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Upper Gunnison Basin Boatable Days Web Tool Step-by-Step Instruction Guide

This Boatable Days Web Tool is an open-access resource owned by the Upper Gunnison River Water Conservancy District (Upper Gunnison District) developed in partnership with American Whitewater, Lotic Hydrologic, and the Upper Gunnison District Watershed Management Planning Team. This tool is available to water managers, river outfitters, recreational enthusiasts, and other interested stakeholders to assess how historical, current, and future flow conditions impact river recreation opportunities on the Taylor and Upper Gunnison Rivers. This project was made possible through the generous support of the Colorado Water Conservancy Board's Colorado Watershed Restoration Program and Stream Management Planning Grant, the Upper Gunnison District, and American Whitewater.

Disclaimer: Nothing in this Web Tool guarantees the safety or navigability of any particular river segment. Rivers are inherently dangerous and unexpected changes to the natural and manmade environment can occur at any time.

Section 1: Instructions for Analyzing Boatable Days Using Pre-Defined Year Types

1. Launch the Boatable Days Web Tool directly from the [Upper Gunnison River Water Conservancy District's webpage](#).
2. The Web Tool's home page displays the parameters that need to be identified to analyze Boatable Days. Select the river, user group, and river segment of interest. Next, select the two year-types (Year Type 1 and Year Type 2) or hydrologic scenarios to assess, such as dry year versus wet year. If you select the pre-defined year type you do not need to input any custom streamflow time series data. See page 4 for instructions on evaluating a custom flow time series. When all the parameters are selected, click the "Run Analysis" button as demonstrated below.

Boatable Days Analysis: Gunnison and Taylor Rivers

Make selections from each of the dropdowns below to run a Boatable Days analysis. Select a river, reach, user group, and two scenarios from the dropdown menus below that you want to use to calculate Boatable Days. You may enter up to two custom streamflow time series by clicking the 'Run Analysis' button and navigating to the table at the bottom of the page.

Select River	Select User Group	Select Section	Select Year Type 1	Select Year Type 2
Taylor	Commercial Rafting	Todds Slot to South Bank	Dry	Wet

Run Analysis

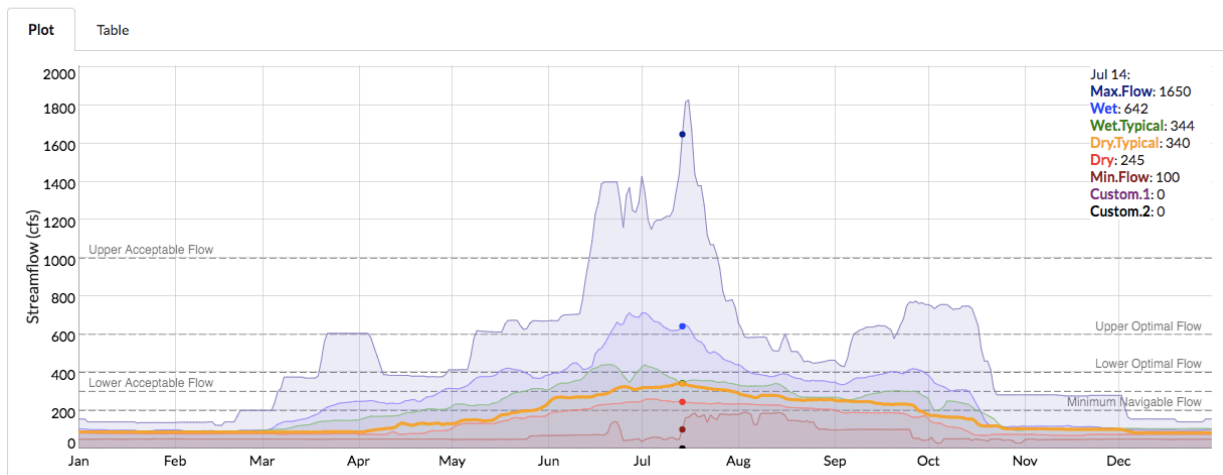
The first set of results will be the hydrologic output displayed in two separate tabs as a graphical “Plot” and “Table”.

