GUIDE FOR CREATING STAND-ALONE URLS FOR THE DATA GRAPHER SYSTEM

Although the Data Grapher has a full HTML interactive interface embodied in the web pages found at https://or.water.usgs.gov/grapher/, the system also allows for an automated creation of customized graphs and tables through the use of URLs that specify all of the details needed to create and retrieve those graphs and tables.

The Data Grapher consists of the following programs, each of which has slightly different inputs, and therefore slightly different parameters that may be used in a valid URL:

- Single-Site Data Grapher, time series or XY graphs
- Two-Site Data Grapher, time series or XY graphs
- Three-Site Data Grapher, time series
- Multiple-Site Data Grapher, time series
- Data Grapher by Year or Month
- Color Map Data Grapher
- Data Grapher with Percentiles
- XY Plot Data Grapher, with special features
- Wind Rose Data Grapher
- Multiple-Graph or Multiple-Parameter Data Grapher (HTML output only)
- Monthly and Daily Inventory (HTML output only)
- Data Tabler

For more information about the Data Grapher system of programs, you can view several how-to tutorials at https://or.water.usgs.gov/grapher/tutorial/how_to.html and examine a set of example graphs and tables at https://or.water.usgs.gov/grapher/tutorial/examples.html.

Using this guide, you can create a URL that can be used independently of the Data Grapher's online interface. Once a URL is constructed, it may be pasted into a web browser manually or used in an automated program that connects to the internet to return a graphic image or a table file. The URL also can be used in an HTML <img> image tag of a web page to embed a Data Grapher graphic into any web page. The syntax to embed a Data Grapher graphic into a web page is as follows:

<img src="*insert Data Grapher URL that produces an image output here*" width=xxx height=yyy alt="graph of something">
where xxx and yyy are the width and height of the resulting image in pixels.

The base URL for each program is given at the beginning of each section below. A question mark (?) follows the base URL before the first argument. An ampersand (&) is used to separate successive arguments, and each argument follows the form "parameter=value". Multiple methods are provided for the specification of start and end dates for the graphs or tables. Examples are provided for each program.

SINGLE-SITE DATA GRAPHER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/grapher.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
graph_type	optional	time_series	Graph type (time_series, xy_plot)
parm1	required	—	First parameter to plot, see list for codes
parm2	optional	none	Second parameter to plot, see list for codes
stat1	optional	unit	Statistic for first parameter; see list
stat2	optional	unit	Statistic for second parameter; see list
run_mean1	optional	off	Code controlling computation of a running mean, first parameter (on, off)
run_mean2	optional	off	Code controlling computation of a running mean, second parameter (on, off)
run_days1	optional	7	Number of days for running mean, first parameter (2-30 days)
run_days2	optional	7	Number of days for running mean, second parameter (2-30 days)
nosupersat1	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), first parameter (on, off)
nosupersat2	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), second parameter (on, off)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
min1	optional	auto	Y axis minimum for first parameter (number or “auto”); > 0 for log scale
max1	optional	auto	Y axis maximum for first parameter (number or “auto”); > 0 for log scale
min2	optional	auto	Y axis minimum for second parameter (number or “auto”); > 0 for log scale
max2	optional	auto	Y axis maximum for second parameter (number or “auto”); > 0 for log scale
xpix	optional	600	Width of final image, in pixels (500-2500, or “auto”)
ypix	optional	615	Height of final image, in pixels (500-2500, or “auto”)
xgrid	optional	all	Keyword controlling whether X axis grid lines are shown (all, major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
color1	optional	0000FF	Hex color code for first parameter (RGB, 0000FF is blue)
color2	optional	FF0000	Hex color code for second parameter (RGB, FF0000 is red)
linew1	optional	1	Code for line width, first parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
linew2	optional	1	Code for line width, second parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
axis1_type	optional	linear	Y axis type for first parameter (linear, log); all data must be > 0 for log scale
axis2_type	optional	linear	Y axis type for second parameter (linear, log); all data must be > 0 for log scale, and axis2_type cannot be different from axis1_type for a time series graph type
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

* Some combination of date inputs is required; see Date Inputs section below

DATE INPUTS

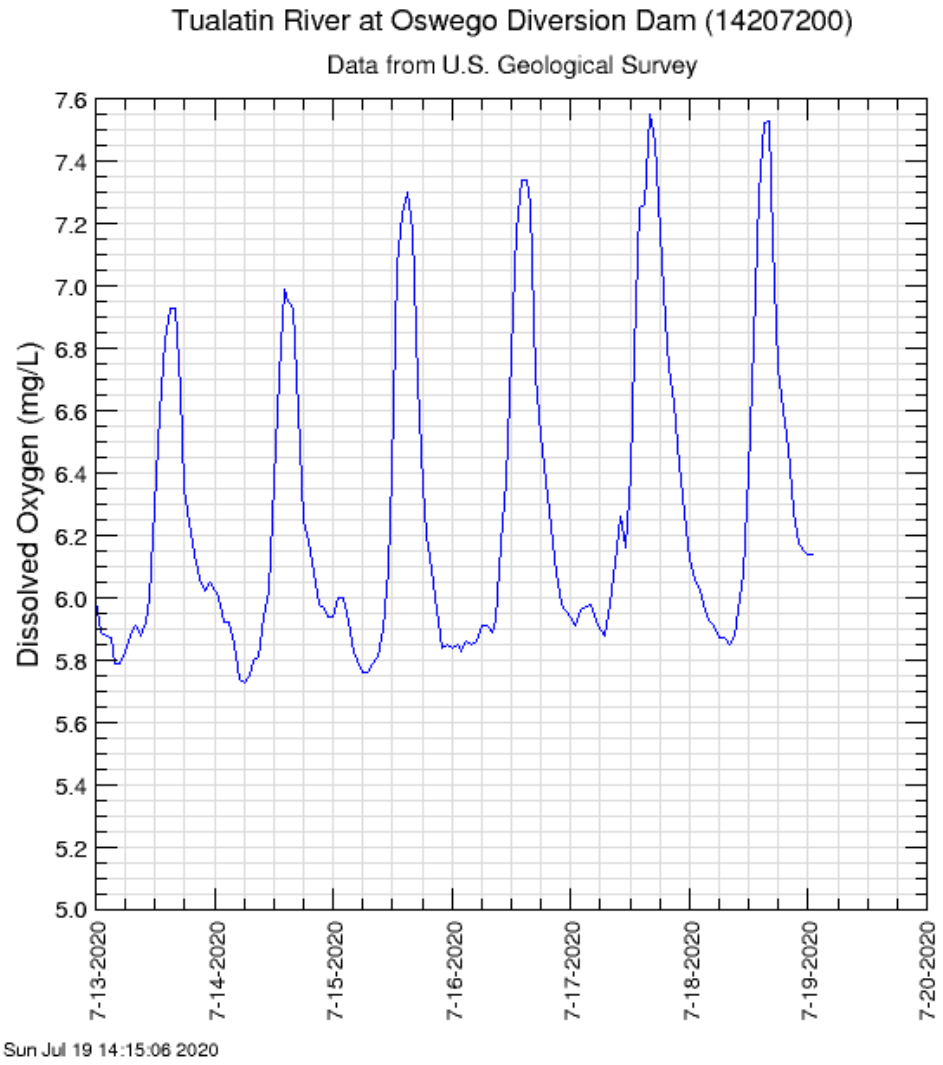
If the *all_dates* input is set to *on*, then the entire dataset will be included, and this input takes precedence over any other combination of date inputs. The *plot_recent* input takes precedence over the *plot_latest* input if both are *on*. It is acceptable to create a plot with no data if the *plot_recent* input is *on* and no data are available in the last number of days specified by the *latest_days* input.

If the *all_dates* input is *off*, then one of four types of date inputs is required:

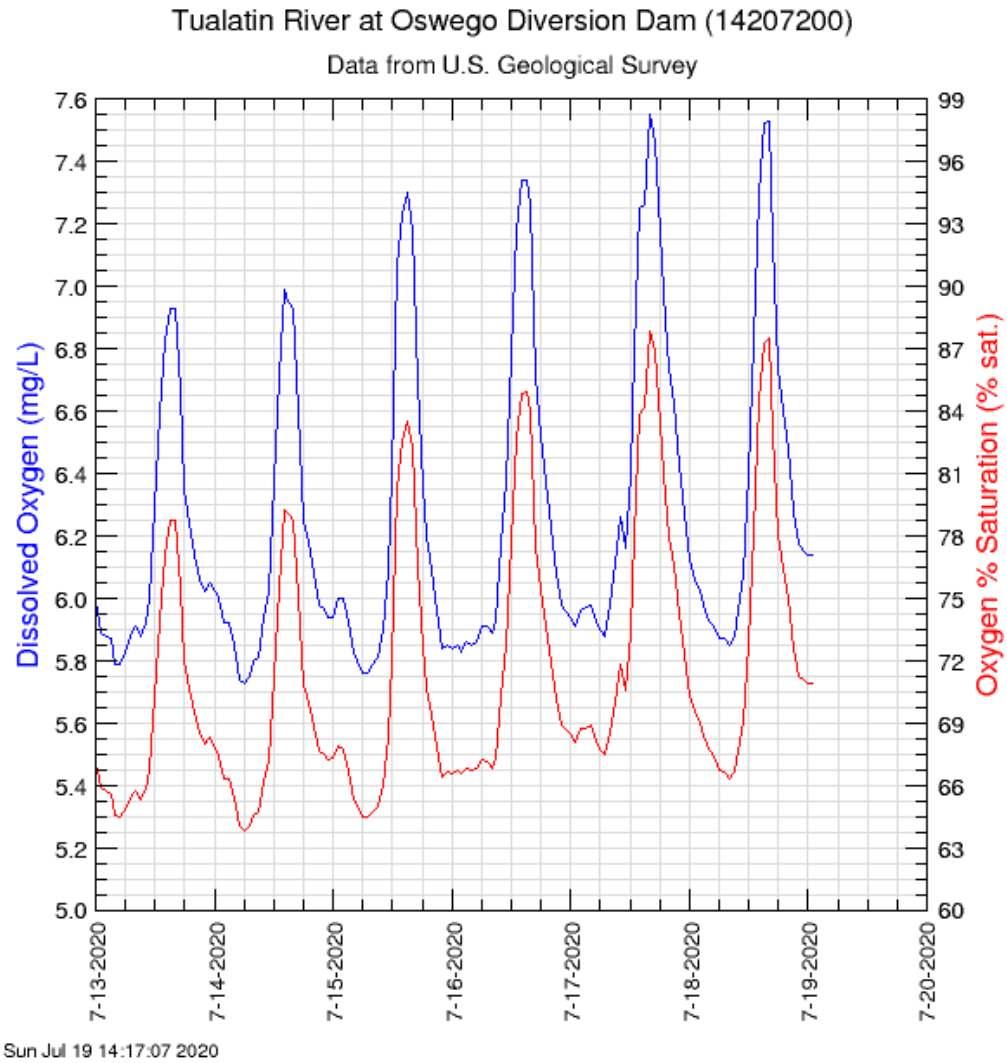
- Perhaps the most commonly used set of date parameters that someone might use is one that specifies recent data, where the end date is today. This is accomplished with the following two arguments:
  plot_recent=on
  latest_days=xx where xx is a number greater than zero (default=30)
  One advantage to this combination of parameters is that the user need not specify any particular dates, so the same URL can be used in the future to produce a similar graph with recent data. If no recent data are available within the *latest_days* period, a graph will be produced without data.
- Another URL construction that does not need to specify any dates is one that requests a certain number of days of data with an end date at the end of the available data, which might not be today. This is accomplished with the following two arguments:
  plot_latest=on
  latest_days=xx where xx is a number greater than zero (default=30)
- The next easiest option is to specify the full start and end dates in YYYYMMDD format:
  begin_date=YYYYMMDD where YYYY= 4-digit year, MM= 2-digit month, and DD= 2-digit day
  end_date=YYYYMMDD where YYYY= 4-digit year, MM= 2-digit month, and DD= 2-digit day
- Finally, the last option is to specify the full starting and ending dates with six inputs:
  begin_day=xx where xx is a number between 1 and 31
  begin_month=xx where xx is a number between 1 and 12
  begin_year=xxxx where xxxx is the four-digit year of the start date
  end_day=xx where xx is a number between 1 and 31
  end_month=xx where xx is a number between 1 and 12
  end_year=xxxx where xxxx is the four-digit year of the end date

EXAMPLES: SINGLE-SITE DATA GRAPHER

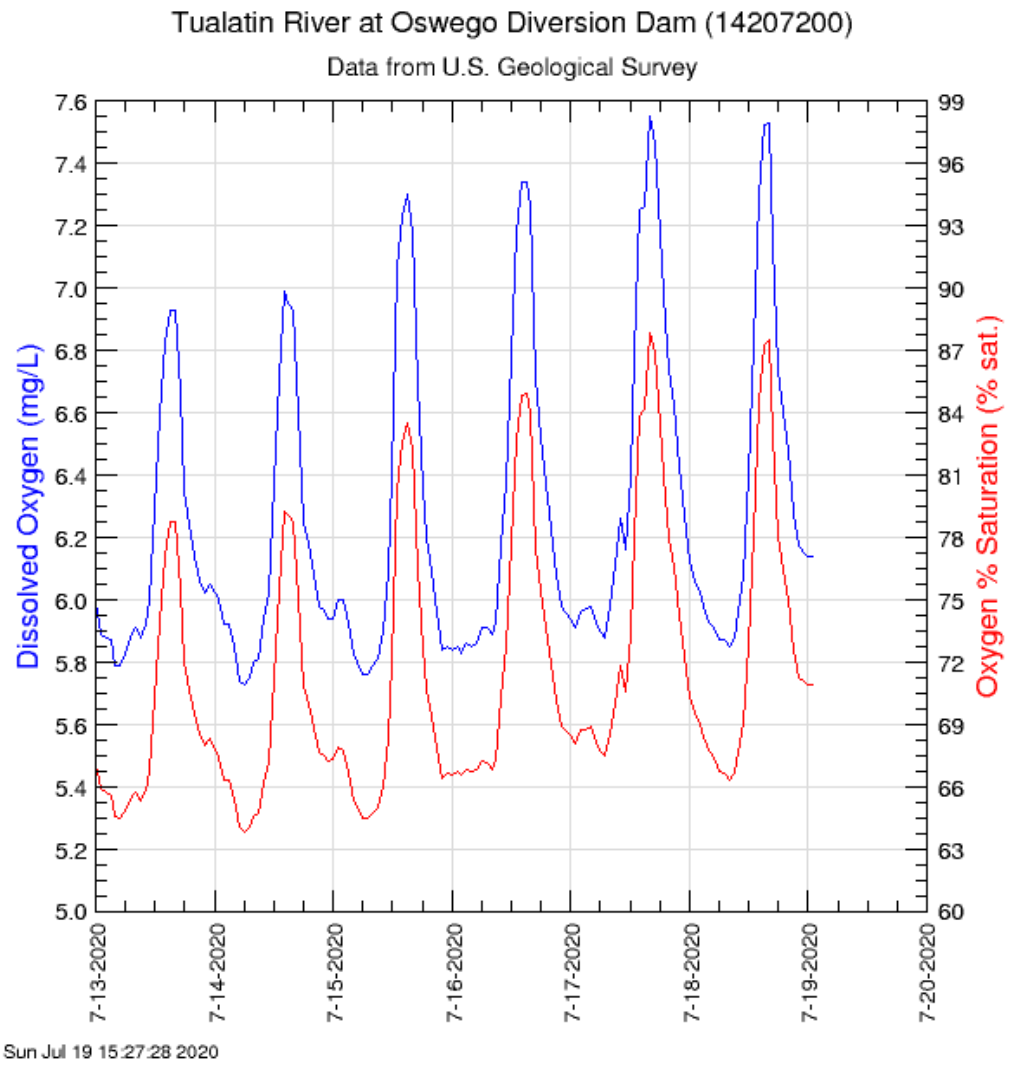
A graphic image (png format) of the last 7 days (*plot_recent=on&latest_days=7*) of dissolved oxygen (*parm1=do*) from site 14207200 (*site_id=14207200*):
https://or.water.usgs.gov/cgi-bin/grapher/grapher.pl?site_id=14207200&parm1=do&plot_recent=on&latest_days=7&download=on



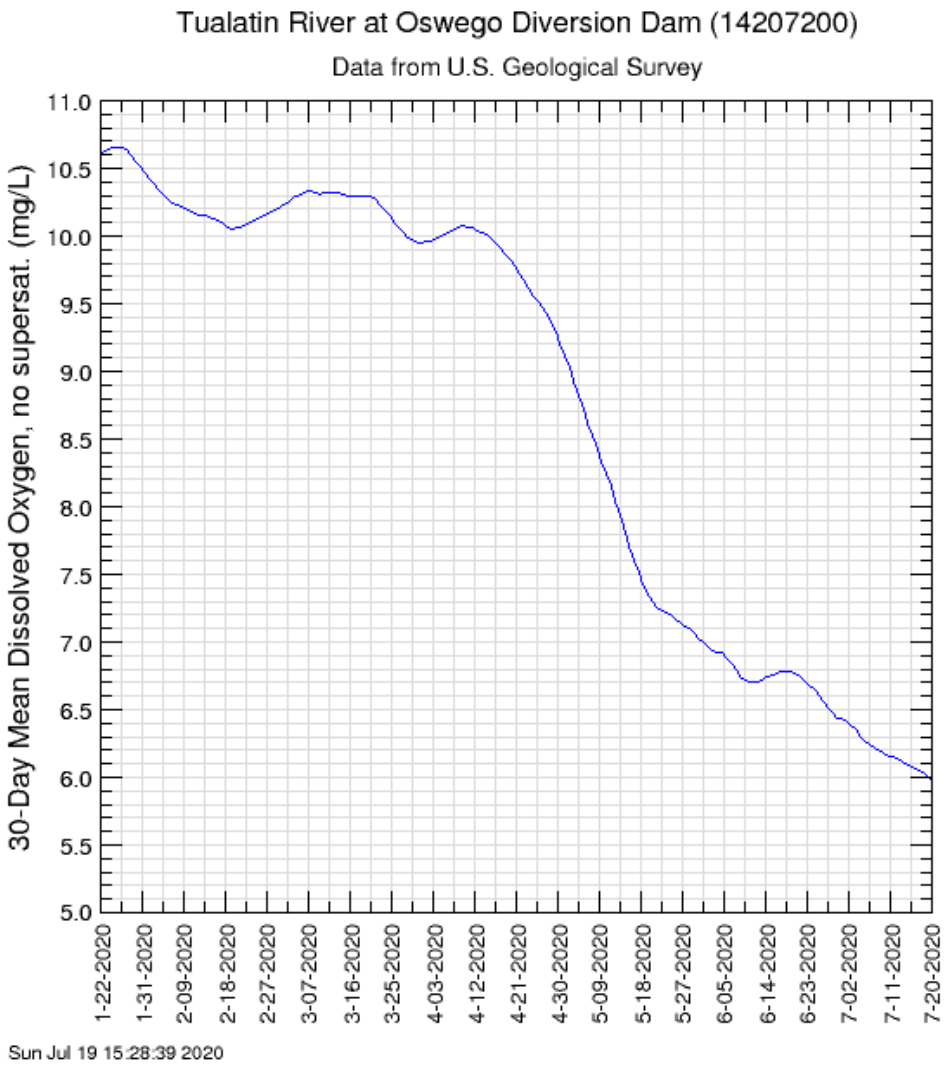
The same graphic (PDF format this time; *filefmt=pdf*), adding oxygen percent saturation as a second parameter (*parm2=psat)*:
https://or.water.usgs.gov/cgi-bin/grapher/grapher.pl?site_id=14207200&parm1=do&parm2=psat&plot_recent=on&latest_days=7&download=on&filefmt=pdf



And the same graph, but removing some of the grid lines (*xgrid=major&ygrid=major*):
https://or.water.usgs.gov/cgi-bin/grapher/grapher.pl?site_id=14207200&parm1=do&parm2=psat&plot_recent=on&latest_days=7&xgrid=major&ygrid=major&download=on&filefmt=pdf



Finally, to make a graph of the 30-day mean of dissolved oxygen concentration (*parm1=do&stat1=mean&run_mean1=on&run_days1=30*), with no credit for supersaturation (*nosupersat1=on*), in PDF format from the same site as above and for the last 180 days (*plot_recent=on&latest_days=180*), use the following URL:
https://or.water.usgs.gov/cgi-bin/grapher/grapher.pl?site_id=14207200&parm1=do&nosupersat1=on&stat1=mean&run_mean1=on&run_days1=30&plot_recent=on&latest_days=180&download=on&filefmt=pdf



TWO-SITE DATA GRAPHER

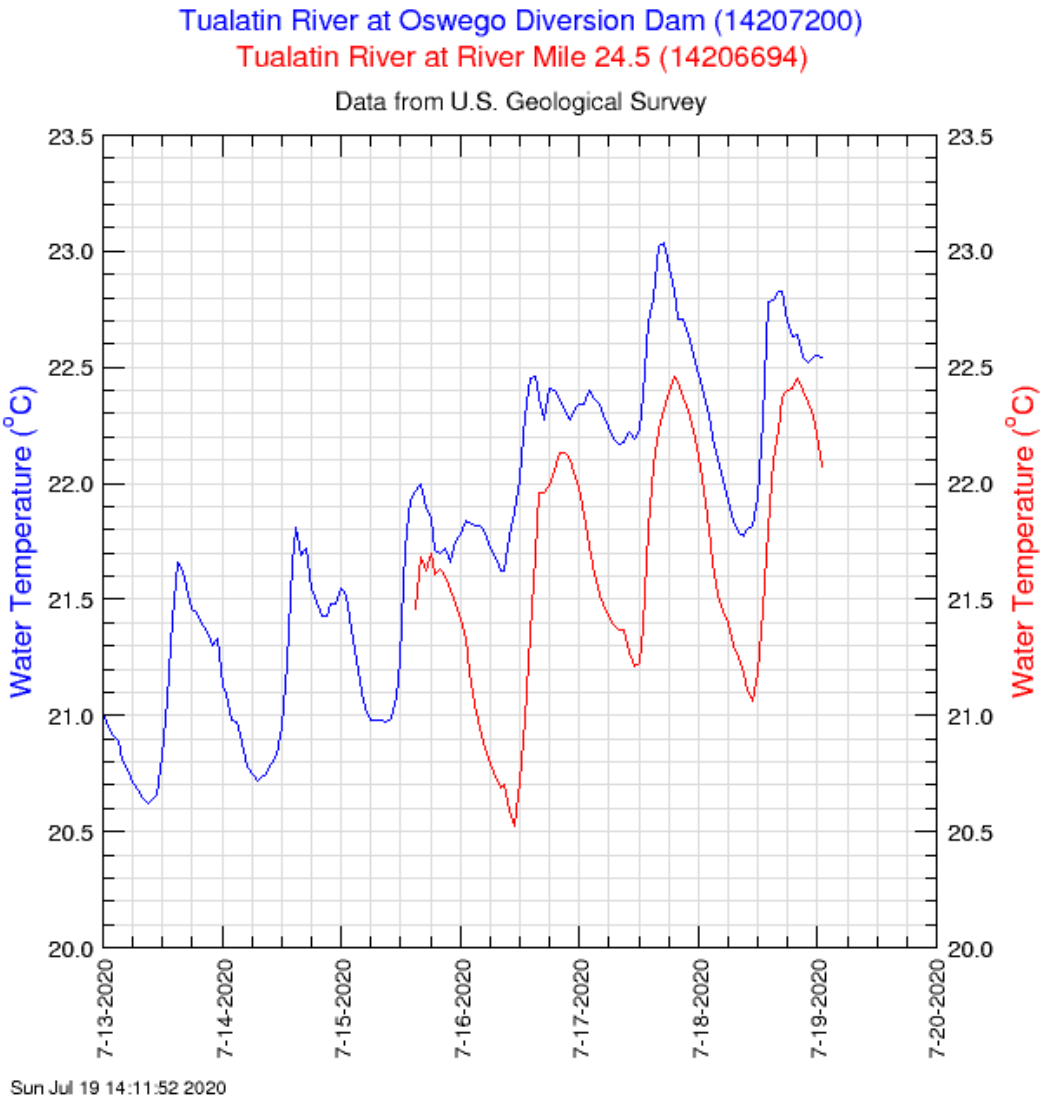
Base URL: https://or.water.usgs.gov/cgi-bin/grapher/grapher_2site.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, first group, specific to Data Grapher
basin2_id	optional	all	USGS basin or site grouping, second group, .specific to Data Grapher
site_id	required	—	USGS site identification number, first site, usually 7 or 15 digits
site2_id	required	—	USGS site identification number, second site, usually 7 or 15 digits
graph_type	optional	time_series	Graph type (time_series, xy_plot)
parm1	required	—	First parameter to plot, see list for codes
parm2	optional	—	Second parameter to plot, see list for codes
stat1	optional	unit	Statistic for first parameter; see list
stat2	optional	unit	Statistic for second parameter; see list
run_mean1	optional	off	Code controlling computation of a running mean, first parameter (on, off)
run_mean2	optional	off	Code controlling computation of a running mean, second parameter (on, off)
run_days1	optional	7	Number of days for running mean, first parameter (2-30 days)
run_days2	optional	7	Number of days for running mean, second parameter (2-30 days)
nosupersat1	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), first parameter (on, off)
nosupersat2	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), second parameter (on, off)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
min1	optional	auto	Y axis minimum for first parameter (number or “auto”)
max1	optional	auto	Y axis maximum for first parameter (number or “auto”)
min2	optional	auto	Y axis minimum for second parameter (number or “auto”)
max2	optional	auto	Y axis maximum for second parameter (number or “auto”)
xpix	optional	600	Width of final image, in pixels (500-2500, or “auto”)
ypix	optional	640	Height of final image, in pixels (500-2500, or “auto”)
xgrid	optional	all	Keyword controlling whether X axis grid lines are shown (all, major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
color1	optional	0000FF	Hex color code for first parameter (RGB, 0000FF is blue)
color2	optional	FF0000	Hex color code for second parameter (RGB, FF0000 is red)
linew1	optional	1	Code for line width, first parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
linew2	optional	1	Code for line width, second parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

