

- 1. What is the Spring Prioritization Tool 1.0?** The Spring Prioritization Tool 1.0 contains an Excel database of attributes for 3,891 total springs and calculated scores for comparing relative spring conservation value, threat, and isolation from other water sources. It was developed to help land managers and conservation practitioners in the northern Sky Island Region (Southern Arizona) better understand the physical, biological, and social context for springs in their region and to aid the prioritization of conservation activities. The spreadsheet is called *SpringTool_v1.0.xlsx* and includes the following sheets:
 - **Metadata:** List of variable description, unit of measurement, scale of analysis, data source, date or version of data acquisition, hyperlink to data source, and notes on any data calculation conducted.
 - **SpringsData:** Compiled original data on variables for all springs included in the project.
 - **ScoringMethod:** Description of how spring scores (conservation value, threat, and isolation) were calculated for all mapped springs and a subset of surveyed springs.
 - **ScaledSpringsData:** Compiled springs data converted to a 0-10 scale which serve as inputs to spring score calculations.
 - **Weighting:** Adjustable weighting to calculate spring scores from springs data.
 - **SpringScores:** Calculated scores for spring conservation value, threat, and isolation and other key attributes included to aid spring prioritization for conservation activities
 - **KeyFindings:** Prioritization analyses for all springs included in the region.
- 2. I just want to see the springs on a map, how do I do that?** Mapped spring scores can be visualized here:
<http://skyisland.maps.arcgis.com/apps/webappviewer/index.html?id=e1a66f71f0e24cf7bac41a1a222c75cc>
- 3. Where can I get the tool?** You can download the tool, a shapefile of the springs in the tool, and this FAQ document at <https://www.skyislandalliance.org/publications/research-papers/>. To download the tool, just fill out the form, then click on the link that will pop up after you submit the form.

SPRING PRIORITIZATION TOOL V1.0

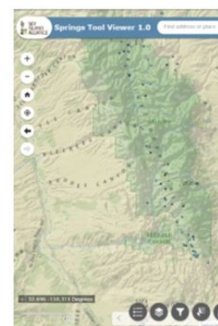
This Spring Prioritization Tool was developed to help land managers and conservation practitioners in the northern Sky Island Region (Southern Arizona) better understand the physical, biological, and social context for springs in their region and to aid the prioritization of conservation activities. Version 1.0 includes 3,891 total springs (328 surveyed springs).

[*Spring Prioritization Tool v1.0 map viewer*](#)

[*Spring Prioritization Tool v1.0 FAQ*](#)

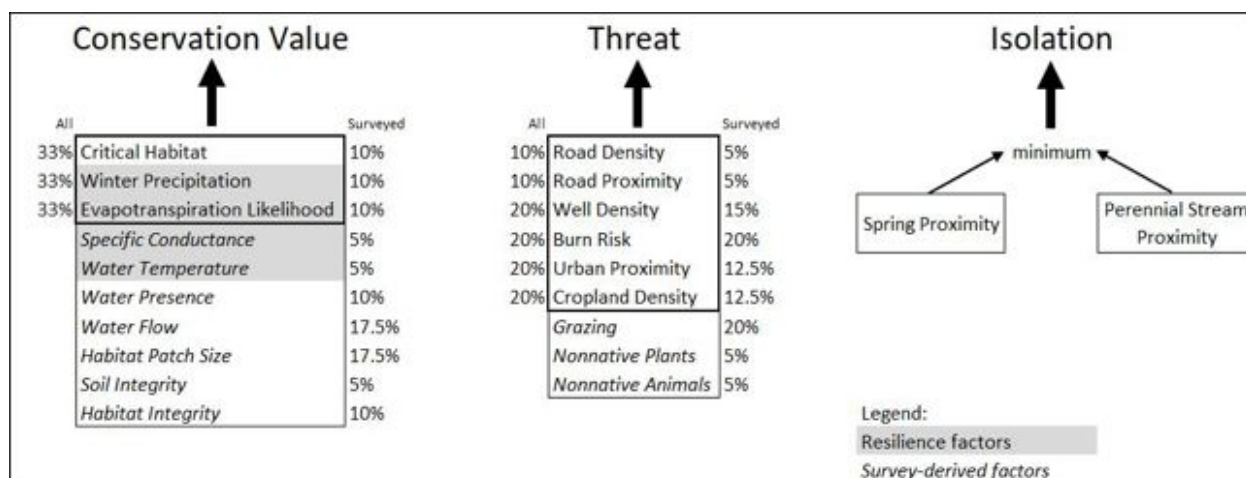
THANKS FOR FILLING THAT OUT!