3. Review the hydrographical outputs in the “Plot” tab. The output will include a flow time series for each year-type in addition to the minimum and maximum flows recorded each day over the 43-year period of record (1975-2018). Flow preference thresholds for the chosen river recreation user group, river segment, and the range from Minimum Navigable to Upper Acceptable flows will be displayed. Using your cursor, hover above the streamflow line on the graph in order to see average daily flow values for each time series as shown in the screenshot. As you scroll across the hydrographs, flow values will display in the top right corner of the chart.

Hydrological Scenarios

USGS Gauge ID: 09109000
[Link to USGS gauging station website](#)

The interactive plot below displays hydrographs from several characteristic year types. These values were developed by statistically summarizing historical daily streamflow gauging records (see link above) into characteristic year types. User-defined thresholds for Upper Acceptable, Optimal, Lower Acceptable, and Minimum Navigable flows are indicated as dashed horizontal lines on the graph. Use your cursor to explore the plot or view the tabular data to assess streamflow values associated with each scenario. You may enter your own time series data in the table at the bottom of the page to create a custom scenario for boatable days comparisons.



4. Review the tabular outputs for each pre-defined time series by clicking on the second “Table” tab. Daily average flows are shown for each year-type along with minimum and maximum flows.

Hydrological Scenarios

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The interactive plot below displays hydrographs from several characteristic year types. These values were developed by statistically summarizing historical daily streamflow gauging records (see link above) into characteristic year types. User-defined thresholds for Upper Acceptable, Optimal, Lower Acceptable, and Minimum Navigable flows are indicated as dashed horizontal lines on the graph. Use your cursor to explore the plot or view the tabular data to assess streamflow values associated with each scenario. You may enter your own time series data in the table at the bottom of the page to create a custom scenario for boatable days comparisons.

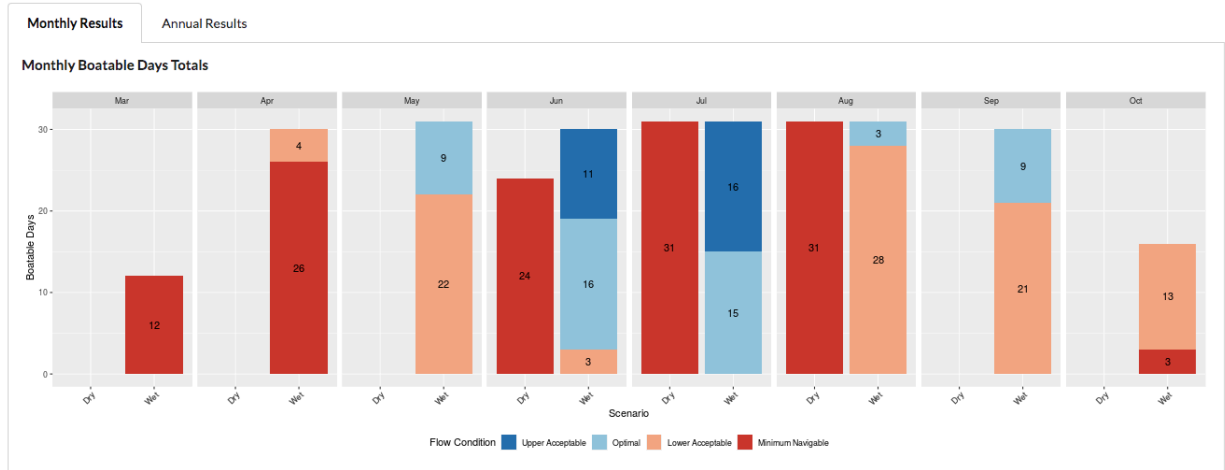
Plot **Table**

Month	Day	Min.Flow	Dry	Dry.Typical	Wet.Typical	Wet	Max.Flow
Jan	1	49	82	87	91	103	155
Jan	2	49	81	87	91	102	155
Jan	3	49	82	87	91	103	155
Jan	4	49	81	87	91	100	140
Jan	5	49	81	87	91	99	140
Jan	6	49	81	87	91	99	140
Jan	7	49	80	87	91	99	140
Jan	8	49	80	87	90	99	140
Jan	9	50	79	87	91	99	140
Jan	10	50	80	87	91	98	140
Jan	11	50	79	87	91	96	140

5. Scroll down and click on the “Monthly Results” tab to view the monthly Boatable Days results for your selected river segment, user group, and flow scenario. Flow preferences are noted in the legend below the plots (e.g., navigable, acceptable, optimal).