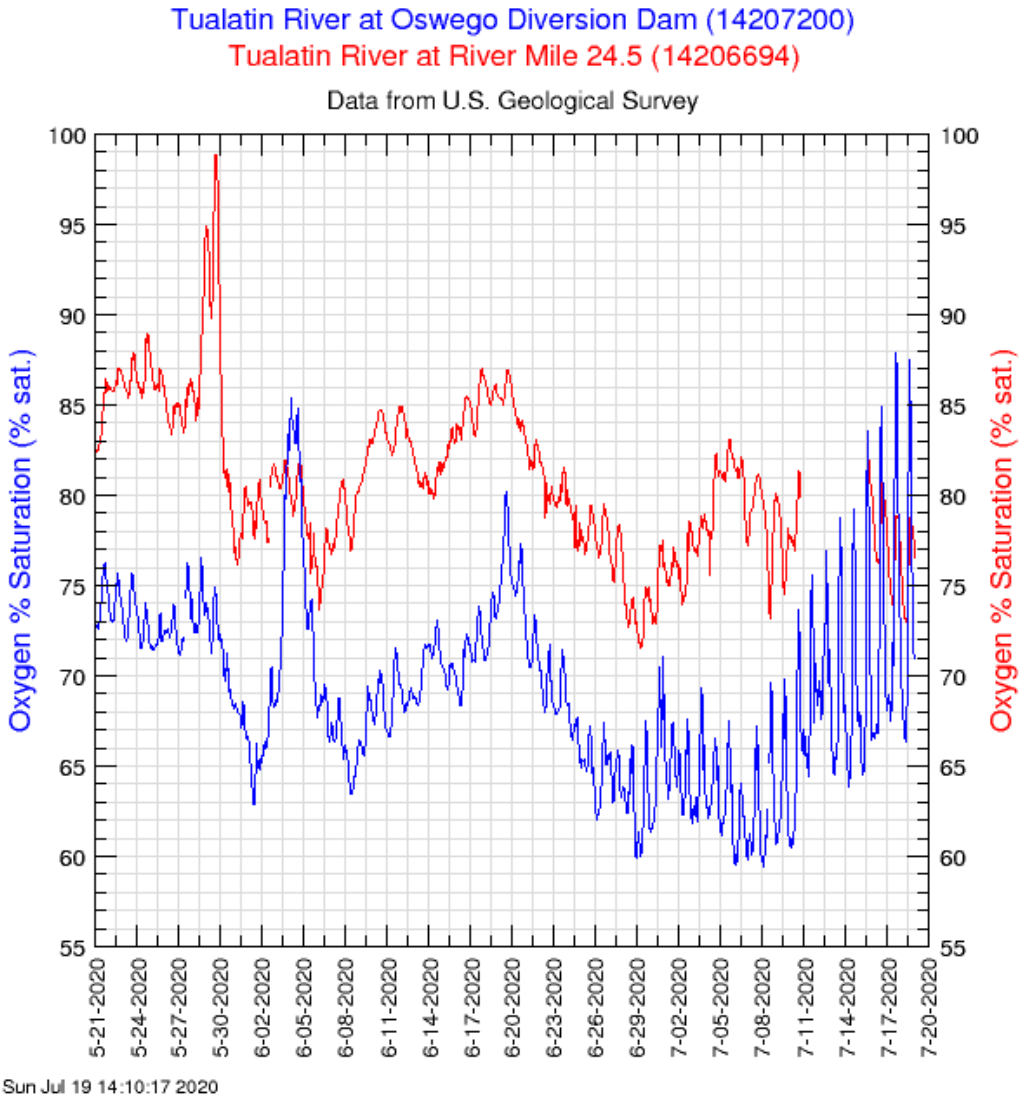
* Some combination of date inputs is required; see Date Inputs section for Single-Site Data Grapher program

EXAMPLES: TWO-SITE DATA GRAPHER

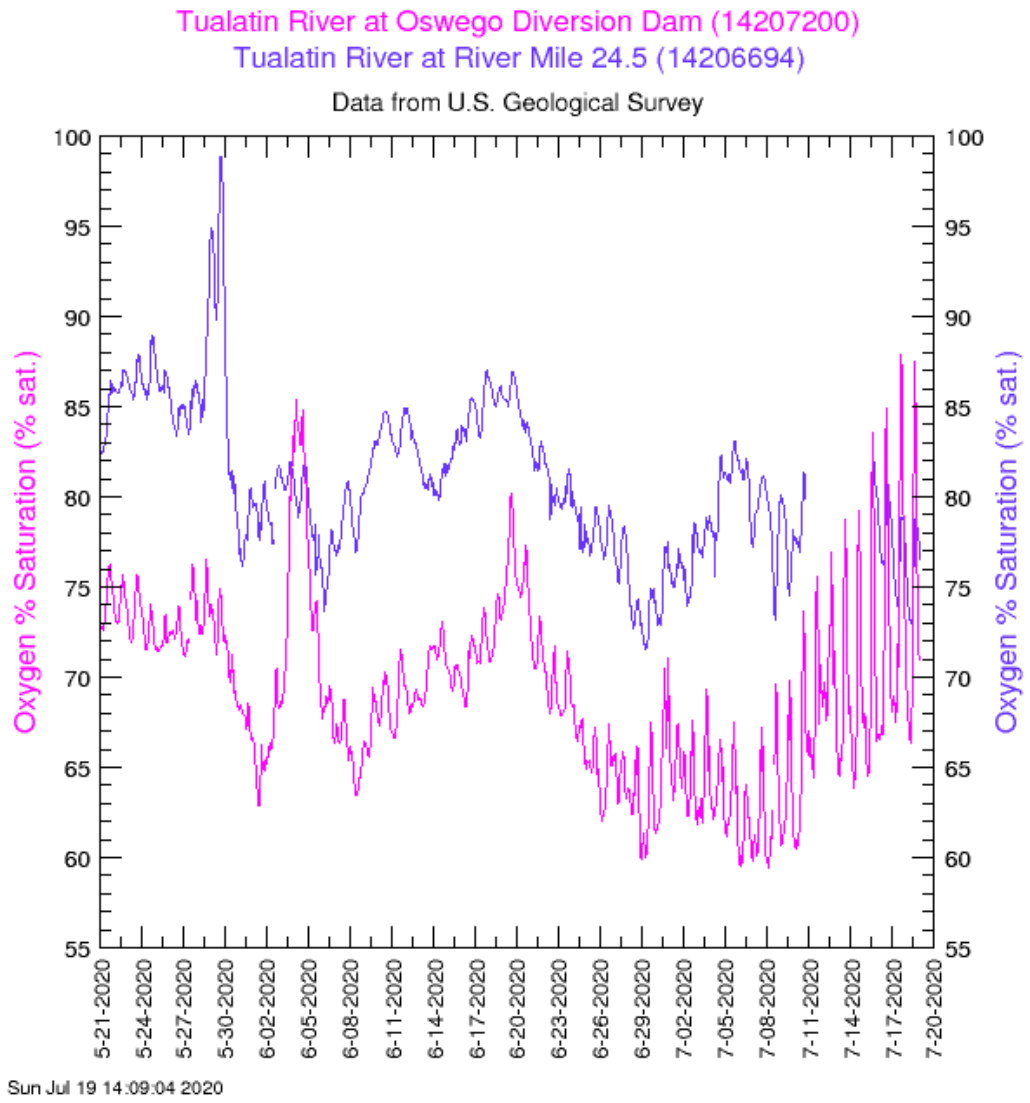
A graphic image (png format) of the last 7 days of water temperature from sites 14207200 and 14206694:
https://or.water.usgs.gov/cgi-bin/grapher/grapher_2site.pl?site_id=14207200&site2_id=14206694&parm1=t&parm2=t&plot_recent=on&latest_days=7&download=on



Now, a 60-day comparison of oxygen percent saturation at the same sites, in PDF format:
https://or.water.usgs.gov/cgi-bin/grapher/grapher_2site.pl?site_id=14207200&site2_id=14206694&parm1=psat&parm2=psat&plot_recent=on&latest_days=60&download=on&filefmt=pdf



And the same graph with no grid lines (*xgrid=off&ygrid=off*) and different line colors (*color1=FF00FF&color2=6633FF*) is produced with this URL:
https://or.water.usgs.gov/cgi-bin/grapher/grapher_2site.pl?site_id=14207200&site2_id=14206694&parm1=psat&parm2=psat&plot_recent=on&latest_days=60&xgrid=off&ygrid=off&color1=FF00FF&color2=6633FF&download=on&filefmt=pdf



THREE-SITE DATA GRAPHER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/grapher_3site.pl

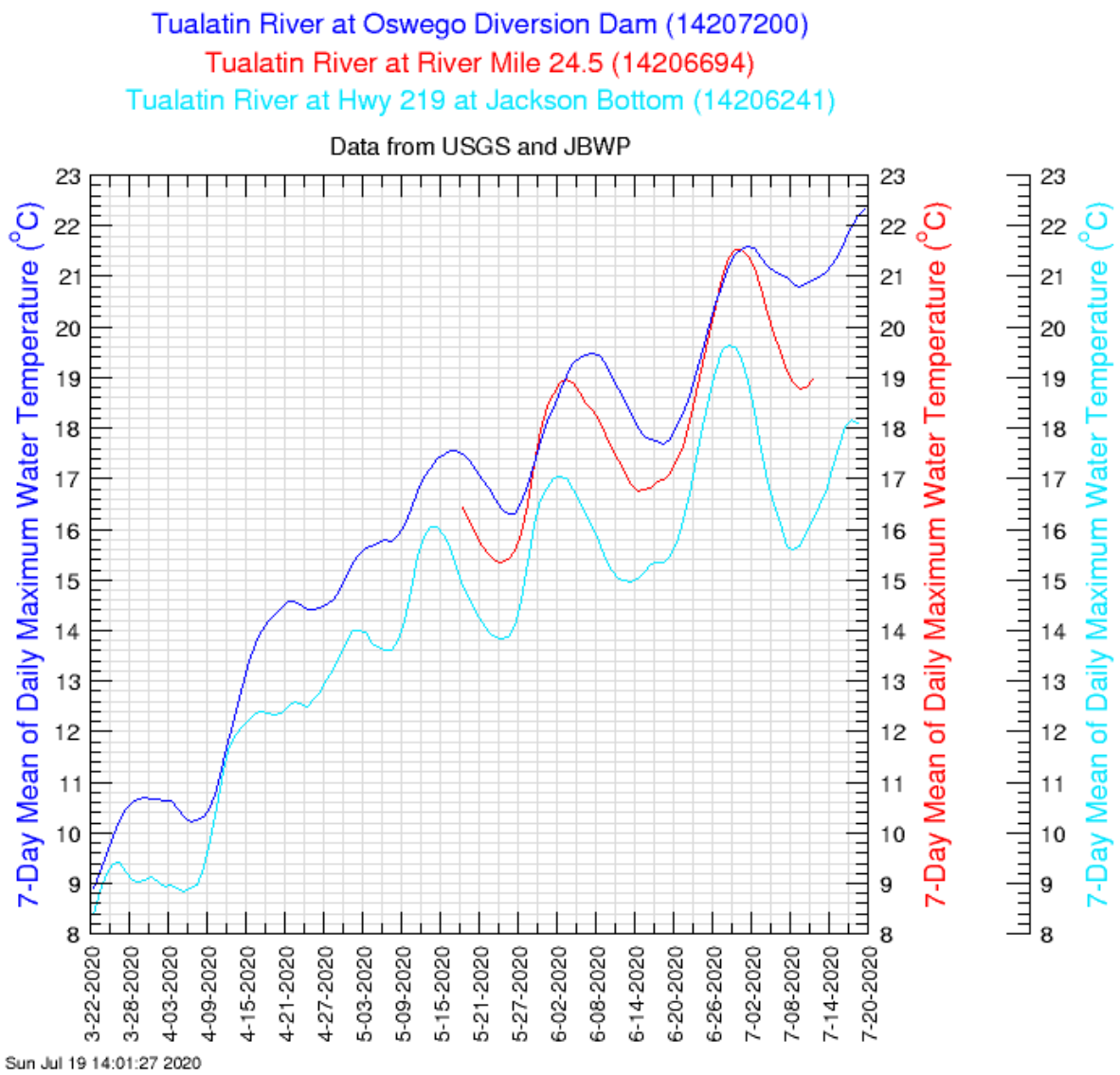
Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, first group, specific to Data Grapher
basin2_id	optional	all	USGS basin or site grouping, second group, .specific to Data Grapher
basin3_id	optional	all	USGS basin or site grouping, third group, .specific to Data Grapher
site_id	required	—	USGS site identification number, first site, usually 7 or 15 digits
site2_id	required	—	USGS site identification number, second site, usually 7 or 15 digits
site3_id	required	—	USGS site identification number, third site, usually 7 or 15 digits
parm1	required	—	First parameter to plot, see list for codes
parm2	optional	—	Second parameter to plot, see list for codes
parm3	optional	—	Third parameter to plot, see list for codes
stat1	optional	unit	Statistic for first parameter; see list
stat2	optional	unit	Statistic for second parameter; see list
stat3	optional	unit	Statistic for third parameter; see list
run_mean1	optional	off	Code controlling computation of a running mean, first parameter (on, off)
run_mean2	optional	off	Code controlling computation of a running mean, second parameter (on, off)
run_mean3	optional	off	Code controlling computation of a running mean, third parameter (on, off)
run_days1	optional	7	Number of days for running mean, first parameter (2-30 days)
run_days2	optional	7	Number of days for running mean, second parameter (2-30 days)
run_days3	optional	7	Number of days for running mean, third parameter (2-30 days)
nosupersat1	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), first parameter (on, off)
nosupersat2	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), second parameter (on, off)
nosupersat3	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), third parameter (on, off)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
min1	optional	auto	Y axis minimum for first parameter (number or “auto”)
max1	optional	auto	Y axis maximum for first parameter (number or “auto”)
min2	optional	auto	Y axis minimum for second parameter (number or “auto”)
max2	optional	auto	Y axis maximum for second parameter (number or “auto”)
min3	optional	auto	Y axis minimum for third parameter (number or “auto”)
max3	optional	auto	Y axis maximum for third parameter (number or “auto”)
xpix	optional	730	Width of final image, in pixels (500-2500, or “auto”)
ypix	optional	665	Height of final image, in pixels (500-2500, or “auto”)
xgrid	optional	all	Keyword controlling whether X axis grid lines are shown (all, major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
color1	optional	0000FF	Hex color code for first parameter (RGB, 0000FF is blue)
color2	optional	FF0000	Hex color code for second parameter (RGB, FF0000 is red)

Parameter Name	Required/ Optional	Default, if any	Description
color3	optional	00E6FF	Hex color code for third parameter (RGB, 00E6FF is a light cyan)
linew1	optional	1	Code for line width, first parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
linew2	optional	1	Code for line width, second parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
linew3	optional	1	Code for line width, third parameter (0, 1, 2, 3; for thin, normal, thick, thickest)
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

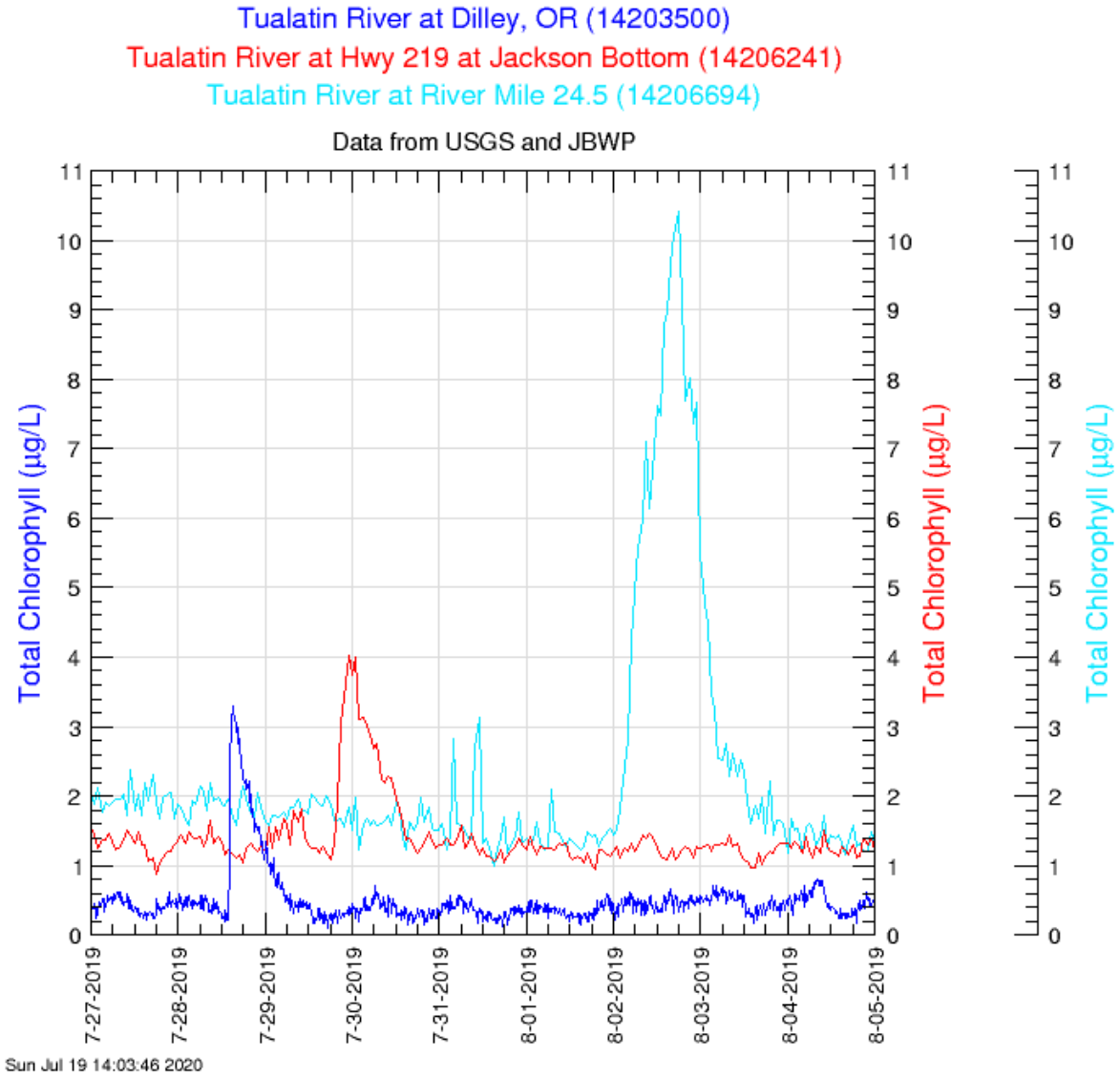
* Some combination of date inputs is required; see Date Inputs section for Single-Site Data Grapher program

EXAMPLES: THREE-SITE DATA GRAPHER

A graph of the 7-day average of the daily maximum water temperature (used in the Oregon water-temperature water-quality standard) over the last 120 days at sites 14207200, 14206694, and 14206241, in PDF format, can be produced with:
https://or.water.usgs.gov/cgi-bin/grapher/grapher_3site.pl?site_id=14207200&site2_id=14206694&site3_id=14206241&parm1=t&parm2=t&parm3=t&stat1=max&stat2=max&stat3=max&run_mean1=on&run_mean2=on&run_mean3=on&run_days1=7&run_days2=7&run_days3=7&plot_recent=on&latest_days=120&download=on&filefmt=pdf



A graph of chlorophyll from late July and early August of 2019 for sites 14203500, 14206241, and 14206694 (upstream to downstream on the same river), with only major grid lines, showing a plume of algae as it moved downstream, can be produced with this URL:
https://or.water.usgs.gov/cgi-bin/grapher/grapher_3site.pl?site_id=14203500&site2_id=14206241&site3_id=14206694&parm1=chla&parm2=chla&parm3=chla&begin_day=27&begin_month=7&begin_year=2019&end_day=4&end_month=8&end_year=2019&xgrid=major&ygrid=major&download=on



DATA GRAPHER WITH PERCENTILES

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
parm	required	—	Parameter to plot, see list for codes
stat	optional	unit	Statistic to be computed; see list
run_mean	optional	off	Code controlling computation of a running mean (on, off)
run_days	optional	7	Number of days for running mean (2-30 days)
nosupersat	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation) (on, off)
begin_md	optional*	—	Begin month and day in MMDD format: MM is a 2-digit month, DD is a 2-digit day
end_md	optional*	—	End month and day in MMDD format: MM is a 2-digit month, DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
all_dates	optional*	off	Code controlling whether all available years should be included (on, off)
years	optional*	—	Specific years to include in the graph (4 digits); multiple years are specified by repeated specification of the "years" parameter
no_years	optional*	off	Code controlling whether to plot just the percentiles and no years (on, off)
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
hide_minmax	optional	off	Code controlling whether to hide the region of minimum to maximum (on, off)
hide_p10p90	optional	off	Code controlling whether to hide the region of 10th to 90th percentile (on, off)
hide_p25p75	optional	off	Code controlling whether to hide the region of 25th to 75th percentile (on, off)
hide_median	optional	off	Code controlling whether to hide the median line (on, off)
skip_leap	optional	off	Code controlling whether to skip February 29th when plotting results (on, off)
min	optional	auto	Y axis scale minimum (number or "auto")
max	optional	auto	Y axis scale maximum (number or "auto")
xpix	optional	660	Width of final image, in pixels (500-2500, or "auto")
ypix	optional	615	Height of final image, in pixels (500-2500, or "auto")
xgrid	optional	all	Keyword controlling whether X axis grid lines are shown (all, major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
axis_type	optional	linear	Y axis type (linear, log); all data must be > 0 for log scale
num_years	optional**	—	Number of years of data available; needed when specifying some graph attributes
cref[#]	optional**	**	Color definitions, where # ranges from 0 to 13; see list
cindex[#]	optional**	**	Color index designations (3-16) for graph features; # ranges 0 to num_years+3
linew[#]	optional**	**	Line width for median and plotted years (0-3); # ranges from 3 to num_years+3
style[#]	optional**	**	Line style for median and plotted years (1-3); # ranges from 3 to num_years+3
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

* Some combination of date inputs is required; see Date Inputs section below

** Specification of color definitions and the assignment of color indices, line widths, and line styles for various graph features is explained in the Graph Attributes section below

Date Inputs

If the *no_years* input is set to *on*, then no individual years will be plotted, and the graph will be made up only of the percentile regions and the median, assuming that those components are not hidden. The *no_years* input takes precedence over the *all_dates* and *years* inputs.

If the *all_dates* input is set to *on* (and *no_years* is *off*), then all years of the dataset will be included with individual lines, and this input takes precedence over the y*ears* inputs. If the *all_dates* and *no_years* inputs are *off*, then the program expects one or more years to be set with the *years* input. Multiple years are specified by repeated inclusion of the *years* parameter in the URL.

The begin and end months can be set individually, or through the *begin_md* and *end_md* inputs. The *begin_md* and *end_md* inputs take precedence over the individual month and day inputs.

Graph Attributes

The interactive online version of this program allows the user to specify custom color definitions; fill colors for the various percentile regions; and the color, line width, and line style of the median line and the lines for the various years included in the graph. It is possible to specify all of these attributes in an independent URL, but including such attributes in the URL requires an understanding of the defaults and definitions for colors and how the various colors and datasets are indexed. So, stick with the defaults if you wish, or dive into the following definitions to learn how to modify these graph attributes.

