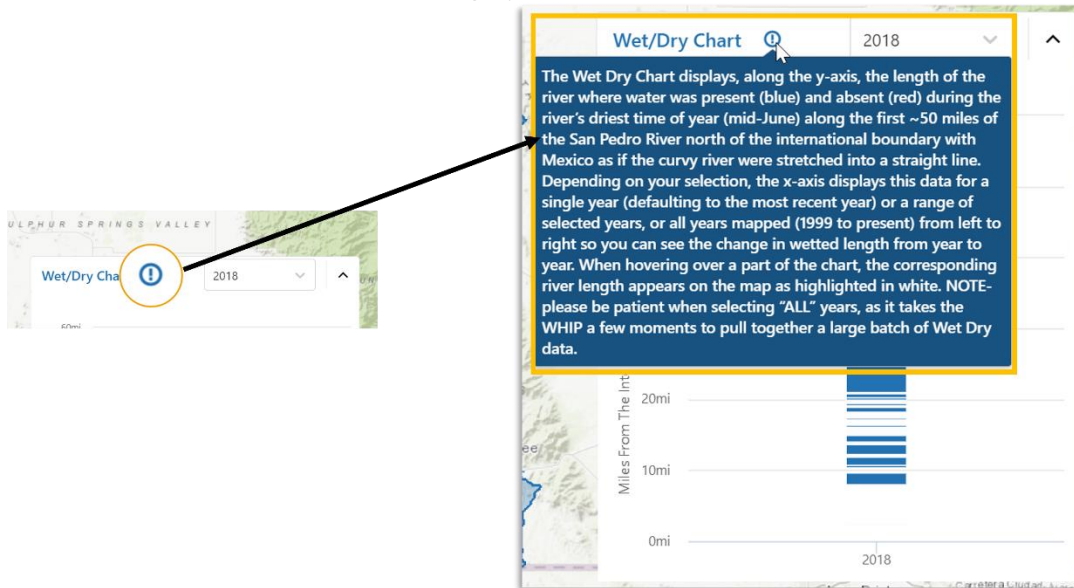


1. Select a year for the chart of the selected indicator.

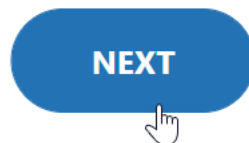


2. The chart will calculate and display the data for the selected year and area of interest (if defined). The chart will display an output based on the selections.

To **interpret the graphs**, an information button “!” is available next to the title of the graph. Click to read more about how to understand the graph.



Once you have selected your area (optional) and indicator(s) of interest, you have the option to define a date range for your data to export and/or generate a final report for your data of interest. On the left-hand panel, you will see a “Next” button below the Indicator menu. Click “Next” to proceed to the last step to define the date range of your selection.



3. Define date range for selected indicator(s)

The next step in the Data Explorer is to define a date range of interest for your data. This allows you to manually define the start and end date of the time range for which you wish to export and/or generate a final report for your data of interest. In this panel, you have the option to proceed to the final step of the Data Explorer – click **“Next”** to proceed to the Export Report tool.

To change an area of interest and/or indicator(s), click **“Back”** to return to the previous steps to make changes to your previous selections.

2 SELECT DATE RANGE

Use the date selector below to set the date range for your report. Some data may not be available for all date ranges, in that event the data will be displayed along side the other time filtered dataset.

Start Date

01/01/2000

End Date

01/01/2020

January 2000

January 2000

Su	Mo	Tu	We	Th	Fr	Sa
26	27	28	29	30	31	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

Define the start and end dates of your date range

Go back to Area and Indicator selection

Proceed to Export Report

BACK

NEXT

4. Export Report

The final step in the Data Explorer is to export your selected data in two formats: **“Print a PDF”** and **“Download Data”** - you have the option to do *either* or *both*. A PDF document will export your data in a summarized format, and the direct data download will export selected data in a raw table format (.csv) to your local drive for further analysis outside the WHIP.