Monthly and Annual Boatable Days Totals

The plots below indicate the number of days that fall into a variety of flow preference categories for user groups selected above. Days may fall into one of the following categories in any given month or year: Upper Acceptable, Optimal, Lower Acceptable, and Minimum Navigable. Results for the comparison of the two scenarios selected in the sidebar are displayed side-by-side for each month in the chart on the left. The total number of days in each category is printed on the stacked columns. Months with zero Boatable Days under both scenarios are not included in the chart. The chart on the right displays annual Boatable Days totals for each preference category.



6. Click on the “Annual Results” tab to view annual Boatable Days totals for the two selected scenarios. Use the monthly Boatable Days results in conjunction with the annual totals to get the most accurate information.

Monthly and Annual Boatable Days Totals

The plots below indicate the number of days that fall into a variety of flow preference categories for user groups selected above. Days may fall into one of the following categories in any given month or year: Upper Acceptable, Optimal, Lower Acceptable, and Minimum Navigable. Results for the comparison of the two scenarios selected in the sidebar are displayed side-by-side for each month in the chart on the left. The total number of days in each category is printed on the stacked columns. Months with zero Boatable Days under both scenarios are not included in the chart. The chart on the right displays annual Boatable Days totals for each preference category.

Monthly Results **Annual Results**

Annual Boatable Days Totals

Year Type	Flow Condition	Total Days
Dry	Minimum Navigable	86
Wet	Lower Acceptable	91
Wet	Minimum Navigable	41
Wet	Optimal	52
Wet	Upper Acceptable	27

Section 2: Instructions for Analyzing Boatable Days Using a Custom Flow Time Series

1. Analyzing one or two custom time series: Using the custom time series feature, the Web Tool analyzes the Boatable Days results for a specific year or for future projected flows. A custom time series can be compared to a pre-defined year-type or to a second custom time series. As shown below, use the “[Select Year Type](#)” dropdown menus to select one or two custom inputs. Then, click the “Run Analysis” button. *Note: If you need help generating a custom time series, please email Beverly Richards at beverly@uqrwcd.org.*

Boatable Days Analysis: Gunnison and Taylor Rivers

Make selections from each of the dropdowns below to run a Boatable Days analysis. Select a river, reach, user group, and two scenarios from the dropdown menus below that you want to use to calculate Boatable Days. You may enter up to two custom streamflow time series by clicking the 'Run Analysis' button and navigating to the table at the bottom of the page.

Select River:

Select User Group:

Select Section:

Select Year Type 1:

Select Year Type 2:

2. After clicking the “Run Analysis” button, scroll down to the “User Defined Time Series” table. The custom time series can be copied and pasted directly into the appropriate column. If only one custom time series is input, ensure that the column matches the selected scenario (Custom.1 vs. Custom.2). Important: You must click “Run Analysis” again for the results to appear.

User Defined Time Series

You may enter your own streamflow time series data in one or more of the 'Custom' columns below. These time series can then be used as a basis for comparison to other year types or to each other for the purposes of Boatable Days calculations. Values can be entered into the table clicking and editing one cell at a time. Alternatively, multiple values can be copied from a spreadsheet (Ctrl + C) and pasted into a column by clicking a starting cell and then using a keystroke shortcut (Ctrl + V) to enter values into the selected cell and the cells below it.

Reset Table

	Month	Day	Custom.1	Custom.2
1	Jan	1	500.0	1000.0
2	Jan	2	500.0	1000.0
3	Jan	3	500.0	1000.0
4	Jan	4	500.0	1000.0
5	Jan	5	500.0	1000.0
6	Jan	6	500.0	1000.0
7	Jan	7	500.0	1000.0
8	Jan	8	500.0	1000.0
9	Jan	9	500.0	1000.0
10	Jan	10	500.0	1000.0
11	Jan	11	500.0	1000.0
12	Jan	12	500.0	1000.0
13	Jan	13	500.0	1000.0
14	Jan	14	500.0	1000.0
15	Jan	15	500.0	1000.0
16	Jan	16	500.0	1000.0
17	Jan	17	500.0	1000.0
18	Jan	18	500.0	1000.0
19	Jan	19	500.0	1000.0