Color Definitions. This program uses a set of 14 colors that the user can modify, as in the table below:

Index for Definition	Index for Assignment	Default Color Hex Code	Default Color Name	Default Color Swatch
0	3	0000FF	Blue	
1	4	FF0000	Red	
2	5	00E6FF	Cyan	
3	6	FF00FF	Magenta	
4	7	00FF00	Green	
5	8	008B00	Dark Green	
6	9	990033	Burgundy	
7	10	FF9900	Orange	
8	11	B98000	Brown	
9	12	9900CC	Purple	
10	13	E0E0E0	Light Gray	
11	14	CACACA	Medium Gray	
12	15	B4B4B4	Dark Gray	
13	16	000000	Black	

These colors can be re-defined with the *cref[#]* parameter in a URL, where the # is the index for definition and the value is assigned as a 6-character RGB hex code. For example, the second color could be re-defined as a yellow color with the URL argument *cref[1]=FFFF00*. When a color is re-defined, any reference to the use of that color will carry through to the final graph.

If the standard color definitions are acceptable, or after one or more are re-defined, they can be assigned to certain regions or lines in the graph through the use of their assignment index. Therefore, if the standard color definitions were retained and the user wanted to assign a particular line or region in the graph to have a blue color, the user would assign that graph attribute using a color index of 3.

Line Widths and Line Styles. Line widths and line styles for the median and any included years can be set with the *linew[#]* and *style[#]* parameters in a URL, using the values in the following table:

Value	Line Width	Line Style
0	thin	—
1	normal	solid
2	thick	dotted
3	thickest	dashed

The use of these parameters is discussed below, after first understanding how the datasets are indexed. Note that for some output formats, the thin and normal line widths look pretty much the same.

Dataset Indexing. Datasets in this program are numbered from 0 to *num_years*+3, where *num_years* is the number of years of data available to the graph, as in the table below:

Dataset Index	Dataset Description	Default Color Index	Default Line Width Index	Default Line Style Index
0	region between minimum and maximum	13	—	—
1	region between the 10th and 90th percentiles	14	—	—
2	region between the 25th and 75th percentiles	15	—	—
3	median line	16	1	1
4	first year for the period of record	3	1	1
5	second year for the period of record	4	1	1
6	third year for the period of record	5	1	1
…	…	…	…	…
num_years+3	last year for the period of record	…	…	…

If the period of record for a site begins in 2001 and ends in 2020, then 20 different years could be plotted on the graph. In this example, therefore, the *num_years* parameter should be set to 20, and the dataset index would range from 0 to 23. The default color index (assignment index) ranges from 3 to 16, and the first year in this available set of years (dataset number 4) would have a default color index of 3 (*cindex[4]=3*), a normal line width (*linew[4]=1*), and a solid line style (*style[4]=1*). By default, the color index for the years increases from 3 to 12 for the first 10 years (which uses all colors except the grays and black) while retaining normal line widths and solid line styles. The next 10 years by default would retain the normal line width but change the line style to 3 (dashed) while running through colors 3 through 12 again. Dotted lines (style of 2) follow by default for the next 10 years. After running through the first 30 years, the line width would increment to thick (2), then thickest (3) followed by thin (0), with each thickness running through the colors first and then incrementing through the styles before going to the next line width. This default scheme can thereby accommodate 10x4x3=120 datasets with unique attributes before being forced to repeat a set of attributes. In most instances, you'll likely be able to simply choose various colors with normal or thick solid lines for the plotted datasets.

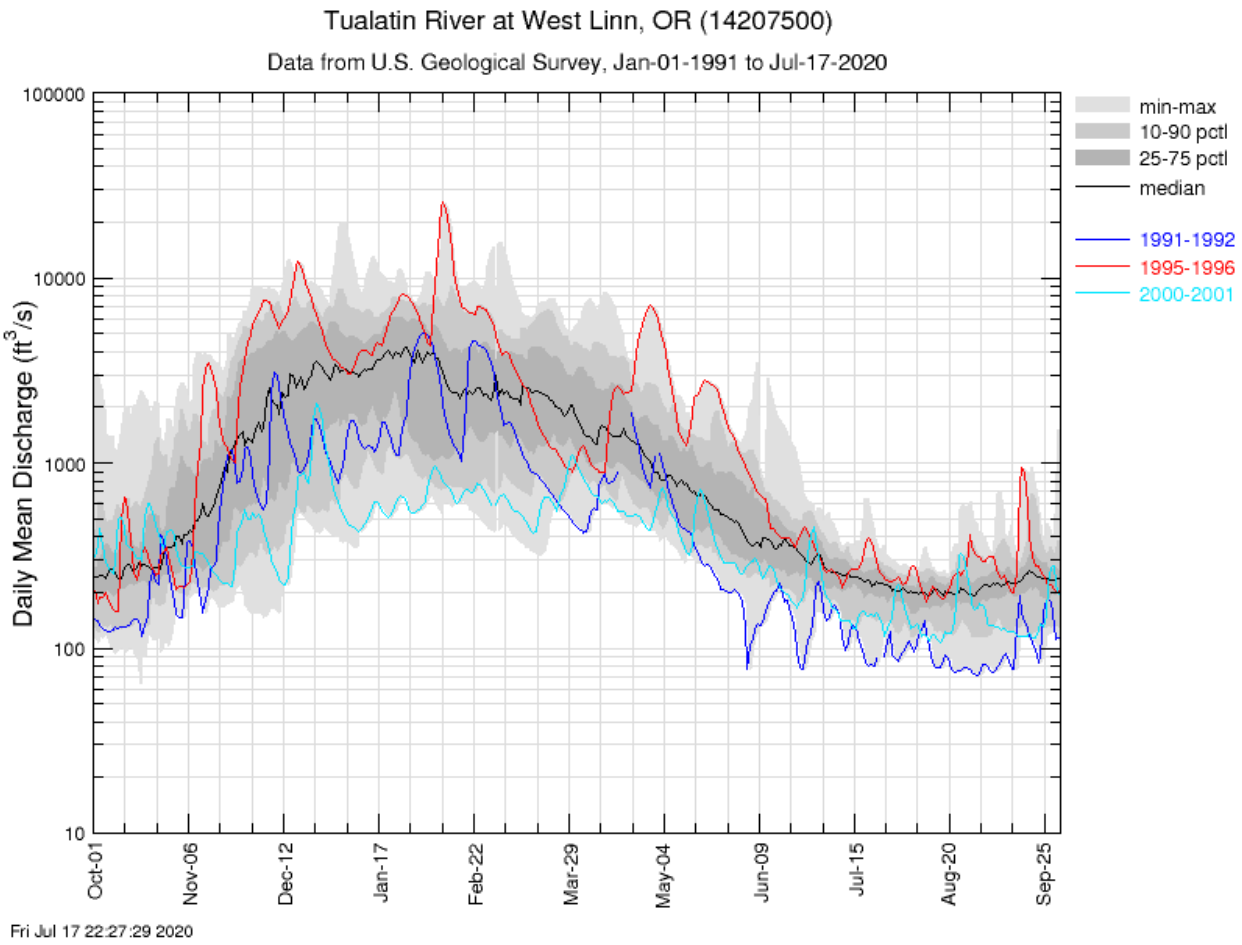
Note that the default assignment of colors, line widths, and line styles proceeds only for those years that are initially assigned to be plotted. In other words, if 20 different years are available, but only two years (say 2015 and 2019) are requested to be plotted along with the percentiles, then the first year (2015, dataset index 18) would be assigned a default color index of 3 and the second (2019, dataset index 22) would be assigned a color index of 4. To re-assign the color or line width or line style, one would still need to include the proper value for *num_years* in the URL and calculate the proper dataset index for the year(s) whose attributes need to be modified.

Using this information, a URL could reassign the median line color to magenta using *cindex[3]=6*, or could assign the year 2019 (in the above example) to have a thick purple line by including *num_years=20&years=2019&cindex[22]=12&linew[22]=2* in the URL.

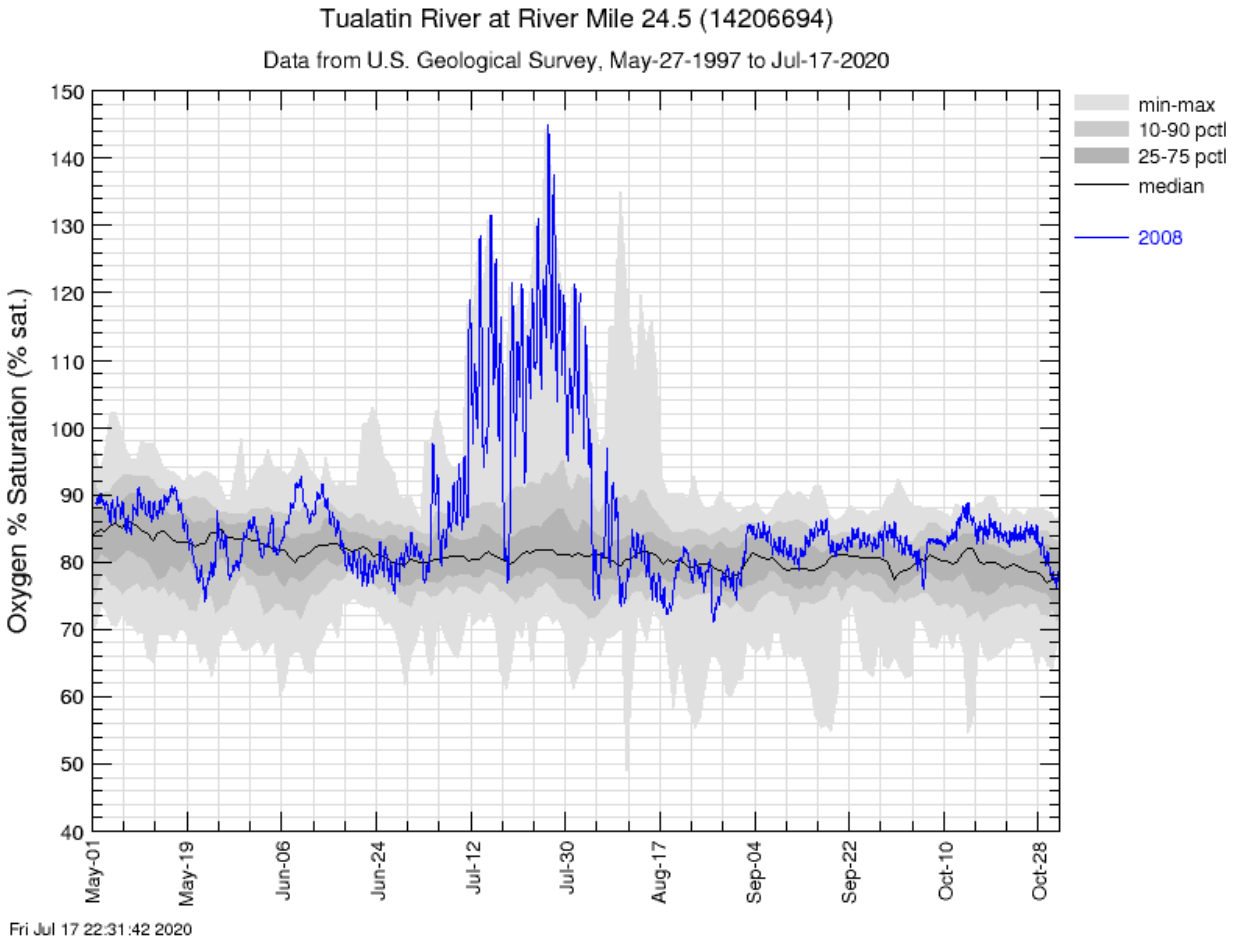
EXAMPLES: DATA GRAPHER WITH PERCENTILES

A graph of daily mean streamflow from several water years (1992, 1996, 2001) along with historical percentiles for site 14207500, on a logarithmic scale and with a custom image width, can be created with the following URL:

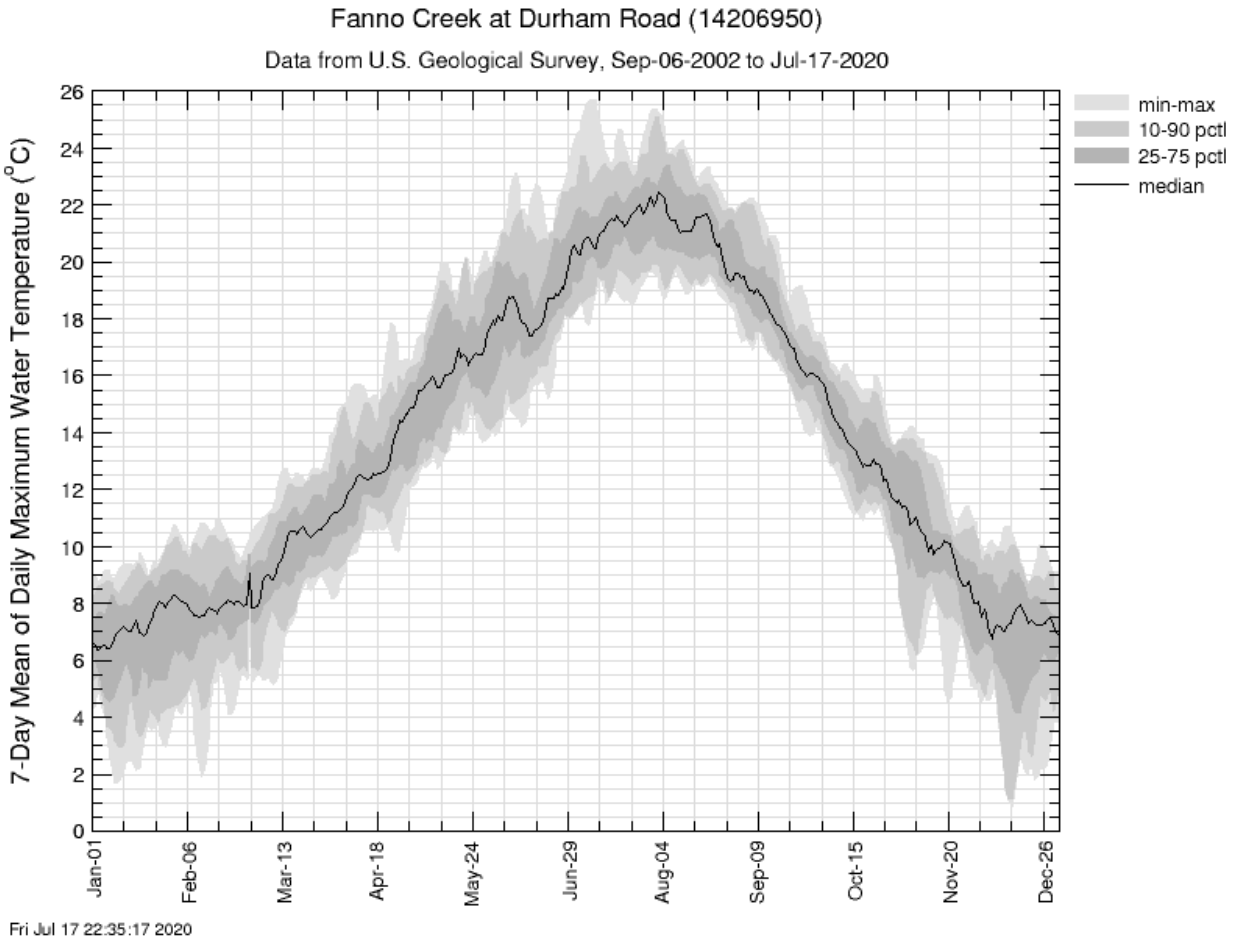
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14207500&parm=q&stat=mean&begin_md=1001&end_md=0930&years=1992&years=1996&years=2001&axis_type=log&xpix=800&download=on



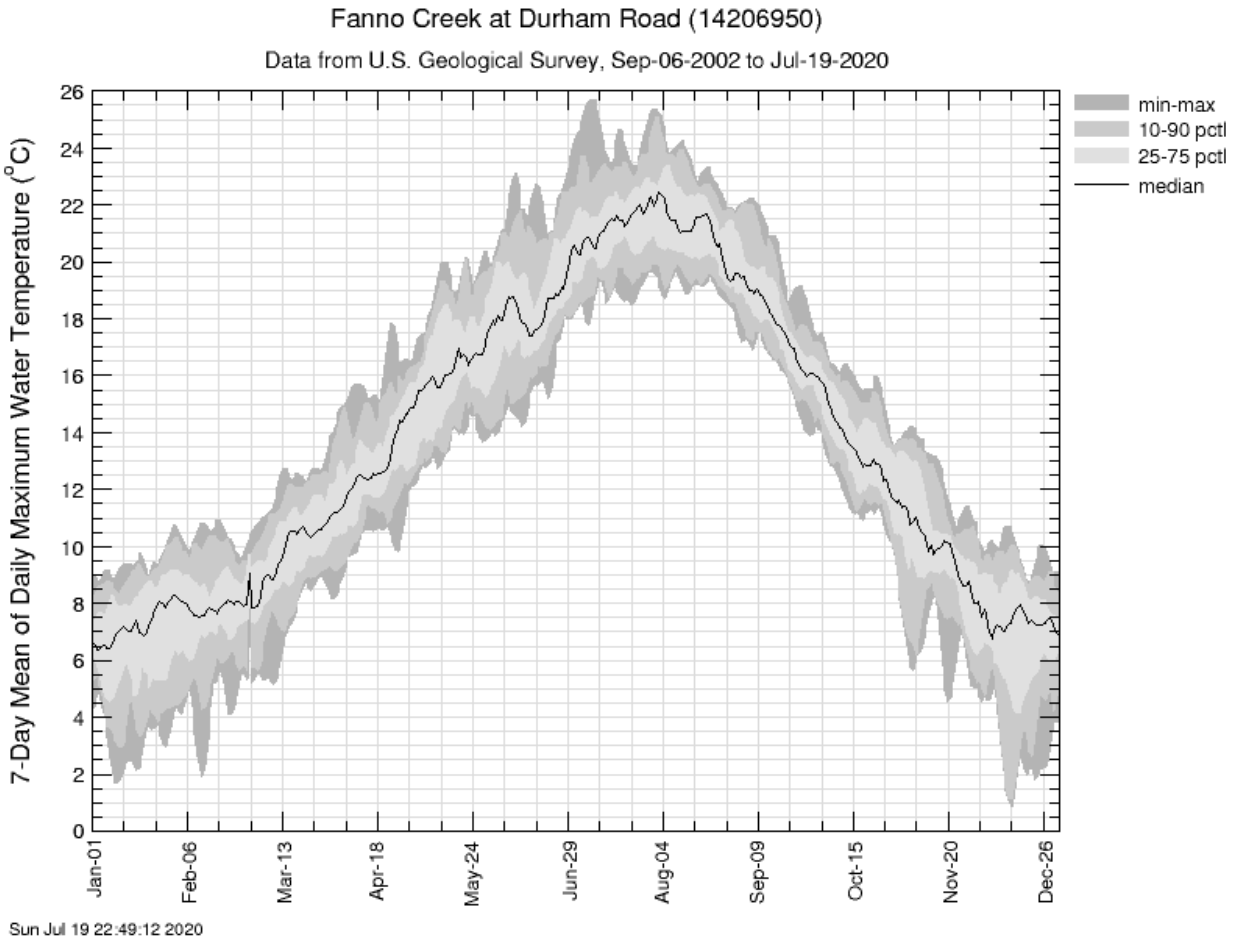
A graph of oxygen percent saturation from the summer of 2008 at site 14206694 illustrates some anomalous conditions with the following URL:
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206694&parm=psat&begin_md=0501&end_md=1031&years=2008&xpix=800&download=on



Here is an example of just the percentiles (*no_years=on*) of water temperature (*parm=t*), using the 7-day mean of the daily maximum (*stat=max&run_mean=on&run_days=7*), for site 14206950 plotted as the full calendar year:
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206950&parm=t&stat=max&run_mean=on&run_days=7&begin_md=0101&end_md=1231&no_years=on&xpix=800&download=on

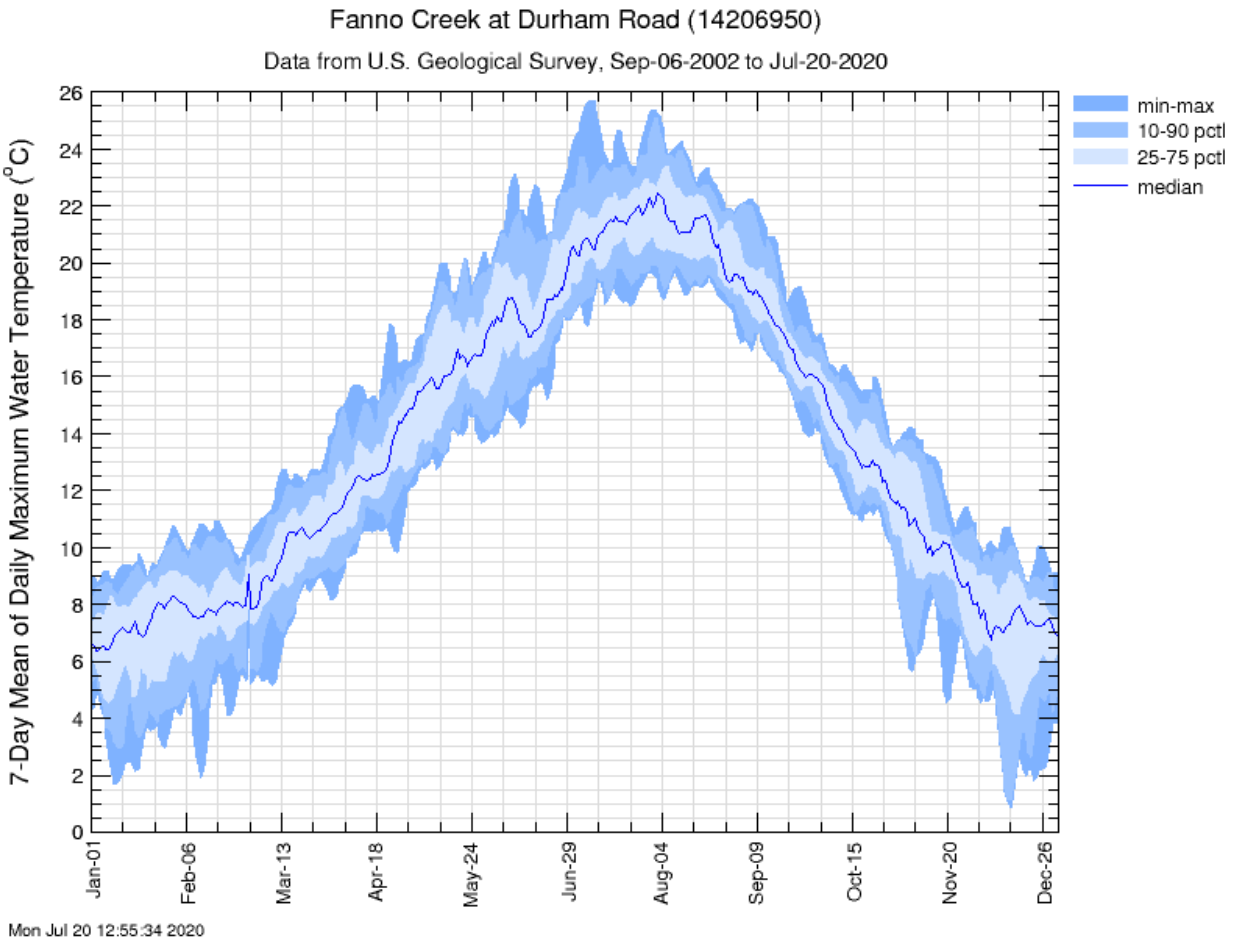


Tweaking the default color indices for the percentile regions, we can reverse the gradation of gray colors to go from light to dark instead of dark to light, using *cindex[0]=15&cindex[2]=13* in the following URL for the same graph as in the previous example:
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206950&parm=t&stat=max&run_mean=on&run_days=7&begin_md=0101&end_md=1231&no_years=on&xpix=800&cindex[0]=15&cindex[2]=13&download=on