HERE IS THE SPRING PRIORITIZATION TOOL V1.0.



← **CLICK ME!**

4. **I need help, who do I contact?** Sami Hammer with Sky Island Alliance is available for technical support. Please contact Sami at sami@skyislandalliance.org or (520) 624-7080 x16.
5. **Who made this project possible?** This project was supported by the Bureau of Reclamation WaterSMART Applied Science Grant for the Desert and Southern Rockies Landscape Conservation Cooperatives and the Nina Mason Pulliam Charitable Trust. The creators of the Springs Prioritization Tool 1.0 acknowledge and appreciate the many contributions of technical experts and spring survey volunteers who made this project possible.
6. **What datasets were used?** Data compiled for analysis were derived from many sources; please see the “Metadata” tab in the spreadsheet *SpringTool_v1.0.xlsx* to view the list of variable descriptions, unit of measurement, scale of analysis, data source, date or version of data acquisition, hyperlink to data source when available, and any notes on data calculation conducted prior to inclusion in the database.
7. **How were spring scores calculated?** See the “ScoringMethod” tab in the spreadsheet *SpringTool_v1.0.xlsx* to read the full description of what variables were included in each score. All variables were scaled from 0-10 prior to inclusion in the score calculations (scaled spring data available on the “ScaledSpringsData” tab). In the diagram below, you can see the variables and default weighting used in each score:



8. **Why are there two sets of spring scores, some called “all” and some called “surveyed only”?** An additional conservation value and threat score was calculated for springs that were surveyed at least once because more information was available. Every spring included in the project has a score based on GIS-derived data only (aka the “All Springs” score), but some also have a survey-based score (aka the “Surveyed Springs” score).
9. **How do I adjust the weighting in the calculated spring scores?** In the spreadsheet *SpringTool_v1.0.xlsx*, go to the “Weighting” tab. Change the relative weighting for each component of the calculated Conservation Value and Threat Scores separately. It will automatically adjust the final variable to ensure the total adds up to 100, so manually adjust the weighting of other variables in the score until the desired weighting is achieved. For example, to increase the importance of “Critical Habitat” in the Conservation Value score, you could change the weighting value to 50 in the “all”

column and decrease the weighting of “Evapotranspiration Likelihood” to 25. “Winter Precip” will automatically adjust to the remainder: 25. Adjust the “Surveyed Only” column proportionally.

Original Weighting:

	All	Surveyed Only
Conservation Value		
Critical Habitat	33.3	10
Evapotranspiration Likelihood	33.3	10
Winter Precip	33.4	10
<i>Water Presence</i>		10
<i>Water Flow</i>		17.5
<i>Habitat Patch Size</i>		17.5
<i>Soil Integrity</i>		5
<i>Habitat Integrity</i>		10
<i>Specific Conductance</i>		5
<i>Water Temperature</i>		5
Threat		
Road Density	10	5
Road Proximity	10	5
Well Density	20	15
Cropland Density	20	12.5
Urban Proximity	20	12.5
Burn Risk	20	20
<i>Grazing</i>		20
<i>Non-native Plants</i>		5
<i>Non-native Animals</i>		5

Example Weighting Change (yellow cells):

	All	Surveyed Only
Conservation Value		
Critical Habitat	50	20
Evapotranspiration Likelihood	25	10
Winter Precip	25	10
<i>Water Presence</i>		10
<i>Water Flow</i>		15
<i>Habitat Patch Size</i>		15
<i>Soil Integrity</i>		5
<i>Habitat Integrity</i>		5
<i>Specific Conductance</i>		5
<i>Water Temperature</i>		5
Threat		
Road Density	10	5
Road Proximity	10	5
Well Density	20	15
Cropland Density	20	12.5
Urban Proximity	20	12.5
Burn Risk	20	20
<i>Grazing</i>		20
<i>Non-native Plants</i>		5
<i>Non-native Animals</i>		5

- **Pro Tip #1:** Save a separate version of the spreadsheet before you begin to change values in case you want to reset to the original weighting.

- **Pro Tip #2:** To export reweighted spring scores to Google Earth for viewing:
 - Save the “SpringScores” tab as a comma delimited CSV file.
 - On your computer, open Google Earth Pro.
 - Click File>Import.
 - Browse to the location of the CSV file and open it.
 - In the box that appears, next to Field Type, choose Delimited.
 - Next to Delimited, choose Comma.
 - Use the preview pane to ensure your data has imported correctly and click Next.
 - Select the fields that contain the latitude and longitude data and click Next.
 - Click Finish.
 - To use a style template, click Yes.
 - Click OK.
 - Create a new style template, or use a previously generated template.
 - You can adjust the name, color, icon, and height for your placemark. If you like, save your selections as a template to use in the future.
 - SIA has created several style templates that may be useful for viewing spring data. Contact Sami for more info.