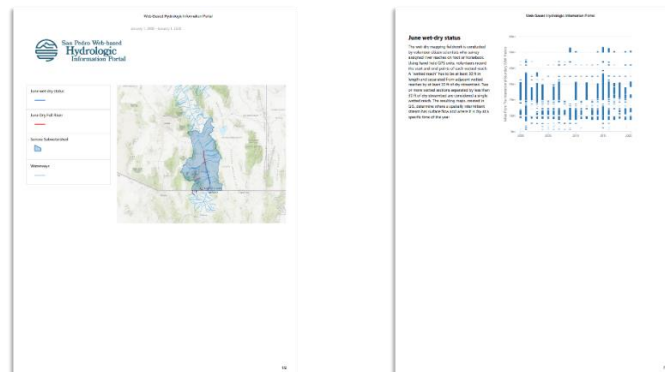


Print PDF

A preview of the map and graphs generated in the previous steps will be available prior to exporting the PDF report. Ensure your selection of the geography, indicator(s), and date range are what you want; if not, click the **“Back”** button to navigate to the previous steps to adjust accordingly.

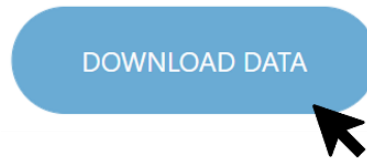
PRINT PDF

Click the **“Print PDF”** button when your selection is finalized. A *Print* window will appear with a preview of the report print layout. In addition to printing, you can also **“Save as a PDF”** to your local files. It is best to select **“Save to PDF”** in the *Print* panel (it may not be the default) to ensure any embedded links remain intact.



Download Data

The data on the selected geography, indicator(s), and date range can also be downloaded for further exploration outside the WHIP. Simply click on the **“Download Data”** button. The download file will appear in your local file downloads folder.

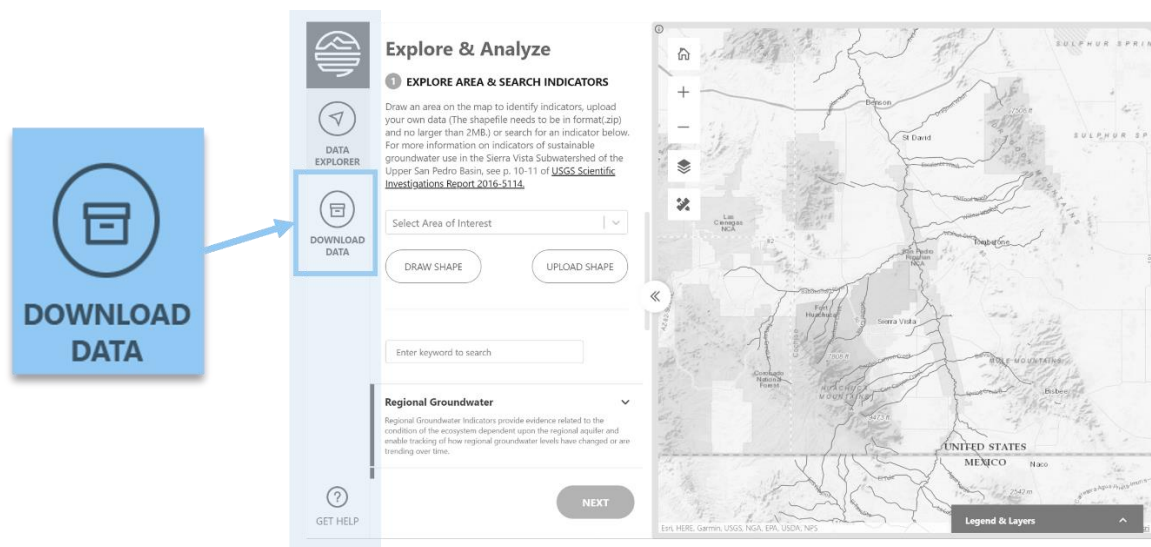


Export the data to both a PDF report *and* tabular data download all at once, in a single click, with the **“Print & Download”** button.



6. Search & Download Data

Bypass the exploratory steps in the previous section and directly proceed to downloading the data through the **Download Data** panel. This panel allows you to directly search and select your indicator(s) of interest, review your selection(s), and download a zip file of the selected data to your local drive.



Steps to Search and Download Data

1. **Search** for the indicator manually or by keyword.
2. **Select** the indicator(s) of interest.
3. **Preview** the selected indicator data in a tabular preview.
4. Click **+ Add** to Downloads to finalize selection. Repeat steps for every indicator you wish to download.
5. **Download** all selected datasets with the Click “Download All” button at the bottom-right corner of the window. The *(Total Number) Items Selected* text next to the “Download All” button will display the total number of datasets you have selected for download.

[illegible]