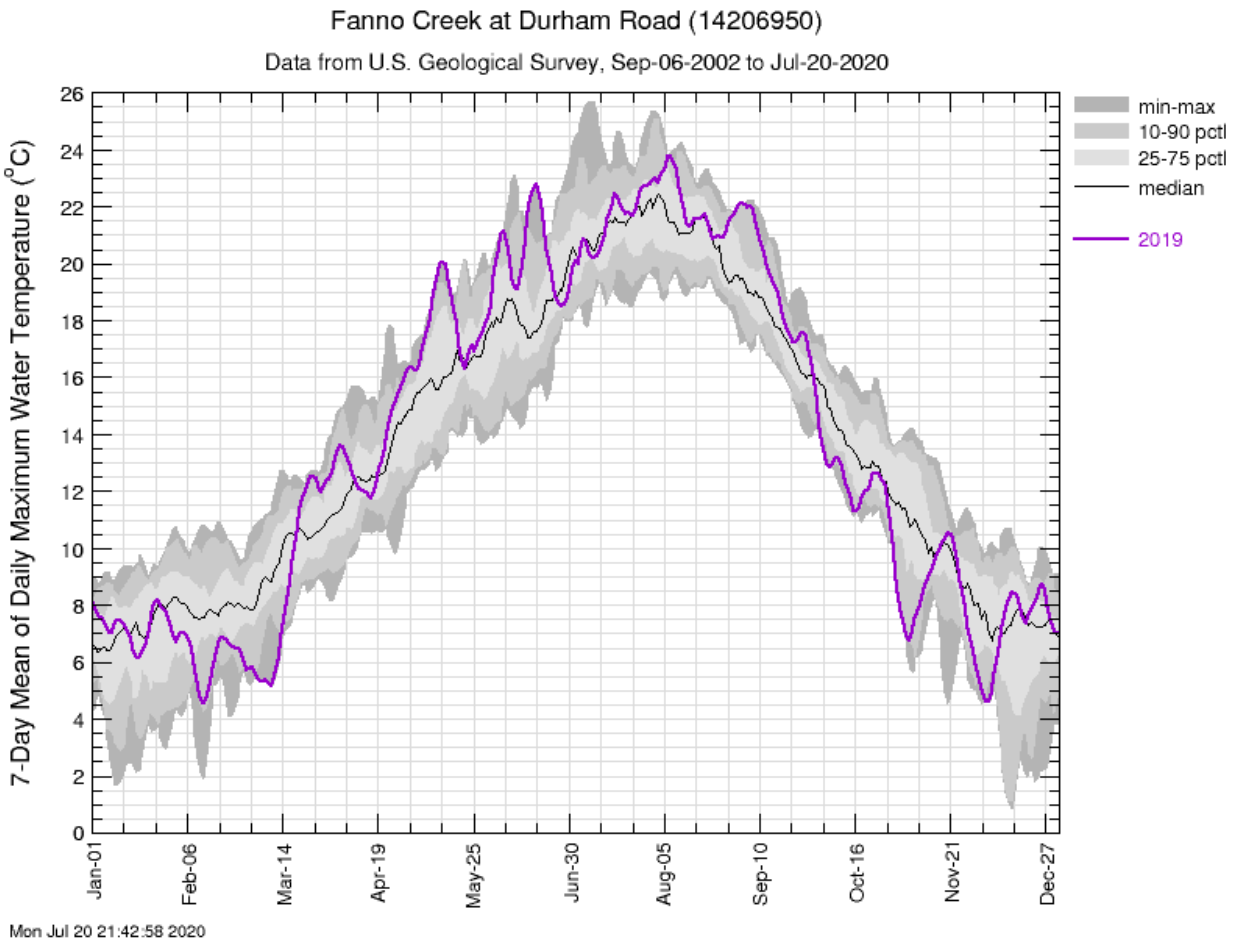


Expanding on that example, we can change the grays to shades of blue by re-defining color definitions 10-12 with something like *cref[10]=7FB2FF&cref[11]=99C2FF&cref[12]=D4E5FF* and setting the median line to blue with *cindex[3]=3* for the same example:

https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206950&parm=t&stat=max&run_mean=on&run_days=7&begin_md=0101&end_md=1231&no_years=on&xpix=800&cref[10]=7FB2FF&cref[11]=99C2FF&cref[12]=D4E5FF&cindex[3]=3&download=on

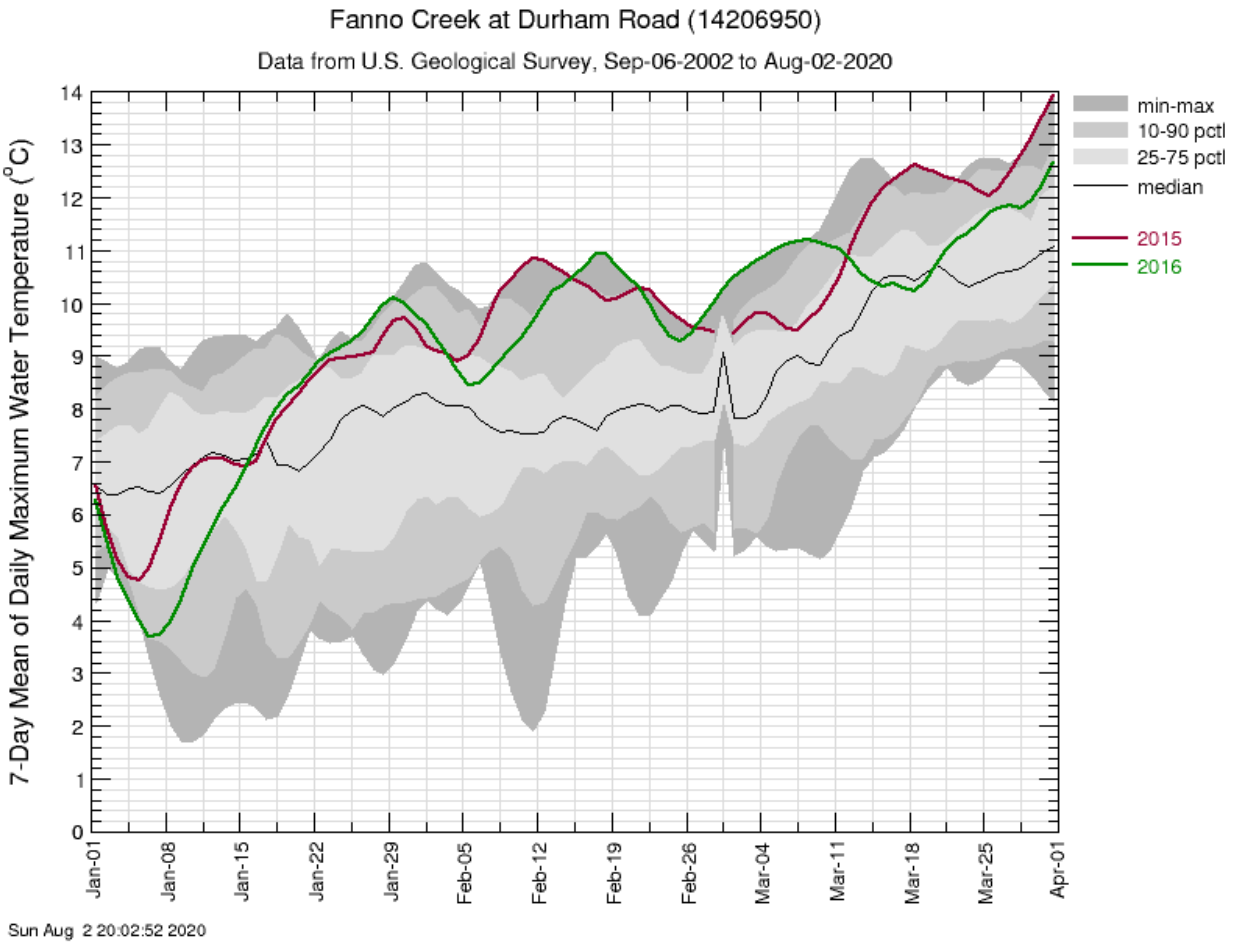


Going back to the shades of gray, let's add 2019 with a thick magenta line. To do that, we need to set *num_years* to 19 (2002 through 2020), which makes the year index for 2019 equal to 21 for this dataset. Therefore, we remove the *no_years=on* argument and add *&years=2019&num_years=19&cindex[21]=12&linew[21]=2* to make the following URL:
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206950&parm=t&stat=max&run_mean=on&run_days=7&begin_md=0101&end_md=1231&xpix=800&cindex[0]=15&cindex[2]=13&years=2019&num_years=19&cindex[21]=12&linew[21]=2&download=on



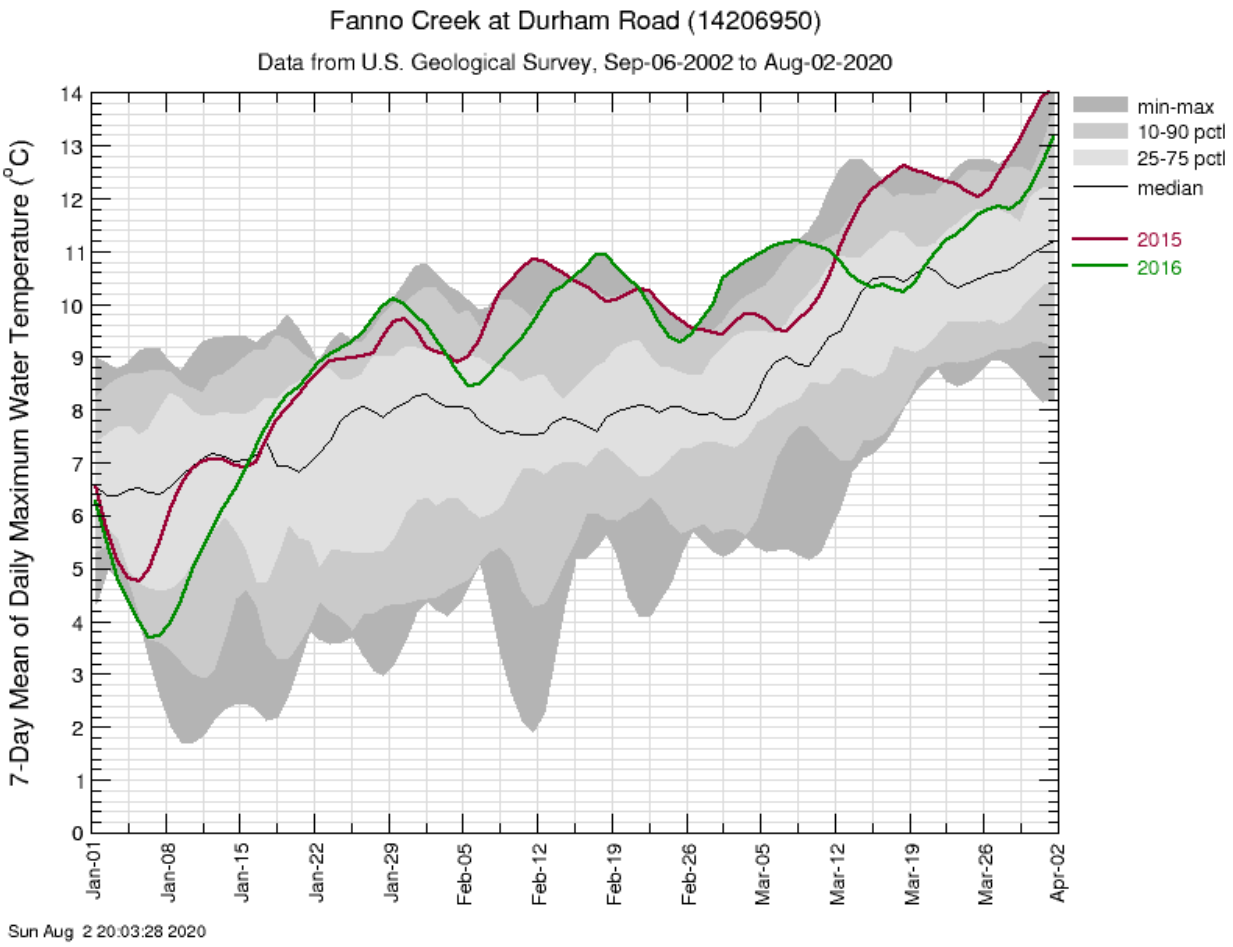
When plotting a set of years that do not include a leap year, the date axis will not include 29-Feb and the percentiles and median will not include 29-Feb. When plotting a set of years that include one or more leap years and the dates of interest span the end of February, then 29-Feb will be included for the leap years and percentiles and median, but a gap of one day will be present for any non-leap years. The user can skip 29-Feb by checking a box on the results page or by specifying *skip_leap=on* in a URL.

Consider the following example plotting the 7-day running average of the daily maximum water temperature for site 14206950 for 01-Jan through 31-Mar for years 2015 and 2016, where 2016 is a leap year:
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206950&parm=t&stat=max&run_mean=on&run_days=7&begin_md=0101&end_md=0331&years=2015&years=2016&min=0&max=14&xpix=800&cindex[0]=15&cindex[2]=13&cindex[17]=9&linew[17]=2&cindex[18]=8&linew[18]=2&num_years=19&download=on



This plot includes 29-Feb. A gap is shown for that day for the year 2015, which is not a leap year. Note that the percentiles for 29-Feb are a bit odd, mainly because they are based on one-fourth of the total number of points relative to the adjoining dates. This plot includes all of the data, which is great, but perhaps the user would like to remove 29-Feb. That is done in the next example.

This example is the same as the last one, except that 29-Feb is removed by setting *skip_leap=on*, and the graph is extended by an additional day so that this and the previous graphs have the same number of days, just for comparison:
https://or.water.usgs.gov/cgi-bin/grapher/graph_pctl.pl?site_id=14206950&parm=t&stat=max&run_mean=on&run_days=7&begin_md=0101&end_md=0401&years=2015&years=2016&skip_leap=on&min=0&max=14&xpix=800&cindex[0]=15&cindex[2]=13&cindex[17]=9&linew[17]=2&cindex[18]=8&linew[18]=2&num_years=19&download=on



MULTIPLE-SITE DATA GRAPHER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graph_multisite.pl

Parameter Name	Required/ Optional	Default, if any	Description
parm	required	—	Parameter to plot, see list for codes
sites	required	—	USGS site identification number, usually 7 or 15 digits; Multiple sites are specified by repeated specification of the "sites" parameter
stat	optional	unit	Statistic to compute; see list
run_mean	optional	off	Code controlling computation of a running mean (on, off)
run_days	optional	7	Number of days for running mean (2-30 days)
nosupersat	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation) (on, off)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
min	optional	auto	Y axis minimum (number or "auto"); > 0 for log scale
max	optional	auto	Y axis maximum (number or "auto"); > 0 for log scale
xpix	optional	900	Width of final image, in pixels (600-2500, or "auto")
ypix	optional	615	Height of final image, in pixels (600-2500, or "auto")
xgrid	optional	all	Keyword controlling whether X axis grid lines are shown (all, major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
axis_type	optional	linear	Y axis type (linear, log); all data must be > 0 for log scale
num_sites	optional**	—	Number of sites specified; needed when specifying some graph attributes
cref[#]	optional**	**	Color definitions, where # ranges from 0 to 12; see list
cindex[#]	optional**	**	Color index designations (3-15) for plotted sites; # ranges 0 to num_sites-1
linew[#]	optional**	**	Line width for plotted sites (0-3); # ranges from 0 to num_sites-1
style[#]	optional**	**	Line style for plotted sites (1-3); # ranges from 0 to num_sites-1
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

* Some combination of date inputs is required; see Date Inputs section for Single-Site Data Grapher program

** Specification of color definitions and the assignment of color indices, line widths, and line styles for various graph features is explained in the Graph Attributes section below

GRAPH ATTRIBUTES

The interactive online version of this program allows the user to specify custom color definitions and the color, line width, and line style of plotted lines for the various sites included in the graph. It is possible to specify all of these attributes in an independent URL, but including such attributes in the URL requires an understanding of the defaults and definitions for colors and how the various colors and datasets are indexed. So, stick with the defaults if you wish, or dive into the following definitions to learn how to modify these graph attributes. This information is similar to what was provided for the Data Grapher with Percentiles, with one fewer color, modified gray colors, and a slightly different dataset index.

Color Definitions. This program uses a set of 13 colors that the user can modify, as in the table below:

Index for Definition	Index for Assignment	Default Color Hex Code	Default Color Name	Default Color Swatch
0	3	0000FF	Blue	
1	4	FF0000	Red	
2	5	00E6FF	Cyan	
3	6	FF00FF	Magenta	
4	7	00FF00	Green	
5	8	008B00	Dark Green	
6	9	990033	Burgundy	
7	10	FF9900	Orange	
8	11	B98000	Brown	
9	12	9900CC	Purple	
10	13	AAAAAA	Gray	
11	14	808080	Dark Gray	
12	15	000000	Black	

These colors can be re-defined with the *cref[#]* parameter in a URL, where the # is the index for definition and the value is assigned as a 6-character RGB hex code. For example, the second color could be re-defined as a yellow color with the URL argument *cref[1]=FFFF00*. When a color is re-defined, any reference to the use of that color will carry through to the final graph.

If the standard color definitions are acceptable, or after one or more are re-defined, they can be assigned to certain lines in the graph through the use of their assignment index. Therefore, if the standard color definitions were retained and the user wanted to assign a particular line in the graph to have a blue color, the user would assign that graph attribute using a color index of 3.

Line Widths and Line Styles. Line widths and line styles for the included sites can be set with the *linew[#]* and *style[#]* parameters in a URL, using the values in the following table:

Value	Line Width	Line Style
0	thin	—
1	normal	solid
2	thick	dotted
3	thickest	dashed

The use of these parameters is discussed below, after first understanding how the datasets are indexed. Note that for some output formats, the thin and normal line widths look pretty much the same.

Dataset Indexing. Datasets in this program are numbered from 0 to *num_sites*-1, where *num_sites* is the number of sites being plotted in the graph, as in the table below:

Dataset Index	Dataset Description	Default Color Index	Default Line Width Index	Default Line Style Index
0	first site, sorted by site ID in ascending numerical order	3	1	1
1	second site, sorted by site ID in ascending numerical order	4	1	1
2	third site, sorted by site ID in ascending numerical order	5	1	1
3	fourth site, sorted by site ID in ascending numerical order	6	1	1
…	…	…	…	…
num_sites-1	last site, sorted by site ID in ascending numerical order	…	…	…

If 8 different sites are specified by the user with the *sites* parameter, then the *num_sites* parameter should be set to 8, and the dataset index would range from 0 to 7. Regardless of the order in which the

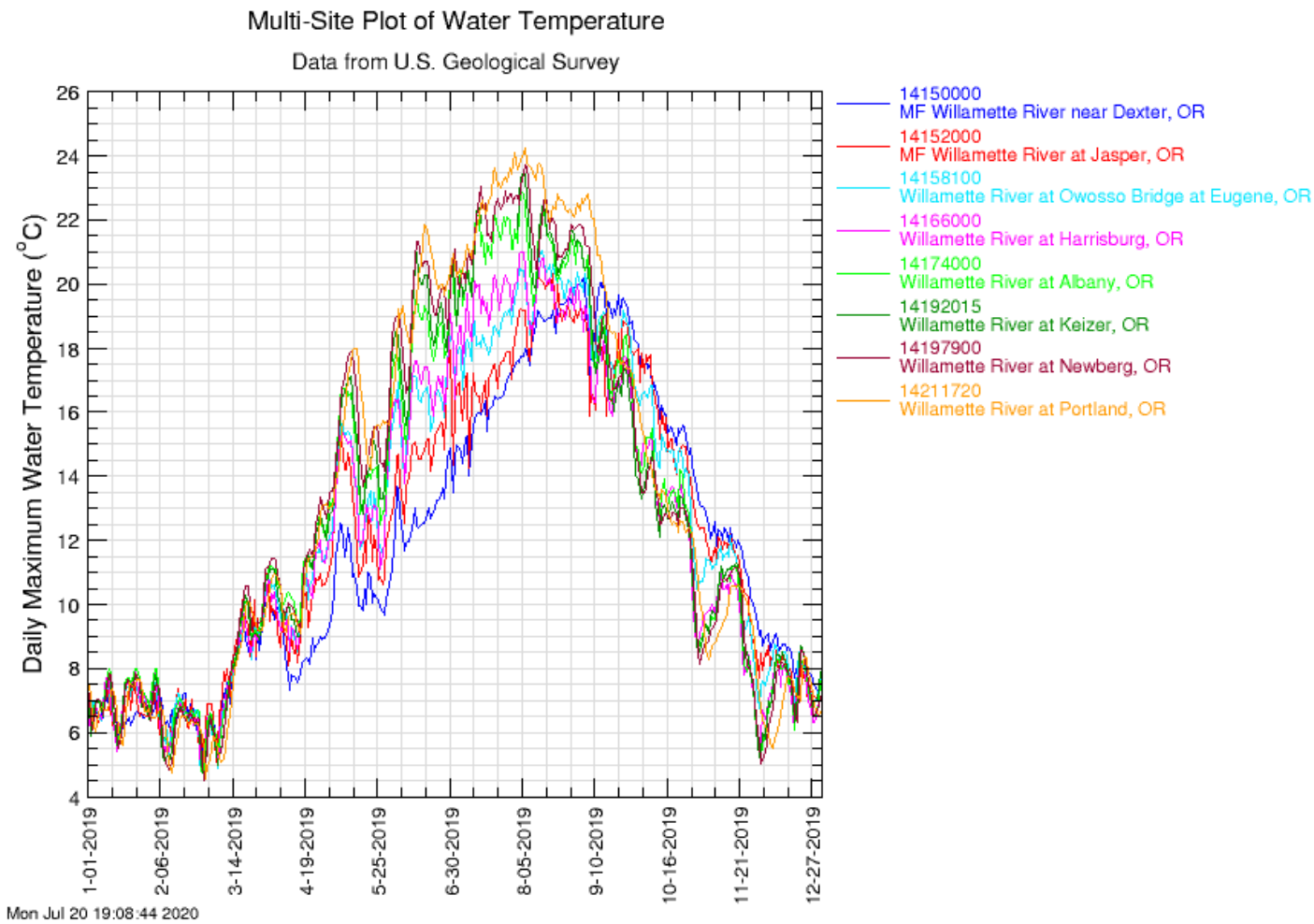
sites are provided in the URL, the sites will be sorted in ascending numerical order for the purpose of assigning dataset indices. The default color index (assignment index) ranges from 3 to 15, and the first site (dataset number 0) would have a default color index of 3 (*cindex[0]=3*), a normal line width (*linew[0]=1*), and a solid line style (*style[0]=1*). By default, the color index for the sites increases from 3 to 15 for the first 13 sites (which uses all of the colors) while retaining normal line widths and solid line styles. The next 13 sites by default would retain the normal line width but change the line style to 3 (dashed) while running through colors 3 through 15 again. Dotted lines (style of 2) follow by default for the next 13 sites. After running through the first 39 sites, the line width would increment to thick (2), then thickest (3) followed by thin (0), with each thickness running through the colors first and then incrementing through the styles before going to the next line width. This default scheme can thereby accommodate 13x4x3=156 datasets with unique attributes before being forced to repeat a set of attributes. In most instances, you'll likely be able to simply choose various colors with normal or thick solid lines for the plotted datasets.

The scheme described above covers the default colors, line widths, and line styles. To re-assign the color or line width or line style, one would still need to include the proper value for *num_sites* in the URL and calculate the proper dataset index for the site(s) whose attributes need to be modified.

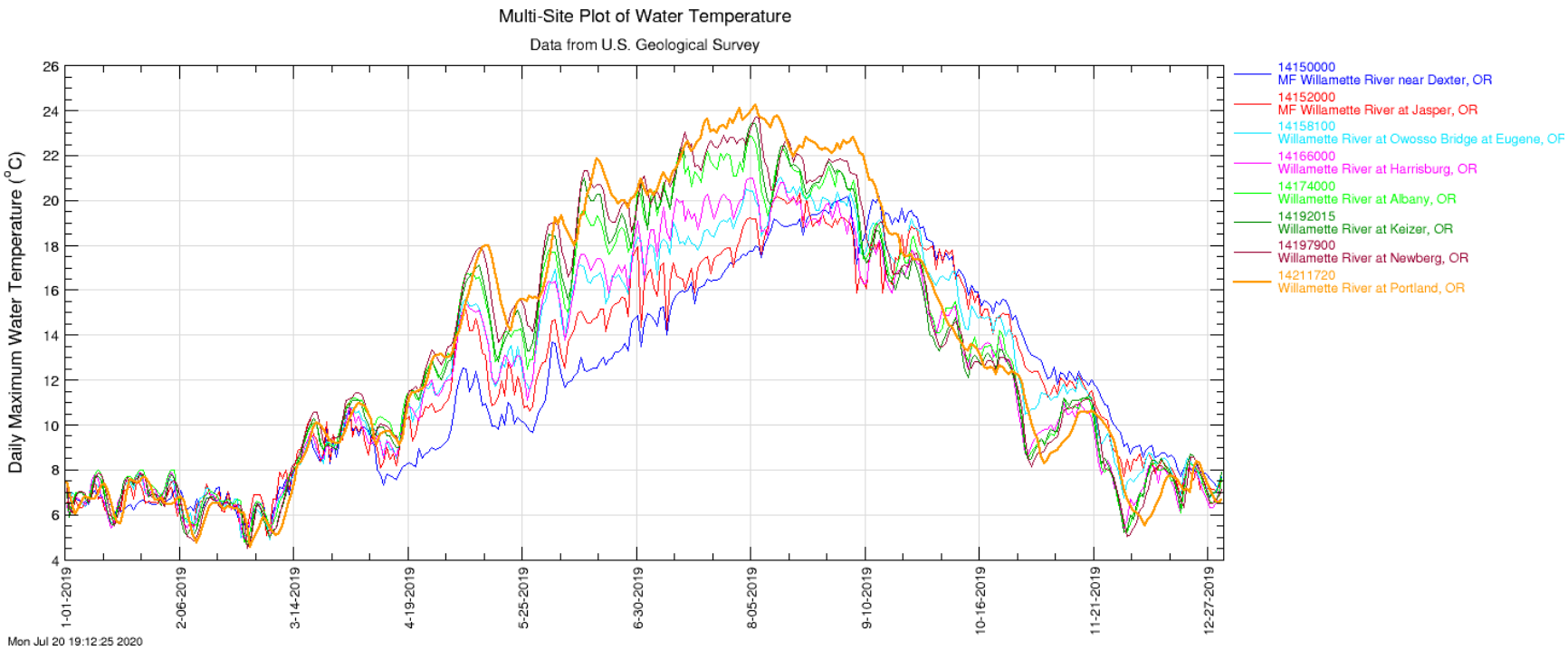
Using this information, a URL could configure the third of eight sites to have a thick purple line by including *num_sites=8&cindex[2]=12&linew[2]=2* in the URL.