10. Which springs have water? To answer this question for each spring, look at the following two variables on the “SpringsData” tab of the *SpringTool_v1.0.xlsx* spreadsheet:

- **Water Presence (Water_Pres):** The average percentage of spring survey visits when free water was visibly present, where higher values represents more consistent water availability and therefore higher conservation value. The accuracy of this parameter is affected by the number and seasonal timing of spring surveys, so values could inaccurately suggest perennality if the surveys were only conducted in the wettest time of year.
- **Water Flow (MeasuredFI):** The average flow measurements of the spring, when flow was measurable, where higher values represent greater water availability and therefore higher conservation value. The accuracy of this parameter is affected by the number and seasonal timing of spring surveys, so values could inaccurately suggest consistently high water availability if the surveys were only conducted once, or in the wettest time of year.

11. Which springs are most accessible? To answer this question for each spring, look at the distance in kilometers to the closest known road or rail which is variable **Dist_2_Rd** in the *SpringTool_v1.0.xlsx* spreadsheet.

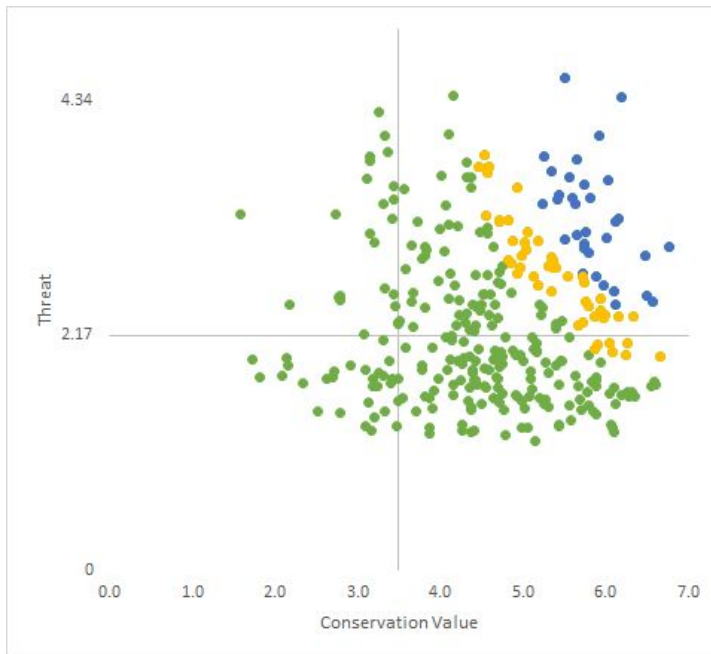
12. Which springs are the most threatened? To answer this question, you can view the calculated threat scores in multiple ways:

- Compare the calculated threat scores on the “SpringScores” tab in the *SpringTool_v1.0.xlsx* spreadsheet.
- View the relative threat scores on the [Map Viewer](#) for all springs by selecting the “Spring Scores - Threat All” data layer for 3,891 springs or the “Spring Scores - Threat Surveyed” data layer for the 328 surveyed springs.
- Look at the distribution of threat scores across springs on the “KeyFindings” tab of the *SpringTool_v1.0.xlsx* spreadsheet.

13. Which spring need protection most urgently?

Identify the springs that score highly for both conservation value and threat. You can view these data in multiple ways:

- View the high priority springs on the [Map Viewer](#) by selecting the “Highest Conservation Value, Highest Threat Springs” data layer for the 328 surveyed springs. If you also select the “Land Management” data layer, you can see the corresponding land management unit for high priority springs.
- On the “KeyFindings” tab of the *SpringTool_v1.0.xlsx* spreadsheet, springs in the lower left quadrant (low conservation value, low threat) may not be a priority for allocation of resources. Springs in the upper right quadrant (high conservation value, high threat) might be the highest priority springs, depending on the type of threat they face. The best investment may be springs of high conservation value and moderate to low threat (middle of right half). Conservation value and threat for surveyed springs does not seem to be correlated.



Very isolated springs that score highly for conservation value could be another way to identify priority springs. Those are shown in the upper right quadrant of this graph, and have Conservation Value - Surveyed scores over 3.5 and Isolation scores of 5 or more.