EXAMPLES: MULTIPLE-SITE DATA GRAPHER

A graph of the daily maximum water temperature from 8 sites along the Willamette River in Oregon (14150000, 14152000, 14158100, 14166000, 14174000, 14192015, 14197900, and 14211720) for calendar year 2019:
https://or.water.usgs.gov/cgi-bin/grapher/graph_multisite.pl?parm=t&stat=max&begin_date=20190101&end_date=20191231&sites=14150000&sites=14152000&sites=14158100&sites=14166000&sites=14174000&sites=14192015&sites=14197900&sites=14211720&download=on



And the same graph, with only the major grid lines, a thicker line for the last site, and a bit wider:
https://or.water.usgs.gov/cgi-bin/grapher/graph_multisite.pl?parm=t&stat=max&begin_date=20190101&end_date=20191231&sites=14150000&sites=14152000&sites=14158100&sites=14166000&sites=14174000&sites=14192015&sites=14197900&sites=14211720&xgrid=major&ygrid=major&xpix=1500&num_sites=8&linew[7]=2&download=on



DATA GRAPHER BY YEAR OR MONTH

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graph_by_yr.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
parm	required	—	Parameter to plot, see list for codes
stat	optional	unit	Statistic to compute; see list
run_mean	optional	off	Code controlling computation of a running mean (on, off)
run_days	optional	7	Number of days for running mean (2-30 days)
nosupersat	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation) (on, off)
year_type	optional	full_year	Type of graph to plot: full calendar year, January to December (full_year) water year, October to September (water_year) custom month range (custom), requires begin_month and end_month
all_dates	optional*	off	Code controlling whether all available years should be used (on, off)
begin_year	optional*	—	Year (4 digits) for the first year of interest
end_year	optional*	—	Year (4 digits) for the last year of interest
begin_month	optional	—	Month number (1 to 12) for the first month of interest, custom year_type
end_month	optional	—	Month number (1 to 12) for the last month of interest, custom year_type
min	optional	auto	Y axis minimum (number or "auto"); > 0 for log scale
max	optional	auto	Y axis maximum (number or "auto"); > 0 for log scale
xpix	optional	660	Width of final image, in pixels (500-2500, or "auto")
ypix	optional	615	Height of final image, in pixels (500-2500, or "auto")
xgrid	optional	major	Keyword controlling whether X axis grid lines are shown (major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
axis_type	optional	linear	Y axis type (linear, log); all data must be > 0 for log scale
num_years	optional**	—	Number of years specified; needed when specifying some graph attributes
cref[#]	optional**	**	Color definitions, where # ranges from 0 to 12; see list
cindex[#]	optional**	**	Color index designations (3-15) for plotted years; # ranges 0 to num_years-1
linew[#]	optional**	**	Line width for plotted years (0-3); # ranges from 0 to num_years-1
style[#]	optional**	**	Line style for plotted years (1-3); # ranges from 0 to num_years-1
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

* Some combination of year inputs is required; see Date Inputs section below

** Specification of color definitions and the assignment of color indices, line widths, and line styles for various graph features is explained in the Graph Attributes section below

DATE INPUTS

If the *all_dates* input is set to *on*, then all years of the dataset will be included, and this input takes precedence over the *begin_year* and *end_year* inputs. If the *all_dates* input is *off*, then both the *begin_year* and *end_year* must be specified. If the *year_type* is set to *custom*, then both the *begin_month* and *end_month* inputs must be specified.

GRAPH ATTRIBUTES

The interactive online version of this program allows the user to specify custom color definitions and the color, line width, and line style of plotted lines for the various years included in the graph. It is possible to specify all of these attributes in an independent URL, but including such attributes in the URL requires an understanding of the defaults and definitions for colors and how the various colors and datasets are indexed. So, stick with the defaults if you wish, or dive into the definitions to learn how to modify these

graph attributes. This information is the same as that used by the Multiple-Site Data Grapher, except that this program uses different years rather than different sites.

Color Definitions. This program uses a set of 13 colors that the user can modify, as in the table below:

Index for Definition	Index for Assignment	Default Color Hex Code	Default Color Name	Default Color Swatch
0	3	0000FF	Blue	
1	4	FF0000	Red	
2	5	00E6FF	Cyan	
3	6	FF00FF	Magenta	
4	7	00FF00	Green	
5	8	008B00	Dark Green	
6	9	990033	Burgundy	
7	10	FF9900	Orange	
8	11	B98000	Brown	
9	12	9900CC	Purple	
10	13	AAAAAA	Gray	
11	14	808080	Dark Gray	
12	15	000000	Black	

These colors can be re-defined with the *cref[#]* parameter in a URL, where the # is the index for definition and the value is assigned as a 6-character RGB hex code. For example, the second color could be re-defined as a yellow color with the URL argument *cref[1]=FFFF00*. When a color is re-defined, any reference to the use of that color will carry through to the final graph.

If the standard color definitions are acceptable, or after one or more are re-defined, they can be assigned to certain lines in the graph through the use of their assignment index. Therefore, if the standard color definitions were retained and the user wanted to assign a particular line in the graph to have a blue color, the user would assign that graph attribute using a color index of 3.

Line Widths and Line Styles. Line widths and line styles for the included sites can be set with the *linew[#]* and *style[#]* parameters in a URL, using the values in the following table:

Value	Line Width	Line Style
0	thin	—
1	normal	solid
2	thick	dotted
3	thickest	dashed

The use of these parameters is discussed below, after first understanding how the datasets are indexed. Note that for some output formats, the thin and normal line widths look pretty much the same.

Dataset Indexing. Datasets in this program are numbered from 0 to *num_years*-1, where *num_years* is the number of years available for plotting in the graph, as in the table below:

Dataset Index	Dataset Description	Default Color Index	Default Line Width Index	Default Line Style Index
0	first year for the period of record	3	1	1
1	second year for the period of record	4	1	1
2	third year for the period of record	5	1	1
3	fourth year for the period of record	6	1	1
…	…	…	…	…
num_years-1	last year for the period of record	…	…	…

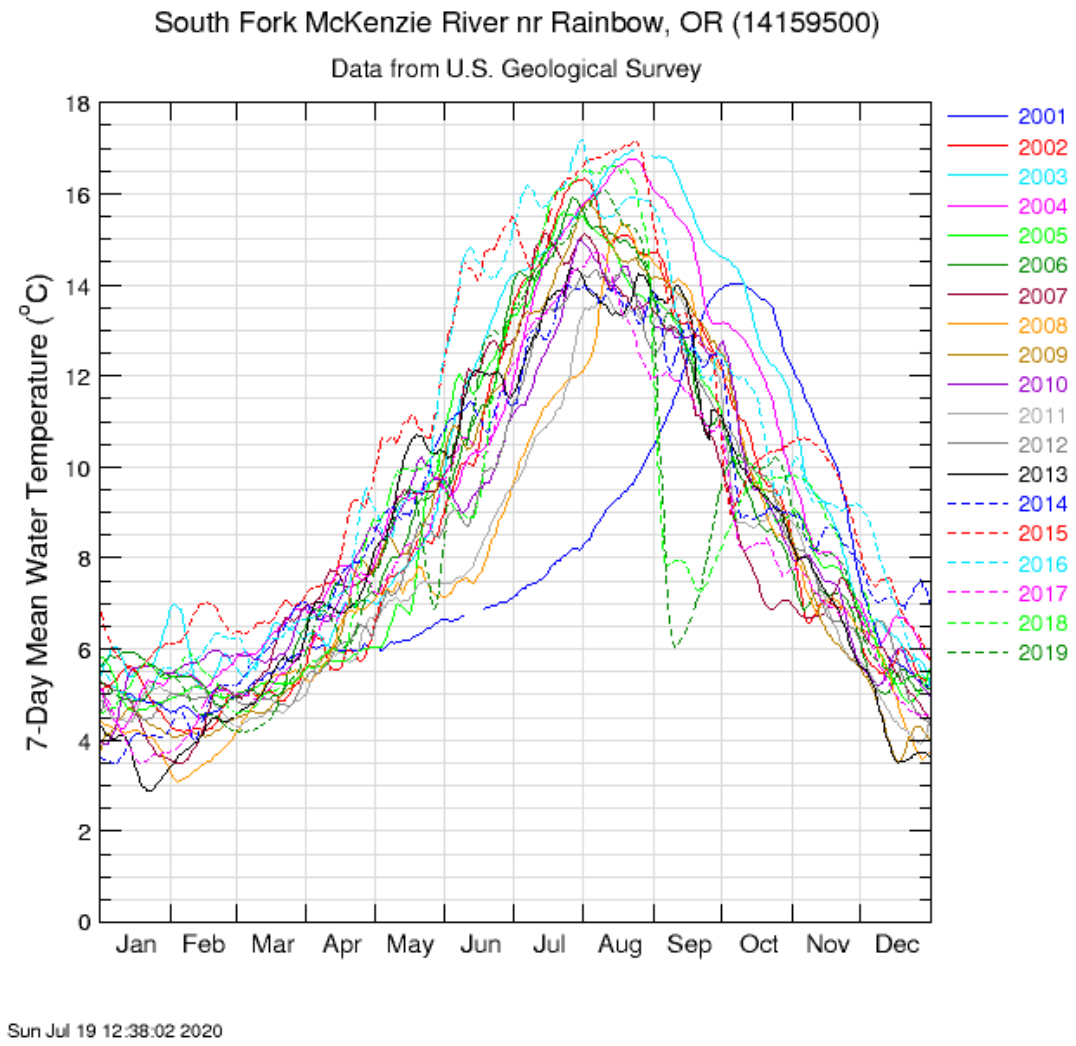
If the period of record for a site begins in 2001 and ends in 2020, then 20 different years could be plotted on the graph. In this example, therefore, the *num_years* parameter should be set to 20, and the dataset index would range from 0 to 19. The default color index (assignment index) ranges from 3 to 15, and the first available year (dataset number 0) would have a default color index of 3 (*cindex[0]=3*), a normal line width (*linew[0]=1*), and a solid line style (*style[0]=1*). By default, the color index for the years increases from 3 to 15 for the first 13 years (which uses all of the colors) while retaining normal line widths and solid line styles. The next 13 years by default would retain the normal line width but change the line style to 3 (dashed) while running through colors 3 through 15 again. Dotted lines (style of 2) follow by default for the next 13 years. After running through the first 39 years, the line width would increment to thick (2), then thickest (3) followed by thin (0), with each thickness running through the colors first and then incrementing through the styles before going to the next line width. This default scheme can thereby accommodate 13x4x3=156 datasets with unique attributes before being forced to repeat a set of attributes. In most instances, you'll likely be able to simply choose various colors with normal or thick solid lines for the plotted datasets.

Note that the default assignment of colors, line widths, and line styles proceeds only for those years that are initially assigned to be plotted. In other words, if 20 different years are available, but only two years (say 2018 and 2019) are requested to be plotted along with the percentiles, then the first year (2018, dataset index 17) would be assigned a default color index of 3 and the second (2019, dataset index 18) would be assigned a color index of 4. To re-assign the color or line width or line style, one would still need to include the proper value for *num_years* in the URL and calculate the proper dataset index for the year(s) whose attributes need to be modified.

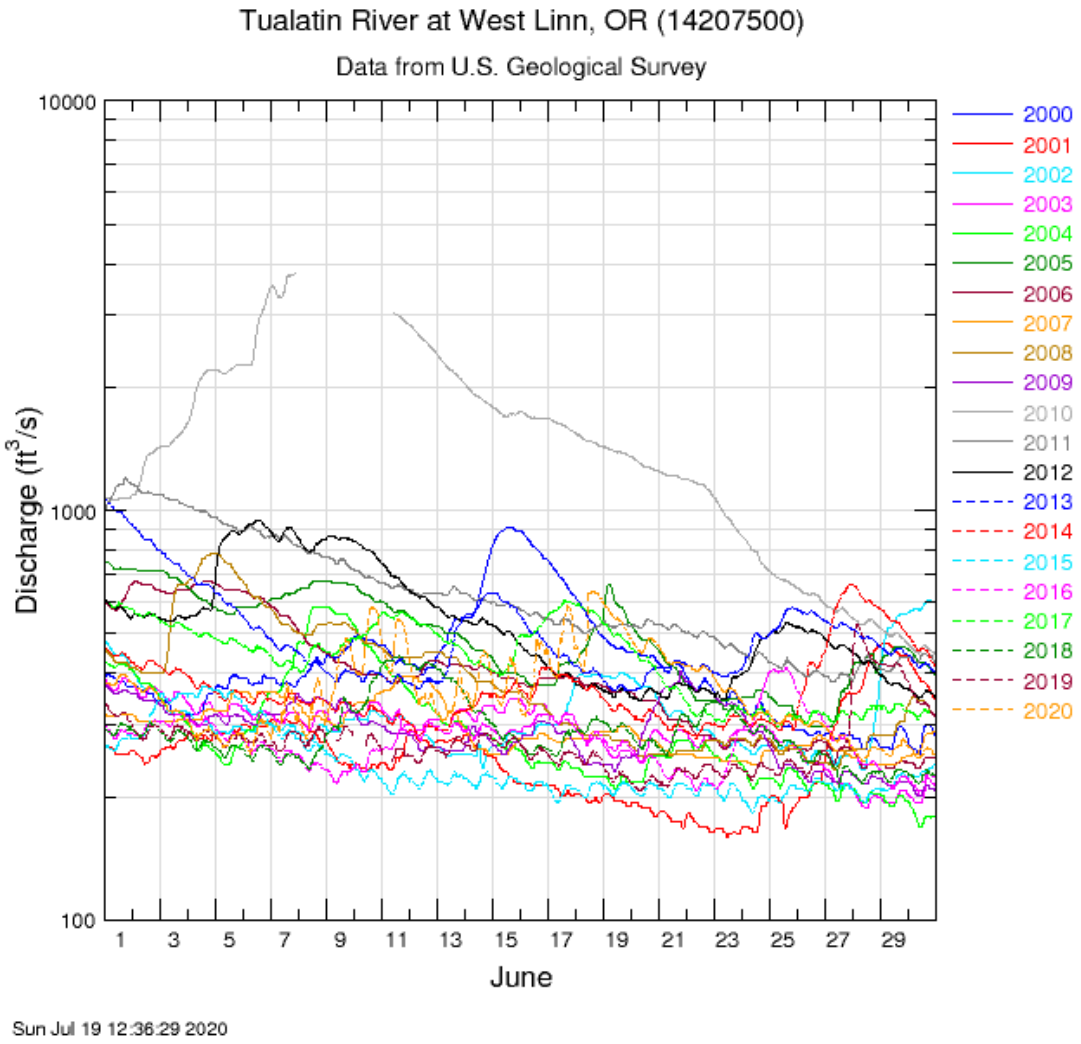
Using this information, a URL could assign the year 2019 (in the above example) to have a thick purple line by including *num_years=20&cindex[18]=12&linew[18]=2* in the URL.

EXAMPLES: DATA GRAPHER BY YEAR OR MONTH

A full calendar year PDF graph of the 7-day mean of the daily maximum water temperature for a site downstream of Cougar Dam on the McKenzie River (14159500) for years 2001 through 2019 is given by: https://or.water.usgs.gov/cgi-bin/grapher/graph_by_yr.pl?site_id=14159500&parm=t&stat=mean&run_mean=on&run_days=7&begin_year=2001&end_year=2019&download=on&filefmt=pdf

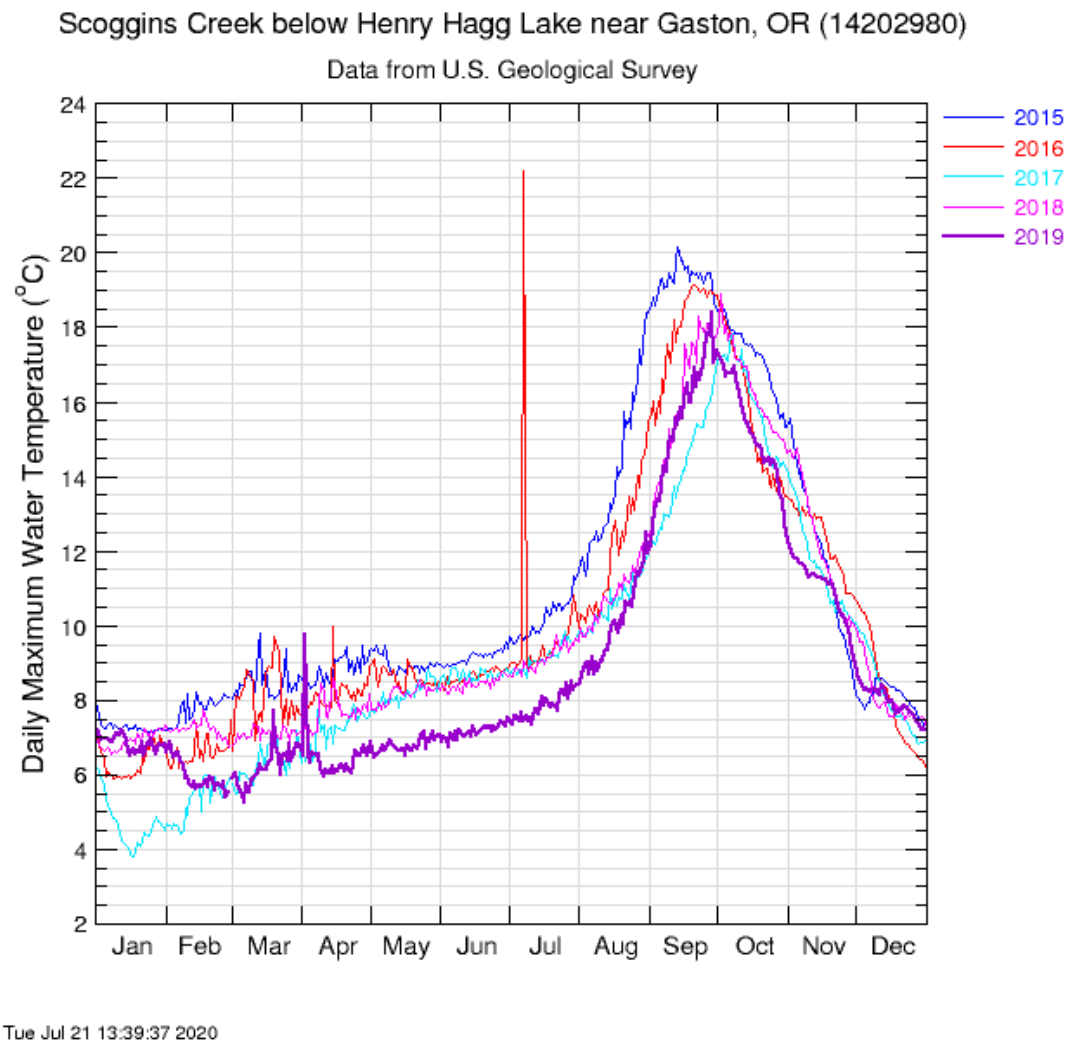


A comparison of streamflow at site 14207500 during June for the years 2000-2020, on a logarithmic scale, can be made with:
https://or.water.usgs.gov/cgi-bin/grapher/graph_by_yr.pl?site_id=14207500&parm=q&begin_year=2000&end_year=2020&year_type=custom&begin_month=6&end_month=6&axis_type=log&download=on&filefmt=pdf



A comparison of daily maximum water temperature at site 14202980 (which has 19 years of temperature record) for the years 2015-2019 can be made with the following URL, using a thick purple line for 2019 (*&num_years=19&cindex[17]=12&linew[17]=2*):

https://or.water.usgs.gov/cgi-bin/grapher/graph_by_yr.pl?site_id=14202980&parm=t&stat=max&begin_year=2015&end_year=2019&num_years=19&cindex[17]=12&linew[17]=2&download=on



COLOR MAP DATA GRAPHER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graph_colormap.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
parm	required	—	Parameter to plot, see list for codes
stat	optional	unit	Statistic to be computed; see list
run_mean	optional	off	Code controlling computation of a running mean (on, off)
run_days	optional	7	Number of days for running mean (2-30 days)
nosupersat	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation) (on, off)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
data_type	optional	orig	Plot unmodified data values (orig) or differences between data and an input (diff)
diff_val	optional	—	Reference value for differences (some number)
cmap_type	optional	date-hr	Type of color map to produce: date on X axis, hour of day on Y axis (date-hr) hour of day on X axis, date on Y axis (hr-date) year on X axis, day of year on Y axis (yr-day) day of year on X axis, year on Y axis (day-yr)
scheme	optional	bl-r1	Color scheme: blue to dark red, 18 steps (bl-r1) blue to dark red, 12 steps (bl-r2) blue to green, 16 steps (bl-gr) green to magenta, 14 steps (gr-mg) brown to blue, 12 steps (br-bl) white to blue, 12 steps (wh-bl) white to orange-red, 12 steps (wh-or) white to dark red, 12 steps (wh-rd) white to magenta, 12 steps (wh-mg) white to green, 12 steps (wh-gr) custom two-color gradient, default of blue to red (cust2) custom three-color gradient, default of blue to white to red (cust3)
steps	optional	—	Number of colors in a custom color scheme
flip	optional	off	Code controlling whether to reverse the color scheme (on, off)
miss_color	optional	CCCCCC	RGB color for missing data, default of light grey (CCCCCC)
lo_color	optional	0000FF	RGB color for low end of custom color gradient, default of blue (0000FF)
mid_color	optional	FFFFFF	RGB color for middle of three-color gradient, default of white (FFFFFF)
hi_color	optional	FF0000	RGB color for high end of custom color gradient, default of red (FF0000)
scale_type	optional	linear	Numerical scale type for color gradient (linear, logarithmic, custom)

Parameter Name	Required/ Optional	Default, if any	Description
cust_scale	optional	—	Space- or comma-delimited list of numbers defining a custom scale; for the URL, put the list in quotation marks
min	optional	auto	Scale minimum (number or “auto”)
max	optional	auto	Scale maximum (number or “auto”)
xpix	optional	750	Width of final image, in pixels (250-2000, or “auto”)
ypix	optional	600	Height of final image, in pixels (250-2000, or “auto”)
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format (only: png, gif, jpg)

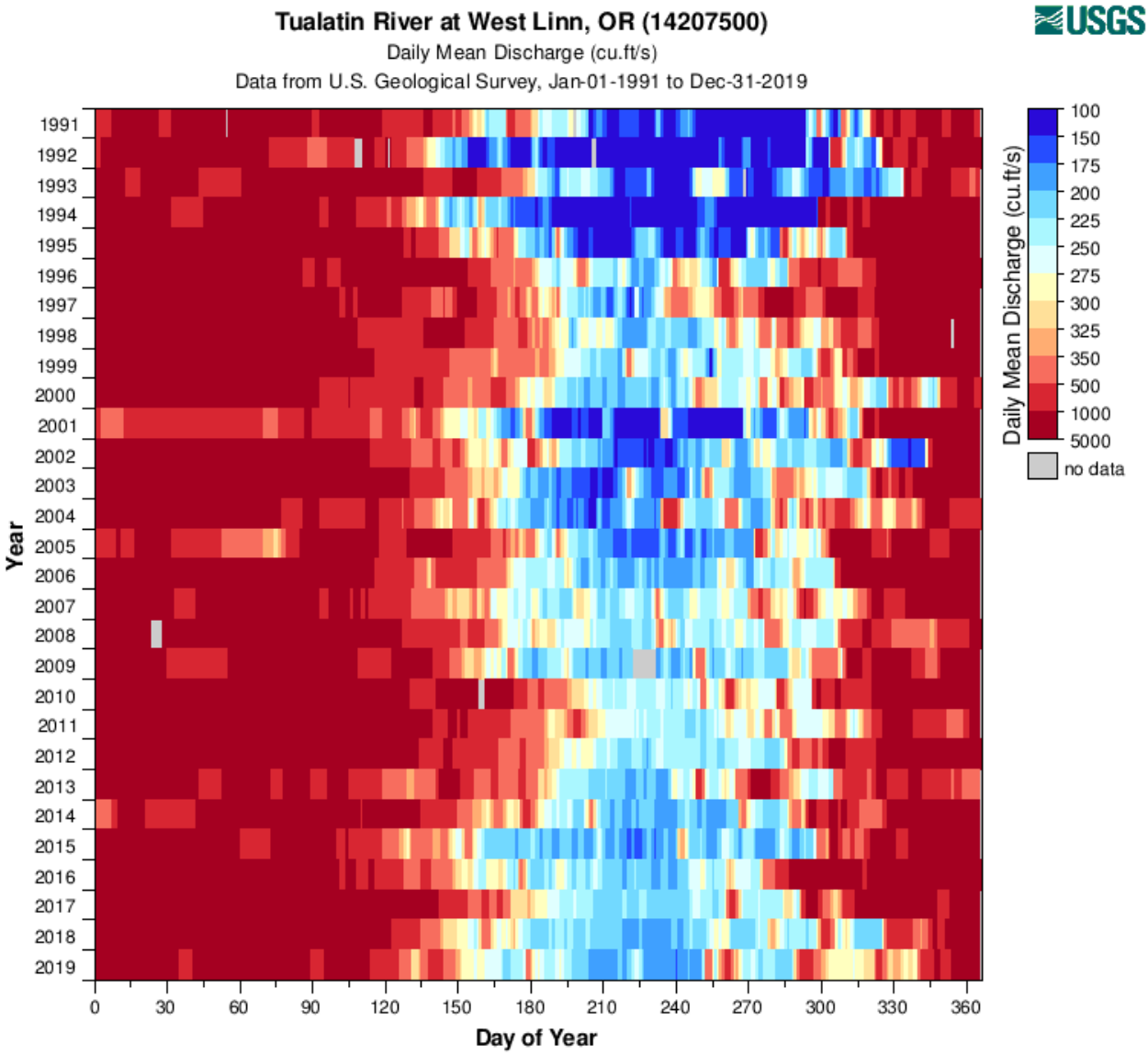
* Some combination of date inputs is required; see Date Inputs section for the Single-Site Data Grapher program

Note that when plotting many years of data, it may be necessary to increase the size of the graphic with the *xpix* or *ypix* parameter to include all of the years as individual tick marks.

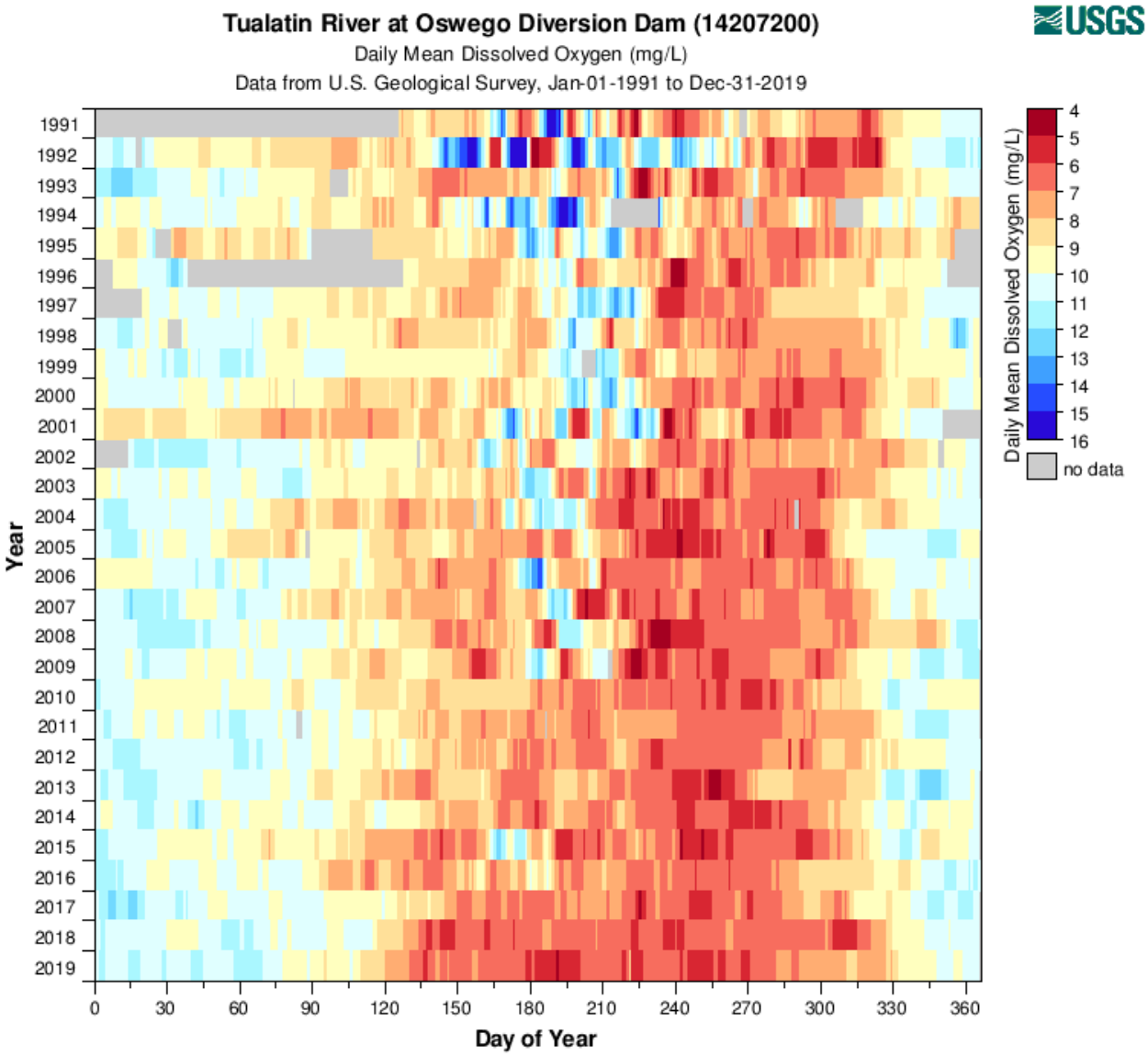
EXAMPLES: COLOR MAP DATA GRAPHER

A color map showing variations in daily mean streamflow for site 14207500 from 1-Jan-1991 through 31-Dec-2019 with the year on the Y axis and the day of year on the X axis, using a preset 12-step color scheme from blue to red, a custom user-defined scale, and a slightly increased image height, is produced with the following URL:

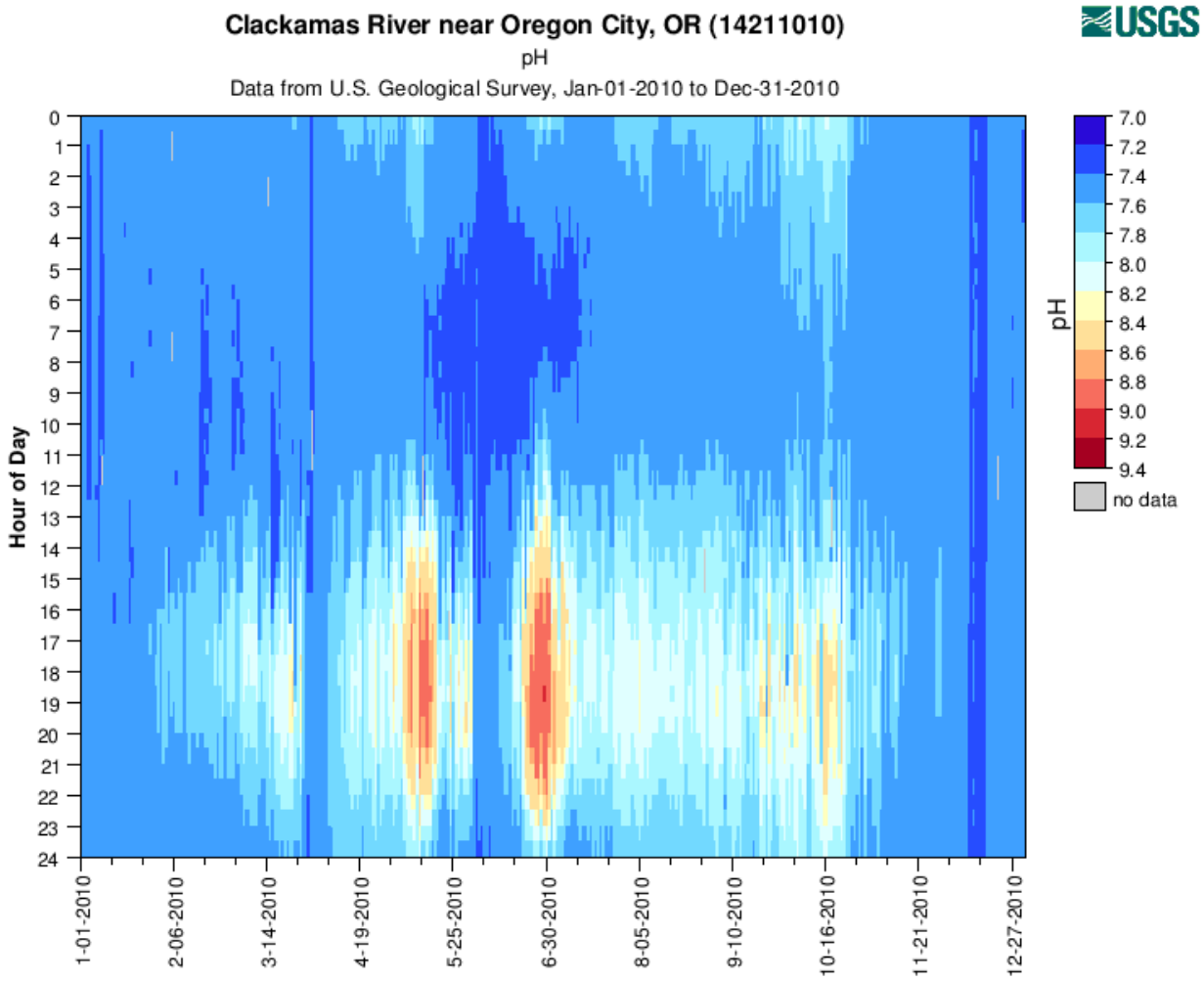
https://or.water.usgs.gov/cgi-bin/grapher/graph_colormap.pl?site_id=14207500&parm=q&stat=mean&begin_month=1&begin_day=1&begin_year=1991&end_month=12&end_day=31&end_year=2019&cmap_type=day-yr&scheme=bl-r2&scale_type=custom&cust_scale="100,150,175,200,225,250,275,300,325,350,500,1000,5000"&xpix=750&ypix=700&download=on



A color map showing dissolved oxygen concentrations from site 14207200 on a linear scale from 4 to 16 mg/L, again from 1991 to 2019 and reversing the color scheme:
https://or.water.usgs.gov/cgi-bin/grapher/graph_colormap.pl?site_id=14207200&parm=do&stat=mean&begin_month=1&begin_day=1&begin_year=1991&end_month=12&end_day=31&end_year=2019&cmap_type=day-yr&scheme=bl-r2&flip=on&xpix=750&ypix=700&min=4&max=16&download=on



And here is a color map of hour-of-day on the Y axis and date on the X axis, showing how pH is highest at site 14211010 only in the afternoon on some days during 2010:
https://or.water.usgs.gov/cgi-bin/grapher/graph_colormap.pl?site_id=14211010&parm=ph&begin_month=1&begin_day=1&begin_year=2010&end_month=12&end_day=31&end_year=2010&cmap_type=date-hr&scheme=bl-r2&xpix=750&ypix=600&min=7&max=9.4&download=on



XY DATA GRAPHER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graphxy.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
parm1	required	—	First parameter to plot, X axis, see list for codes
parm2	optional	—	Second parameter to plot, Y axis, see list for codes
stat1	optional	unit	Statistic for first parameter; see list
stat2	optional	unit	Statistic for second parameter; see list
run_mean1	optional	off	Code controlling computation of a running mean, first parameter (on, off)
run_mean2	optional	off	Code controlling computation of a running mean, second parameter (on, off)
run_days1	optional	7	Number of days for running mean, first parameter (2-30 days)
run_days2	optional	7	Number of days for running mean, second parameter (2-30 days)
nosupersat1	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), first parameter (on, off)
nosupersat2	optional	off	Code controlling whether dissolved-oxygen concentrations should be restricted to those less than its solubility (no supersaturation), second parameter (on, off)
ps_contours	optional	off	Code controlling whether oxygen percent saturation contours are included (on, off)
ps_interval	optional	10	Interval between oxygen percent saturation contour lines, percent
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
key	optional	none	Code to specify a scheme for highlighting some or all data points: no highlighting (none) highlight by month, any year (mon); requires km1 and km2 inputs highlight by month, specific years (monyr); requires km1, km2, ky1, ky2 highlight by year, any month (yr); requires ky1 and ky2 highlight by year, specific months (yrmon); requires km1, km2, ky1, ky2 highlight by date range (dates); requires km1, km2, ky1, ky2, kd1, kd2
km1	optional	—	Beginning month number for color highlighting (1-12)
km2	optional	—	Ending month number for color highlighting (1-12)
ky1	optional	—	Beginning year for color highlighting (4 digits)
ky2	optional	—	Ending year for color highlighting (4 digits)
kd1	optional	—	Beginning day for color highlighting (1-31)
kd2	optional	—	Ending day for color highlighting (1-31)
ngrps	optional**	—	Number of highlight groups; needed when specifying some graph attributes
cref[#]	optional**	**	Color definitions, where # ranges from 0 to 11; see list
cindex[#]	optional**	**	Color index designations (4-15) for plotted groups; # ranges 0 to ngrps-1
linew[#]	optional**	**	Symbol line width for plotted groups (0-3); # ranges from 0 to ngrps-1
stype[#]	optional**	**	Symbol type for plotted groups (1,9,8,4,6); # ranges from 0 to ngrps-1
min1	optional	auto	Y axis minimum for first parameter (number or “auto”); > 0 for log scale
max1	optional	auto	Y axis maximum for first parameter (number or “auto”); > 0 for log scale

Parameter Name	Required/ Optional	Default, if any	Description
min2	optional	auto	Y axis minimum for second parameter (number or “auto”); > 0 for log scale
max2	optional	auto	Y axis maximum for second parameter (number or “auto”); > 0 for log scale
xpix	optional	660	Width of final image, in pixels (500-2500, or “auto”)
ypix	optional	615	Height of final image, in pixels (500-2500, or “auto”)
xgrid	optional	all	Keyword controlling whether X axis grid lines are shown (all, major, off)
ygrid	optional	all	Keyword controlling whether Y axis grid lines are shown (all, major, off)
axis1_type	optional	linear	X axis type (linear, log); all data must be > 0 for log scale
axis2_type	optional	linear	Y axis type (linear, log); all data must be > 0 for log scale
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

* Some combination of date inputs is required; see Date Inputs section for the Single-Site Data Grapher program
** Specification of color definitions and the assignment of symbol colors, symbol line widths, and symbol types for various graph features is explained in the Graph Attributes section below

Graph Attributes

The interactive online version of this program allows the user to specify custom color definitions and the color, line width, and type of symbol for the various groups of points included in the graph. It is possible to specify all of these attributes in an independent URL, but including such attributes in the URL requires an understanding of the defaults and definitions for colors and how the various colors and groups of data are indexed. So, stick with the defaults if you wish, or dive into the definitions to learn how to modify these graph attributes. These definitions are similar to those used in other Data Grapher programs, but not exactly the same, so please read the rules below carefully.

Color Definitions. This program uses a set of 12 colors that the user can modify, as in the table below:

Index for Definition	Index for Assignment	Default Color Hex Code	Default Color Name	Default Color Swatch
0	4	0000FF	Blue	
1	5	FF0000	Red	
2	6	00E6FF	Cyan	
3	7	FF00FF	Magenta	
4	8	00FF00	Green	
5	9	008B00	Dark Green	
6	10	990033	Burgundy	
7	11	FF9900	Orange	
8	12	B98000	Brown	
9	13	9900CC	Purple	
10	14	999999	Dark Gray	
11	15	000000	Black	

These colors can be re-defined with the *cref[#]* parameter in a URL, where the # is the index for definition and the value is assigned as a 6-character RGB hex code. For example, the second color could be re-defined as a yellow color with the URL argument *cref[1]=FFFF00*. When a color is re-defined, any reference to the use of that color will carry through to the final graph.

If the standard color definitions are acceptable, or after one or more are re-defined, they can be assigned to certain groups in the graph through the use of their assignment index. Therefore, if the standard color definitions were retained and the user wanted to assign a particular group of symbols in the graph to have a red color, the user would assign that graph attribute using a color index of 5.

Symbol Types. Five different symbol types can be assigned to the various groups of points in the graph with the *stype[#]* parameter in a URL, using the values in the following table:

Value	Symbol Type
1	circle
9	x
8	plus
4	triangle up
6	triangle down

The reason for the somewhat odd codes for the symbol types is tied to the use of the open-source Grace graphics engine used to make these graphics.

Symbol Line Widths. The symbol line widths for the various groups of points in the graph can be set with the *linew[#]* parameter in a URL, using the values in the following table:

Value	Line Width
0	thin
1	normal
2	thick
3	thickest

The use of these parameters is discussed below, after first understanding how the groups of points are indexed. Note that for some output formats, the thin and normal symbol line widths look pretty much the same.

Group Indexing. Groups of points in this program are numbered from 0 to *ngrps*-1, where *ngrps* is the number of separate groups of points specified by the user-defined data highlighting option. For example, if the user specifies that data should be highlighted by month range of any year (*key=mon*) with a starting month of March (*km1=3*) and an ending month of July (*km2=7*), then six different groups would be available for highlighting: March, April, May, June, July, and Other. If the user specifies a starting month of January and an ending month of December, then "Other" is not an option and the number of groups would be 12. For no data highlighting, only one group is available (*ngrps=1*). Default attributes for the various groups are specified in the table below:

Dataset Index	Dataset Description	Default Symbol Color Index	Default Symbol Type Index	Default Symbol Line Width Index
0	first data group for highlighting	4	1	1
1	second data group for highlighting	5	1	1
2	third data group for highlighting	6	1	1
3	fourth data group for highlighting	7	1	1
…	…	…	…	…
ngrps-1	last data group for highlighting	…	…	…

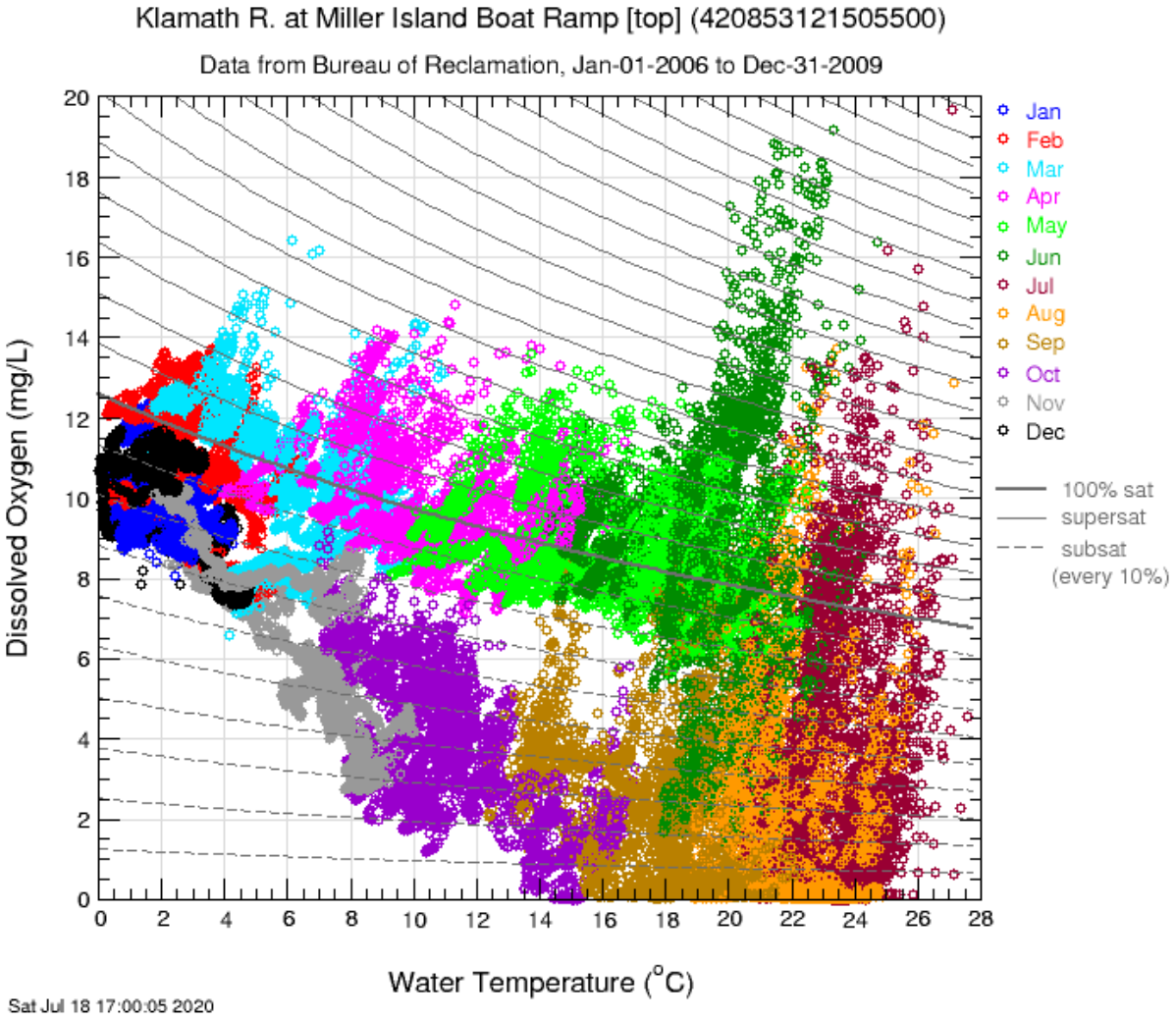
As an example, suppose that the user wants to highlight data from June, July, and August of any year. To accomplish this with a URL, one would include the following parameters and values: *key=mon&km1=6&km2=8&ngrps=4*. The number of data groups is 4 because it must include June, July, August, and Other. The default color index (assignment index) ranges from 4 to 15, and the Other group, if present, is always handled last (dataset index 3 in this example). Regardless, the Other dataset (or the first dataset if Other is not present) will have a default color index of 4 (*cindex[3]=4*), a circle as its default symbol (*stype[3]=1*), and a normal symbol line width (*linew[3]=1*). By default, the color index for the groups increases from 5 to 15 (or 4 to 15 if Other is not present) for the first 11 (or 12 if Other is not present) data groups (which uses all of the colors) while also using circles as the default symbol type

and a normal symbol line width. The next 12 data groups by default would retain the normal symbol line width but change the symbol type to 9 (an "x") while running through colors 4 through 15. After that, the next 12 data groups are plotted with a plus (symbol type 8), then an upward-facing triangle (symbol type 4), and a downward-facing triangle (symbol type 6), all while retaining a normal symbol line type and running through the color sequence for each symbol type. If the number of combinations of colors and symbols runs out, then the symbol line type would increment to thick (2), then thickest (3) followed by thin (0), with each thickness running through the colors first and then incrementing through the symbol types before going to the next symbol line width. This default scheme can thereby accommodate 12x5x4=240 datasets with unique attributes before being forced to repeat a set of attributes. In most instances, you'll likely be able to simply choose various colors with various symbol types and cover all of the datasets.

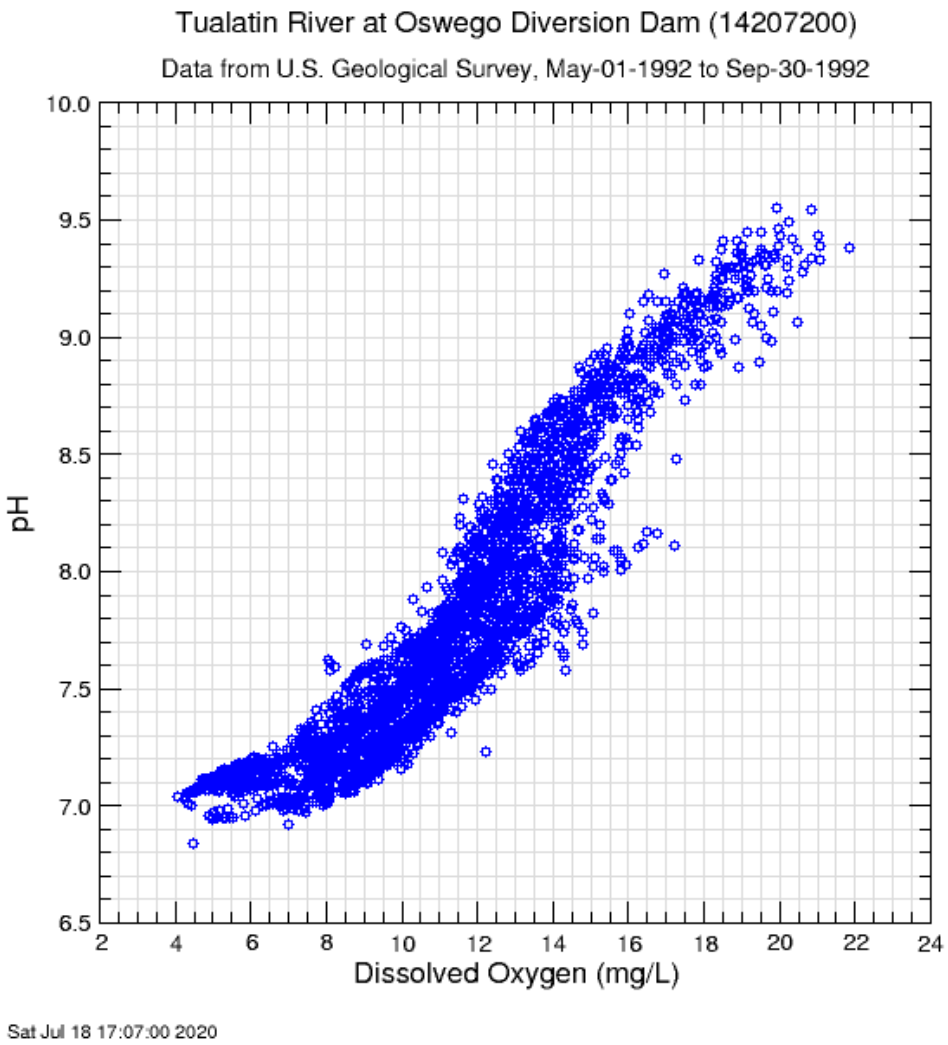
Revisiting the example above in which a user wanted to highlight data from June, July, and August of any year, but desiring that June, July, and August all use the same color (purple: assignment index 13) but different symbol types (for whatever reason), a URL could be set up to include the following: *key=mon&km1=6&km2=8&ngrps=4&cindex[0]=13&cindex[1]=13&cindex[2]=13&stype[0]=8&stype[1]=4 &stype[2]=6* in the URL.

EXAMPLES: XY DATA GRAPHER

Graph of dissolved oxygen concentration versus water temperature for the Klamath River at Miller Island Boat Ramp [top] site (420853121505500) during 2006-2009, using different colors for each month and plotting the data on top of contours of constant percent oxygen saturation:
https://or.water.usgs.gov/cgi-bin/grapher/graphxy.pl?site_id=420853121505500&parm1=t&parm2=do&ps_contours=on&ps_interval=10&begin_date=20060101&end_date=20091231&key=mon&km1=1&km2=12&min1=0&max1=28&min2=0&max2=20&xgrid=major&ygrid=major&xpix=700&download=on

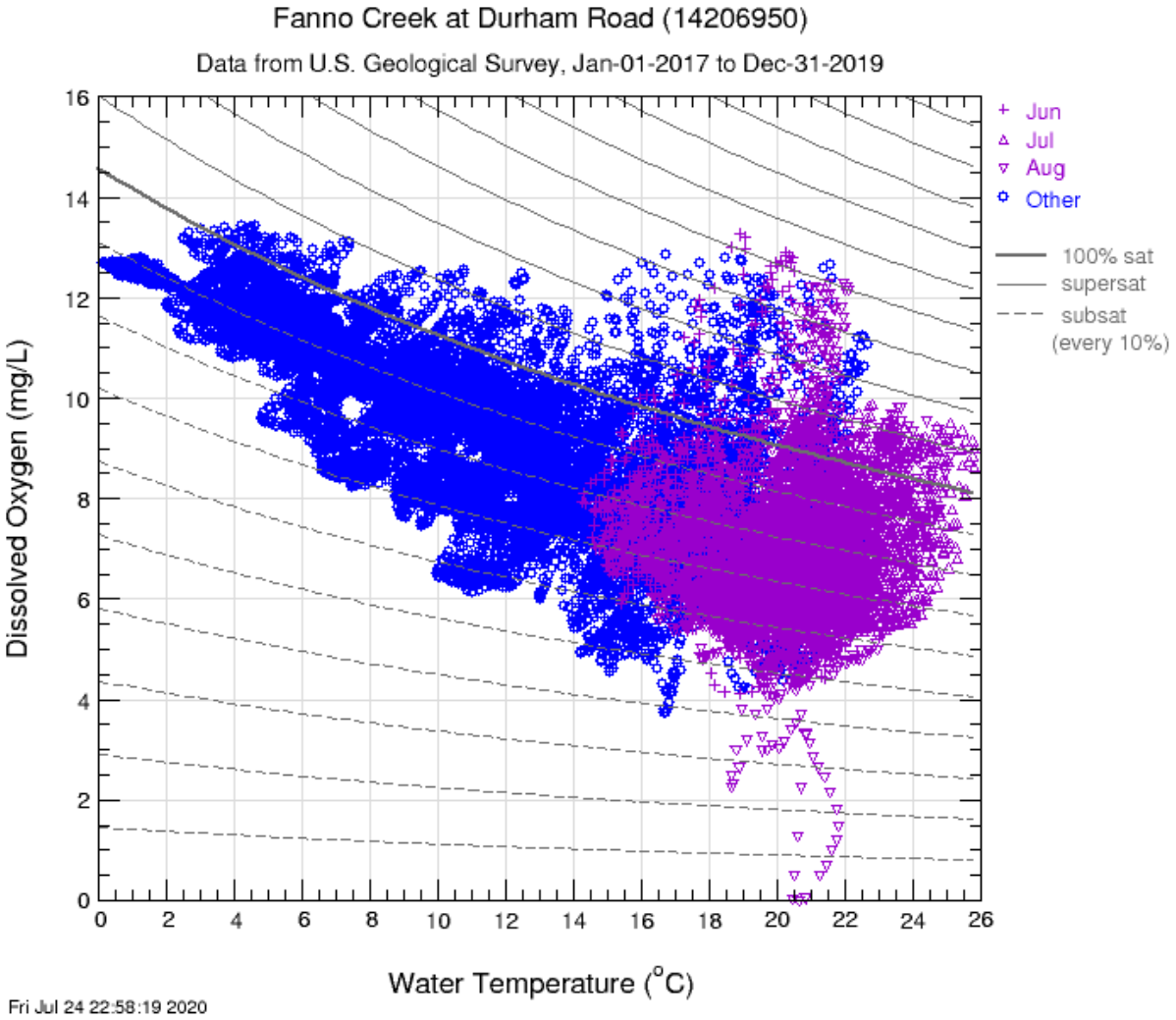


Here's a graph of pH and dissolved oxygen from the summer of 1992 at site 14207200, showing an inflection point that is similar to a titration curve:
https://or.water.usgs.gov/cgi-bin/grapher/graphxy.pl?site_id=14207200&parm1=do&parm2=ph&begin_date=19920501&end_date=19920930&min1=2&max1=24&min2=6.5&max2=10&download=on



And here is another example of dissolved oxygen versus water temperature (with contours of constant oxygen percent saturation) from site 14202950 for the years 2017-2019, highlighting data from June, July, and August of any year, ensuring that data from the highlighted months all use the same color (purple: assignment index 13) but that each month uses a different symbol type (plus, triangle up, triangle down):

https://or.water.usgs.gov/cgi-bin/grapher/graphxy.pl?site_id=14206950&parm1=t&parm2=do&ps_contours=on&ps_interval=10&begin_date=20170101&end_date=20191231&key=mon&km1=6&km2=8&ngrps=4&cindex[0]=13&cindex[1]=13&cindex[2]=13&stype[0]=8&stype[1]=4&stype[2]=6&xpix=700&min1=0&max1=26&min2=0&max2=16&xgrid=major&ygrid=major&download=on



WIND ROSE DATA GRAPHER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graph_windrose.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent
plot_type	optional	wind_rose	Code controlling the type of plot produced: wind rose (wind_rose) or speed/direction scatter plot (speed_dir)
speed_bins	optional	off	Code controlling whether wind rose will include wind-speed categories (on, off)
wr_key	optional	all	Code to specify a scheme for selecting subsets of the data for wind rose plots: all data, no subsetting (all) select data by month, any year (mon); requires wr_km1 and wr_km2 inputs select data by hour of day (hr); requires wr_kh1 and wr_kh2 inputs select data by month and hour of day (monhr); requires wr_km1, wr_km2, wr_kh1, and wr_kh2 inputs
wr_km1	optional	—	Beginning month number for wind rose data selection (1-12)
wr_km2	optional	—	Ending month number for wind rose data selection (1-12)
wr_kh1	optional	—	Beginning hour for wind rose data selection (0-23)
wr_kh2	optional	—	Ending hour for wind rose data selection (0-23)
sd_key	optional	none	Code to specify a scheme for highlighting subsets of the data for speed/dir plots: no highlighting (none) highlight by month, any year (mon); requires sd_km1 and sd_km2 inputs highlight by month, specific years (monyr); sd_km1, sd_km2, sd_ky1, sd_ky2 highlight by year, any month (yr); requires sd_ky1 and sd_ky2 highlight by year, specific months (yrmon); sd_km1, sd_km2, sd_ky1, sd_ky2 highlight date range (dates); sd_km1, sd_km2, sd_ky1, sd_ky2, sd_kd1, sd_kd2
sd_km1	optional	—	Beginning month number for speed/direction color highlighting (1-12)
sd_km2	optional	—	Ending month number for speed/direction color highlighting (1-12)
sd_ky1	optional	—	Beginning year for speed/direction color highlighting (4 digits)
sd_ky2	optional	—	Ending year for speed/direction color highlighting (4 digits)
sd_kd1	optional	—	Beginning day for speed/direction color highlighting (1-31)
sd_kd2	optional	—	Ending day for speed/direction color highlighting (1-31)
max	optional	auto	Graph maximum (number or "auto"); percent for wind rose, m/s for speed/direction
download	optional	off	Code controlling download of output file (on, off); on when using independent URL
filefmt	optional	png	Code denoting the output file format; see list

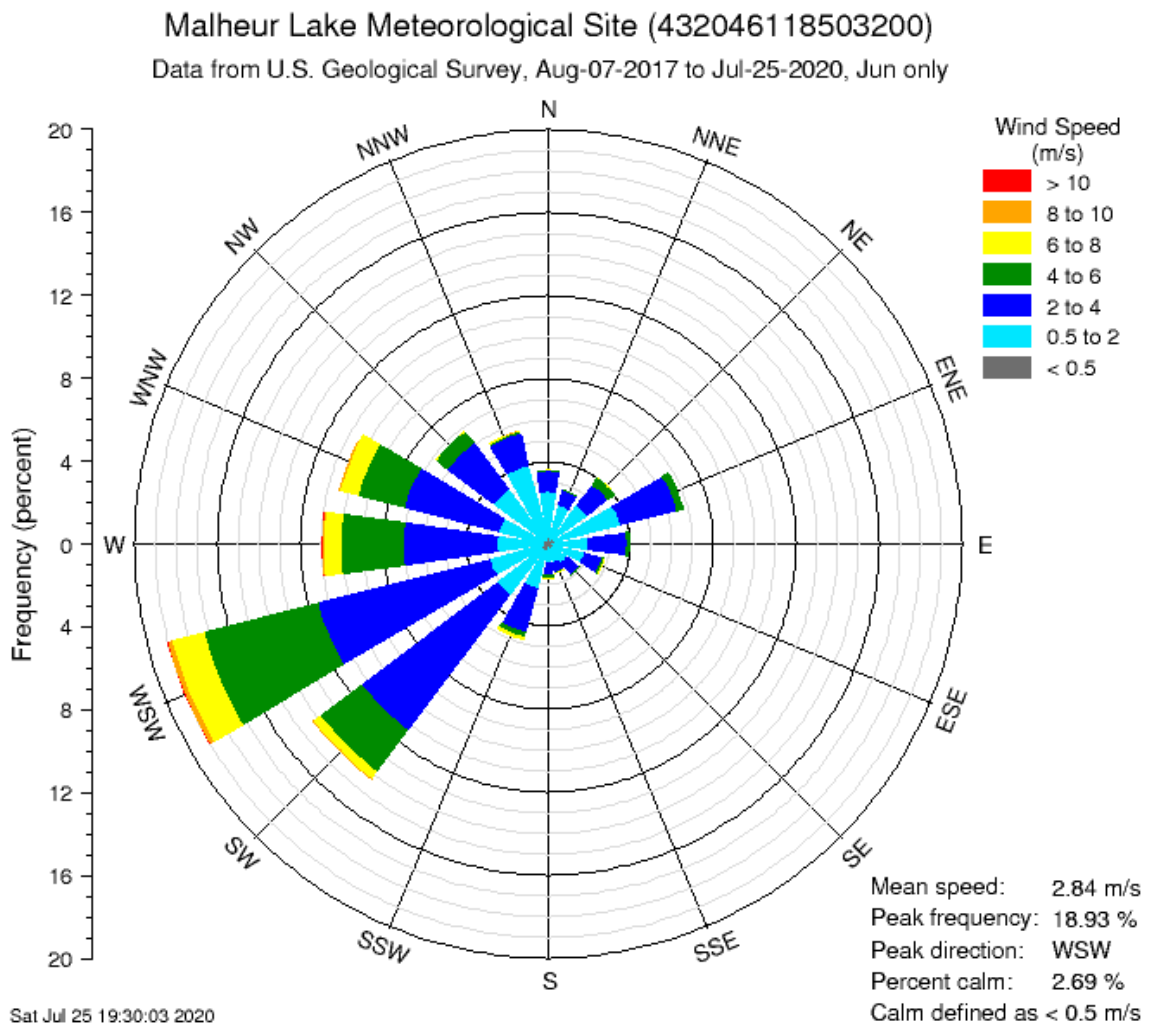
* Some combination of date inputs is required; see Date Inputs section for the Single-Site Data Grapher program

Note that generating a plot directly from an independent URL will provide only the wind rose or speed/direction plot, whereas the interactive online program also will provide a table of frequencies associated with the wind rose.

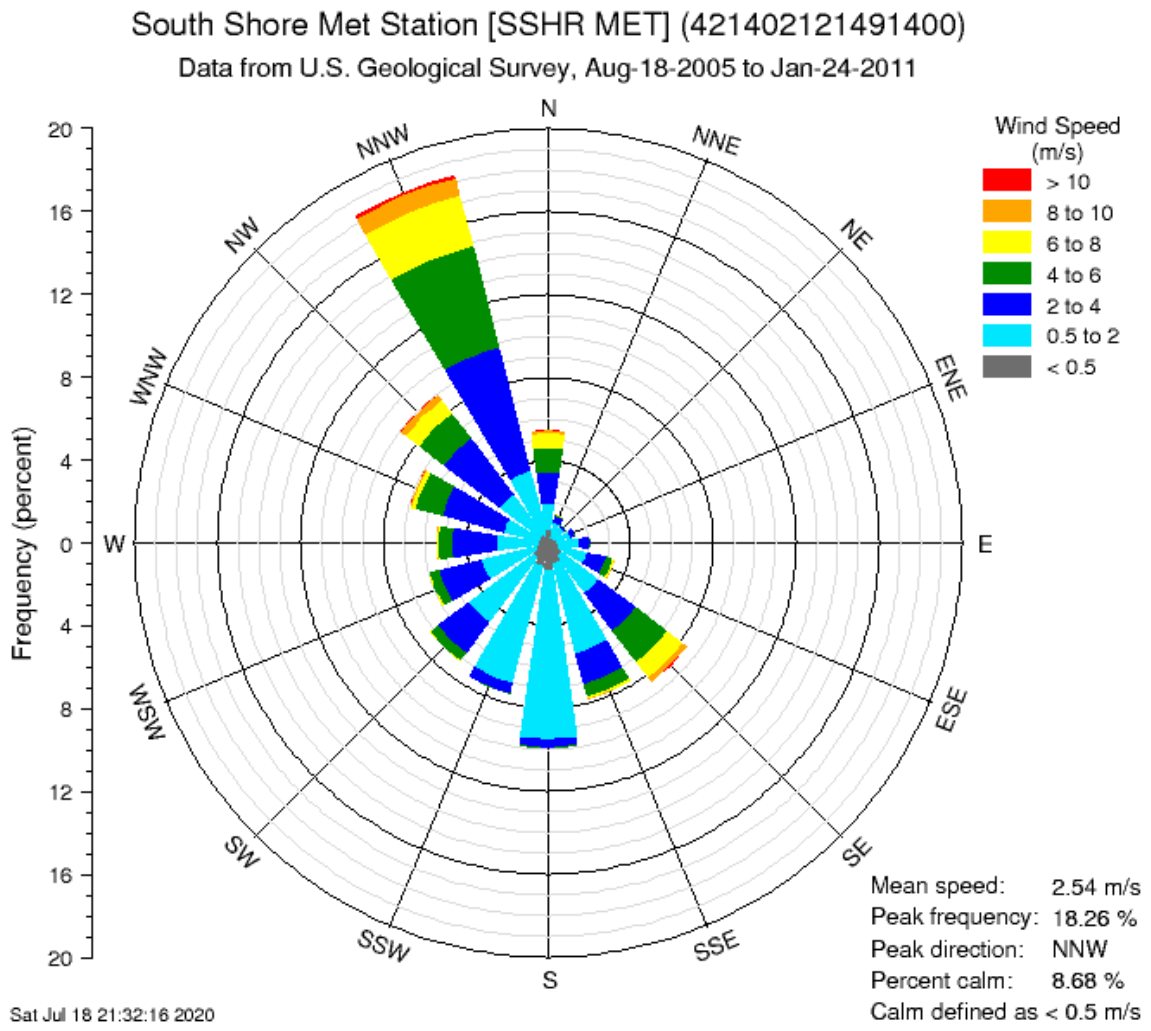
EXAMPLES: WIND ROSE DATA GRAPHER

The following URL will make a wind rose with speed bins using only data collected in June from site 432046118503200:

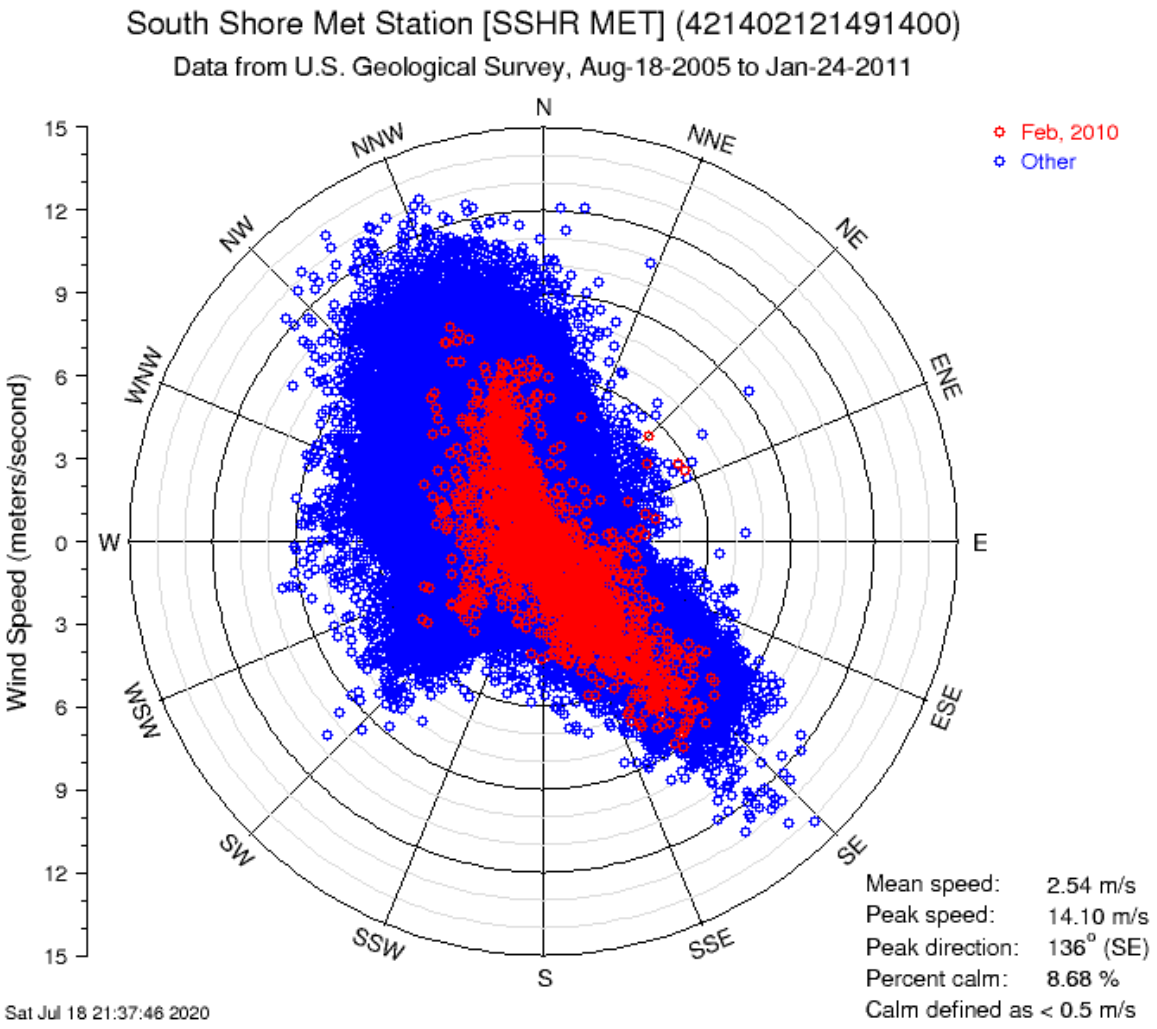
https://or.water.usgs.gov/cgi-bin/grapher/graph_windrose.pl?site_id=432046118503200&all_dates=on&plot_type=wind_rose&speed_bins=on&wr_key=mon&wr_km1=6&wr_km2=6&download=on



The following URL will generate a wind rose with speed bins for all data from site 421402121491400:
https://or.water.usgs.gov/cgi-bin/grapher/graph_windrose.pl?site_id=421402121491400&all_dates=on&plot_type=wind_rose&speed_bins=on&wr_key=all&download=on



And this example uses all data from site 421402121491400 (same as the previous example) to create a wind-speed/wind-direction scatter plot, with data from a particular month highlighted:
https://or.water.usgs.gov/cgi-bin/grapher/graph_windrose.pl?site_id=421402121491400&all_dates=on&plot_type=speed_dir&sd_key=monyr&sd_km1=2&sd_km2=2&sd_ky1=2010&sd_ky2=2010&download=on



MULTIPLE-GRAPH DATA GRAPHER

Unlike the Data Grapher programs that allow for the download of an image or non-HTML file, the output of the Multiple-Graph (or Multiple-Parameter) Data Grapher is a series of graphs and associated information in HTML format. Although a useful way to quickly plot data from multiple sensors at a single site, this program is less interactive than the others. A URL for this program can be used to generate a useful bookmark, but an automated retrieval program would have to process the HTML output received by such a URL request.

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/graph_all.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
all_parms	optional	off	Code that selects all parameters from the selected site
parameter	required	—	Not required if "all_parms" is set to "on". Parameters to plot in individual graphs are specified using the parameter name as the parameter, and "on" as the value, such as: t=on do=on tbdy=on See the parameter list table for parameter names.
stat	optional	unit	Statistic to be computed; see list. Certain statistics are not valid with certain parameters; the program will adjust the statistic or report an error if it finds a conflict.
run_mean	optional	off	Code controlling computation of a running mean (on, off)
run_days	optional	7	Number of days for running mean (2-30 days)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Plot some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Plot some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest or plot_recent

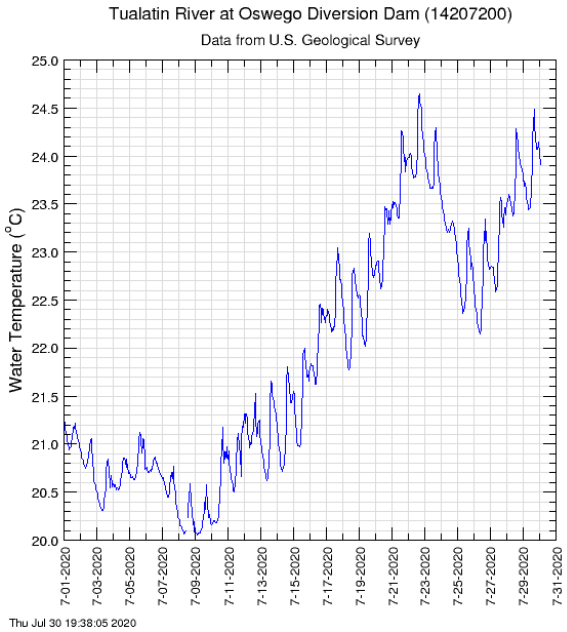
* Some combination of date inputs is required; see Date Inputs section for the Single-Site Data Grapher program

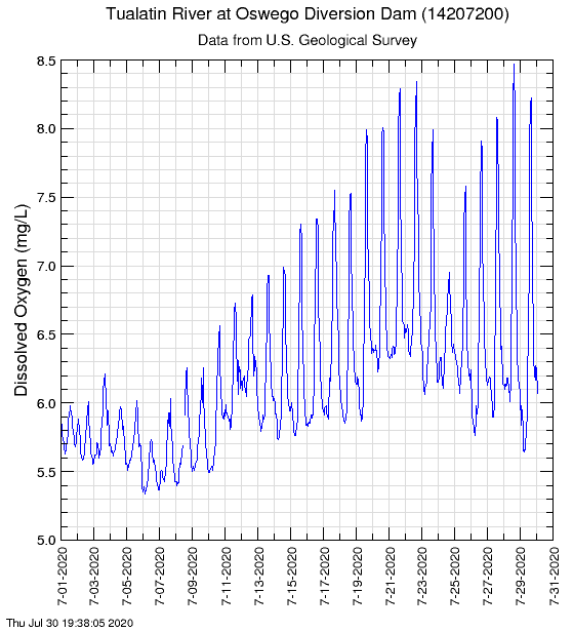
EXAMPLE: MULTIPLE-GRAPH DATA GRAPHER

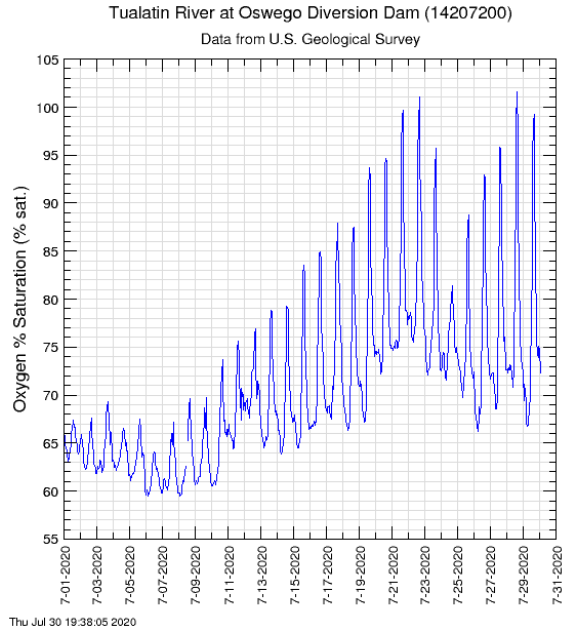
The following URL will create an HTML-formatted output page (suitable for a browser bookmark) containing individual graphs of the last 30 days of water temperature (t), dissolved oxygen (do), oxygen percent saturation (psat), and pH (ph) from site 14207200:
https://or.water.usgs.gov/cgi-bin/grapher/graph_all.pl?site_id=14207200&t=on&do=on&psat=on&ph=on&plot_recent=on&latest_days=30
The graphs are shown on the next page, rather than the entire HTML page. The actual graphs are larger; they were made smaller here to fit on one page.

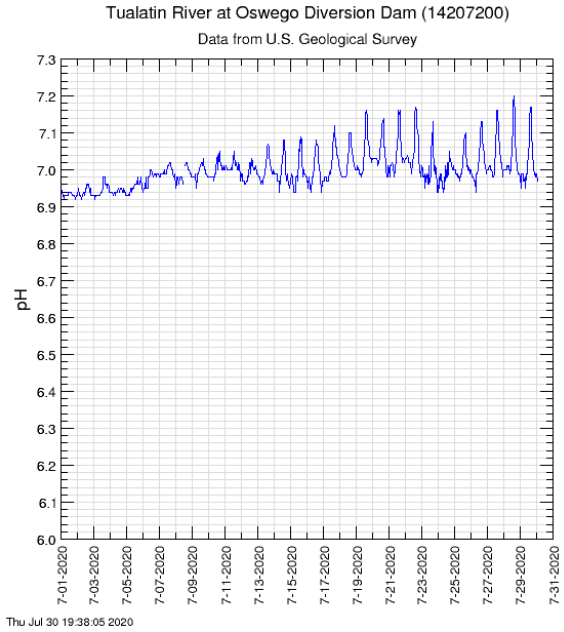
Results of Multiple-Parameter Data Grapher:

Site: Tualatin River at Oswego Diversion Dam
USGS ID: 14207200
Parameters: Water Temperature (deg. C)
Dissolved Oxygen (mg/L)
Oxygen % Saturation (% sat.)
pH (std.unit)
Statistic: All Data
Begin Date: Jul-01-2020 00:00
End Date: Jul-30-2020 24:00









DATA GRAPHER INVENTORY TABLES

Unlike the Data Grapher programs that allow for the download of an image or non-HTML file, the output of the Data Grapher's inventory tables is restricted to HTML format. As a result, the URL can be used to generate a useful bookmark, but an automated retrieval program would have to process the HTML output received by such a URL request. Note that the Data Grapher's inventory tables represent only the data available to the Data Grapher; the data available in NWIS may be different in some cases.

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/inventory.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
parm	required	—	Parameter designated for the inventory, see list for codes
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
inv_type	optional	monthly	Code specifying the type of inventory (monthly, daily)
inv_vals	optional	percent	Code specifying the type of values to inventory: number of data values in each month or day (number) percentage of non-missing values each month or day (percent) number of approved data values each month or day (numberA) percentage of non-missing and approved values each month or day (percentA) number of provisional values each month or day (numberP) percentage of non-missing and provisional values each month or day (percentP)

* Some combination of date inputs is required; see Date Inputs section below

DATE INPUTS

Some combination of date inputs is required. If the *all_dates* input is set to *on*, then the entire dataset will be included, and this input takes precedence over any other combination of date inputs. If the *all_dates* input is *off*, then one of two types of date inputs is required:

- The easiest option is to specify the full start and end dates in YYYYMMDD format:
  begin_date=YYYYMMDD where YYYY= 4-digit year, MM= 2-digit month, and DD= 2-digit day
  end_date=YYYYMMDD where YYYY= 4-digit year, MM= 2-digit month, and DD= 2-digit day

- The other option is to specify the full starting and ending dates with six inputs:
  begin_day=xx where xx is a number between 1 and 31
  begin_month=xx where xx is a number between 1 and 12
  begin_year=xxxx where xxxx is the four-digit year of the start date
  end_day=xx where xx is a number between 1 and 31
  end_month=xx where xx is a number between 1 and 12
  end_year=xxxx where xxxx is the four-digit year of the end date

EXAMPLES: DATA GRAPHER INVENTORY TABLES

The following URL will create an HTML-formatted Data Grapher inventory table for water temperature at site 14207200, aggregated by month over the entire period of record and showing the percentage of non-missing data each month:
https://or.water.usgs.gov/cgi-bin/grapher/inventory.pl?site_id=14207200&parm=t&all_dates=on
Only the inventory table is show below, rather than the entire HTML page.

Monthly Inventory Table

KEY -- Fill Color Indicates Percent of Non-Missing Values

0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100

Monthly Inventory -- Percent of Non-Missing Values (May-07-1991 to Jul-30-2020)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1991					97.8	100	100	100	100	100	100	100
1992	100	100	100	99.9	100	100	100	100	100	100	100	100
1993	100	100	100	99.9	100	100	100	100	84.3	100	100	100
1994	100	100	100	99.9	100	100	100	32.3	100	100	70.0	100
1995	100	100	95.0	14.7	97.8	100	100	100	99.9	100	100	100
1996	100	22.1	0.0	0.0	75.9	100	100	100	100	100	100	99.3
1997	33.6	100	100	99.9	99.6	99.6	99.6	99.6	99.3	99.7	99.7	99.6
1998	95.7	80.2	99.6	99.4	99.9	99.7	99.6	99.9	99.6	99.5	100	99.6
1999	99.6	99.7	99.9	90.6	99.7	99.4	77.3	99.7	99.6	99.3	99.7	99.6
2000	99.5	99.7	93.3	99.6	99.1	99.6	99.3	99.2	99.4	99.7	99.9	99.7
2001	99.7	99.7	99.7	99.7	99.6	99.9	99.5	99.7	99.7	99.9	99.6	97.4
2002	99.7	99.7	99.9	99.7	91.3	99.9	99.6	99.9	99.7	99.9	99.7	99.9
2003	100	100	99.7	99.9	100	100	100	99.9	100	100	100	100
2004	100	100	100	99.9	100	100	100	100	100	100	100	97.2
2005	100	100	87.9	98.9	100	99.3	95.8	99.3	99.2	100	99.2	99.7
2006	100	99.7	99.7	99.3	94.9	98.6	98.9	99.6	99.3	99.6	99.7	99.5
2007	99.6	99.9	99.6	98.2	99.3	99.7	100	99.6	99.3	99.6	99.0	100
2008	99.7	99.9	99.5	99.9	95.0	99.9	99.9	99.6	99.6	98.8	99.6	99.7
2009	100	99.7	99.6	99.6	100	99.7	97.7	91.9	94.9	99.7	99.6	99.5
2010	99.7	99.9	99.3	100	99.7	99.3	99.7	99.6	100	99.9	99.7	100
2011	99.6	99.9	86.8	99.9	99.6	100	91.3	96.9	99.9	99.9	99.7	99.9
2012	99.9	99.6	99.9	99.3	100	99.4	99.6	99.7	100	99.6	99.6	100
2013	99.6	99.7	99.6	99.7	99.6	99.7	99.3	99.5	99.7	99.6	99.9	99.9
2014	99.6	100	99.7	99.6	99.9	99.6	99.3	99.7	99.9	99.6	99.7	99.9
2015	99.7	99.6	99.7	99.7	99.2	99.6	99.3	99.7	99.9	99.6	100	95.2
2016	100	99.6	99.3	99.7	100	99.6	99.7	99.3	99.9	99.6	99.9	99.9
2017	100	100	100	99.7	100	99.7	99.7	99.7	99.6	99.7	99.7	100
2018	99.9	99.7	99.7	99.6	100	96.4	99.6	96.8	99.3	99.6	99.6	100
2019	99.7	100	100	97.9	100	99.7	99.1	100	99.0	99.5	99.7	99.9
2020	99.7	99.0	99.2	100	99.6	99.9	96.7					

Here's another example for the same dataset, but instead showing a daily inventory table of the number of non-missing provisional data points in 2020:
https://or.water.usgs.gov/cgi-bin/grapher/inventory.pl?site_id=14207200&parm=t&begin_date=20200101&end_date=20200730&inv_type=daily&inv_vals=numberP
Only the inventory table is show below, rather than the entire HTML page. Note that zeroes are shown for the early period of 2020 because those data were approved, and this inventory shows only the count of provisional data values.

Daily Inventory Table

KEY -- Fill Color Indicates Percent of Non-Missing, Provisional Values

0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100	100

Year 2020 Inventory -- Number of Non-Missing, Provisional Values (Jan-01-2020 to Jul-30-2020)

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0	0	0	24	23	24	24					
2	0	0	0	24	24	24	24					
3	0	0	0	24	24	24	24					
4	0	0	0	24	24	24	24					
5	0	0	0	24	24	24	24					
6	0	0	0	24	24	24	24					
7	0	0	0	24	24	24	24					
8	0	0	0	24	24	24	22					
9	0	0	0	24	24	24	24					
10	0	0	0	24	24	24	24					
11	0	0	0	24	24	24	24					
12	0	0	0	24	24	24	24					
13	0	0	0	24	24	24	24					
14	0	0	0	24	24	24	24					
15	0	0	0	24	24	24	24					
16	0	0	0	24	24	24	24					
17	0	0	0	24	24	23	24					
18	0	0	0	24	24	24	24					
19	0	0	10	24	24	24	24					
20	0	0	24	24	24	24	24					
21	0	0	24	24	24	24	24					
22	0	0	24	24	24	24	24					
23	0	0	24	24	24	24	24					
24	0	0	24	24	24	24	24					
25	0	0	24	24	24	24	24					
26	0	0	24	24	24	24	24					
27	0	0	24	24	22	24	24					
28	0	0	24	24	24	24	24					
29	0	0	24	24	24	24	24					
30	0		24	24	24	24	2					
31	0		24		24							

DATA TABLER

Base URL: https://or.water.usgs.gov/cgi-bin/grapher/tabler.pl

Parameter Name	Required/ Optional	Default, if any	Description
basin_id	optional	all	USGS basin or site grouping, specific to Data Grapher
site_id	required	—	USGS site identification number, usually 7 or 15 digits
all_parms	optional	off	Code that selects all parameters from the selected site
parameter	required	—	Not required if "all_parms" is set to "on". Parameters to include in the table are specified using the parameter name as the parameter, and "on" as the value, such as: t=on do=on tbdy=on See the parameter list table for parameter names. Dissolved oxygen with no credit for supersaturation is specified as "do-nosup=on"
stat	optional	unit	Statistic to be computed; see list. Certain statistics are not valid with certain parameters; the program will adjust the statistic or report an error if it finds a conflict.
run_mean	optional	off	Code controlling computation of a running mean (on, off)
run_days	optional	7	Number of days for running mean (2-30 days)
all_dates	optional*	off	Code controlling whether all available data should be used (on, off)
begin_date	optional*	—	Begin date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
end_date	optional*	—	End date in YYYYMMDD format where YYYY is a 4-digit year, MM is a 2-digit month, and DD is a 2-digit day
begin_month	optional*	—	Month number (1 to 12) for the first date of interest
begin_day	optional*	—	Day of month (1 to 31) for the first date of interest
begin_year	optional*	—	Year (4 digits) for the first date of interest
end_month	optional*	—	Month number (1 to 12) for the last date of interest
end_day	optional*	—	Day of month (1 to 31) for the last date of interest
end_year	optional*	—	Year (4 digits) for the last date of interest
plot_latest	optional*	off	Table some number of days of data, with end date being the end of record (on, off)
plot_recent	optional*	off	Table some number of days of data, with an end date of today (on, off)
latest_days	optional*	30	Number of days to plot (> 0); used with plot_latest
rounding	optional	usgs	Code controlling the rounding of the data: no rounding (none) or USGS standards (usgs)
filefmt	optional	txt	Code denoting the output file format: HTML format (txt) comma-delimited text file (csvsav) tab-delimited text file (rdbsav)

* Some combination of date inputs is required; see Date Inputs section for the Single-Site Data Grapher program

Note that when requesting more than one parameter, the selected statistic may not be appropriate for every parameter, causing either an error or an adjustment to the statistic used for some parameters. The header of the output file will provide details as to the actual statistic used for each parameter in the output file.

EXAMPLE: DATA TABLER

The following URL will generate a comma-delimited output file containing a table of the last 7 days of unrounded available data from site 14206950, for water temperature (t), dissolved oxygen (do), pH (ph), specific conductance (cond), turbidity (tbdy), and streamflow (q):
https://or.water.usgs.gov/cgi-bin/grapher/tabler.pl?site_id=14206950&t=on&do=on&ph=on&cond=on&tbdy=on&q=on&plot_latest=on&latest_days=7&rounding=none&filefmt=csvsav

Data from U.S. Geological Survey (USGS).
Table created Sunday 19-Jul-2020 11:48 EDT

Fanno Creek at Durham Road
USGS station ID: 14206950

All data are given in local time (Daylight Savings Time in summer).
Missing data are denoted as "-123456E20"

Parameters:
  Discharge (cu.ft/s)
  Water Temperature (deg. C)
  Dissolved Oxygen (mg/L)
  pH (std.unit)
  Specific Conductance (uS/cm)
  Turbidity (FNU)

The following data are provisional and subject to revision:
  All discharge data after May-14-2020 08:00
  All water temperature data after May-14-2020 08:00
  All dissolved oxygen data after May-14-2020 08:00
  All pH data after May-14-2020 08:00
  All specific conductance data after May-14-2020 08:00
  All turbidity data after May-14-2020 08:00

The data shown here may not be rounded according to USGS publication standards.
Not all digits shown may be significant and care should be taken not to assume a greater precision than is merited.

MM/DD/YYYY HH:MM	Discharge (cu.ft/s)	Water Temp. (deg. C)	Dissolved Oxygen (mg/L)	pH (std.unit)	Specific Conduct. (uS/cm)	Turbidity (FNU)
7/13/2020 0:00	4.84	19.85	6.83	7.32	284.1	5.1
7/13/2020 1:00	4.34	19.70	6.85	7.33	283.1	4.8
7/13/2020 2:00	4.34	19.55	6.88	7.34	281.9	8.9
7/13/2020 3:00	4.08	19.42	6.90	7.35	281.3	5.1
7/13/2020 4:00	4.08	19.31	6.92	7.35	280.4	4.7
7/13/2020 5:00	3.83	19.14	6.92	7.35	279.8	6.5
7/13/2020 6:00	3.83	18.98	6.88	7.35	280.4	5.2
7/13/2020 7:00	3.83	18.82	6.83	7.35	280.3	5.4
7/13/2020 8:00	3.83	18.67	6.77	7.35	280.1	5.2
7/13/2020 9:00	3.83	18.66	6.80	7.36	279.4	5.1
7/13/2020 10:00	3.83	18.72	6.84	7.36	277.8	4.8
7/13/2020 11:00	3.83	18.92	6.90	7.37	277.0	5.2
7/13/2020 12:00	3.83	19.29	6.94	7.38	276.7	4.5
7/13/2020 13:00	3.83	19.73	7.03	7.39	276.5	4.5
7/13/2020 14:00	3.83	20.21	7.17	7.40	276.2	4.6
7/13/2020 15:00	3.83	20.53	7.32	7.41	275.9	4.5

and so forth…

LIST OF DATA GRAPHER BASIN/SITE GROUPS FOR OREGON DATA GRAPHER (NOT NEEDED)

Group Code	Description or Notes
all	all sites in all groups or basins
basinrange	Basin and Range sites, Oregon
clackamas	Clackamas River Basin, Oregon
columbia	Columbia/Snake River sites
cowlitz	Cowlitz River Basin, Washington
deschutes	Deschutes River Basin, Oregon
johnson	Johnson Creek Basin, Oregon
klamath	Klamath River, Oregon and California
longtom	Long Tom River Basin, Oregon
mckenzie	McKenzie River Basin, Oregon
ncoast	North Coastal Basins, Oregon
neoregon	Northeast Oregon sites
nsantiam	North Santiam River Basin, Oregon
rogue	Rogue River Basin, Oregon
sandy	Sandy River Basin, Oregon
scoast	South Coastal Basins, Oregon
ssantiam	South Santiam River Basin, Oregon
tualatin	Tualatin River Basin, Oregon
tualbeav	Tualatin Beaver sites, Oregon
ukl	Upper Klamath Lake, Oregon
umpqua	Umpqua River Basin, Oregon
will	Willamette River Basin sites, Oregon
willhab	Willamette River off-channel sites, Oregon
willowck	Willow Creek sites, Oregon
yakima	Yakima River Basin, Washington

List of Data Grapher Parameter Names

Some parameter names have a number tacked on the end, to distinguish among multiple sensors collecting the same type of data at the same site. Such parameters were added to the list only when needed for Oregon sites. These parameter names do not link directly to NWIS parameter names or codes at this time.

Parameter Name	Description or Notes
t	water temperature, in degrees Celsius
t2	water temperature, sensor #2, in degrees Celsius
t3	water temperature, sensor #3, in degrees Celsius
tes	estimated water temperature, in degrees Celsius
do	dissolved oxygen concentration, in milligrams per liter
do2	dissolved oxygen concentration, sensor #2, in milligrams per liter
do3	dissolved oxygen concentration, sensor #3, in milligrams per liter
ph	pH, in standard units
ph2	pH, sensor #2, in standard units
ph3	pH, sensor #3, in standard units
cond	specific conductance, in microsiemens per centimeter, standardized to 25 degrees Celsius
cond2	specific conductance, sensor #2, in microsiemens per centimeter, standardized to 25 degrees Celsius
cond3	specific conductance, sensor #3, in microsiemens per centimeter, standardized to 25 degrees Celsius
airt	air temperature, in degrees Celsius
bp	barometric pressure, in millimeters of mercury (mm Hg)
wind	wind speed, in meters per second
wdir	wind direction, in degrees from North (0 means a wind from the north, 90 means a wind from the east)
rh	relative humidity, in percent
chla	chlorophyll-a concentration, in micrograms per liter
chla2	chlorophyll-a concentration, sensor #2, in micrograms per liter
bga	blue-green algae population density, in cells per milliliter
phyc	phycocyanin concentration, in micrograms per liter, estimated
tbdy	turbidity, in formazin nephelometric units (FNU)
tbdy2	turbidity, sensor #2, in formazin nephelometric units (FNU)
tbdy3	turbidity, sensor #3, in formazin nephelometric units (FNU)
ssed	suspended sediment concentration, in milligrams per liter
uvf95	fluorescent dissolved organic matter (fDOM), 370ex/460em, in parts per billion QSE
uvf94	fluorescent dissolved organic matter (fDOM), 370ex/520em Turner, relative fluorescence units (RFU)
uvf93	fluorescent dissolved organic matter (fDOM), 370ex/470em Turner, relative fluorescence units (RFU)
uvf92	fluorescent dissolved organic matter (fDOM), 270ex/340em Turner, relative fluorescence units (RFU)
uvf91	fluorescent dissolved organic matter (fDOM), 365ex/470em Turner, relative fluorescence units (RFU)
uvf91p	fluorescent dissolved organic matter (fDOM), 365ex/470em Turner, in micrograms per liter PTSA
no3	nitrate concentration, in milligrams nitrogen per liter
no32	nitrate concentration, sensor #2, in milligrams nitrogen per liter
no33	nitrate concentration, sensor #3, in milligrams nitrogen per liter
rain	rainfall, in inches per time interval
par	photosynthetically active radiation (PAR), in microEinsteins per square meter per second
sol	full-spectrum solar radiation, in Watts per square meter

Parameter Name	Description or Notes
lwr	long-wave atmospheric radiation, in Watts per square meter
s	stage, in feet
gh	gage height, in feet
gh2	gage height, sensor #2, in feet
msl	water-surface elevation, in feet above sea level
elev	water-surface elevation, in feet above the National Geodetic Vertical Datum (NGVD) of 1929
elv	water-surface elevation, in feet above the North American Vertical Datum (NAVD) of 1988
lrel	water-surface elevation, in feet above the Bureau of Reclamation Klamath Basin (USBRKB) datum
q	streamflow, in cubic feet per second
q2	streamflow, sensor #2, in cubic feet per second
kq	streamflow, in thousands of cubic feet per second
kq2	streamflow, sensor #2, in thousands of cubic feet per second
qes	estimated streamflow, in cubic feet per second
vel	stream velocity, in feet per second
tdg	total dissolved gas concentration, in millimeters of mercury (mm Hg)
tdg2	total dissolved gas concentration, sensor #2, in millimeters of mercury (mm Hg)
spill	spill rate from dam, in thousands of cubic feet per second
spill2	spill rate from dam, sensor #2, in thousands of cubic feet per second
dpth	sensor depth, in feet
sd	sensor depth, in meters
sd2	sensor depth, sensor #2, in meters
sd3	sensor depth, sensor #3, in meters
dbw	depth below water LSD, in feet NAVD88
alt	water-level altitude, in feet NAVD88
bot	bottle count, from autosampler
vt	transmitted voltage, in volts
vs	scatter voltage, in volts
	The following are computed parameters, derived from other parameters
psat	oxygen percent saturation, in percent
psat2	oxygen percent saturation, sensor #2, in percent
psat3	oxygen percent saturation, sensor #3, in percent
ssc	suspended sediment concentration derived from turbidity, in milligrams per liter
ssc2	suspended sediment concentration derived from turbidity, sensor #2, in milligrams per liter
ssc3	suspended sediment concentration derived from turbidity, sensor #3, in milligrams per liter
secd	estimated Secchi depth, in feet
fi	Fluorescence Index
rsum	total rainfall accumulation, in inches
gsat	total dissolved gas saturation, in percent
gsat2	total dissolved gas saturation, sensor #2, in percent

List of Data Grapher Statistics

Statistic Code	Statistic Name	Description or Notes
unit	unit values	instantaneous measurements; no computed statistic
mean	daily mean	midnight belongs to both days and is weighted appropriately
max	daily maximum	midnight belongs to both days
min	daily minimum	midnight belongs to both days
med	daily median	midnight belongs to both days
range	daily range	midnight belongs to both days
sum	daily sum or total	for rainfall only; midnight is associated with the previous day
vmean	vector mean	for wind speed and wind direction only; uses vector methods
uvmean	unit-vector mean	for wind direction only; does not take wind speed into account
orhi12	OR High-12	State of Oregon "High-12" metric for total dissolved gas saturation; mean of the 12 highest hourly measurements in a day, where midnight is associated with the previous day
orhi2	OR High-2	State of Oregon "High-2" metric for total dissolved gas saturation; mean of the 2 highest hourly measurements in a day, where midnight is associated with the previous day
wahi12	WA High-12	State of Washington "High-12" metric for total dissolved gas saturation; highest consecutive 12-hour running average of hourly data in a 24-hour period, where reporting starts at 1:00 a.m. and ends at midnight

List of Data Grapher File Formats for Graphics

File Format Code	File Format Name	Description or Notes
eps	encapsulated PostScript	vector file; for all but color maps
pdf	Adobe™ Portable Document Format	vector file; for all but color maps
mif	Maker Interchange Format	vector file; for all but color maps
png	Portable Network Graphics	raster image
jpg	Joint Photographic Experts Group	JPEG; raster image
wmf	Windows™ metafile	vector file; for all but color maps
svg	scalable vector graphics	vector file; for all but color maps
gr	Grace graphics engine file	raw code; for all but color maps
gif	Graphics Interchange Format	raster image; color maps only