



National Ocean Service
Center for Operational Oceanographic
Products and Services

USER GUIDE

Understanding NOAA Tide Predictions

Tide Predictions

NOAA Tide Predictions allows you to generate past, present, and future tide predictions at 3000+ locations along the U.S. coastline.

Tide predictions provide the times and heights for the astronomical tides. Driven by the motion of the Earth, Moon, and Sun, predictions are based on the analysis of data collected at coastal locations.

NOAA Tide Predictions **do not include** other influences that can alter coastal water level heights, like storm surge or sea level rise.

CONTACT US



www.tidesandcurrents.noaa.gov

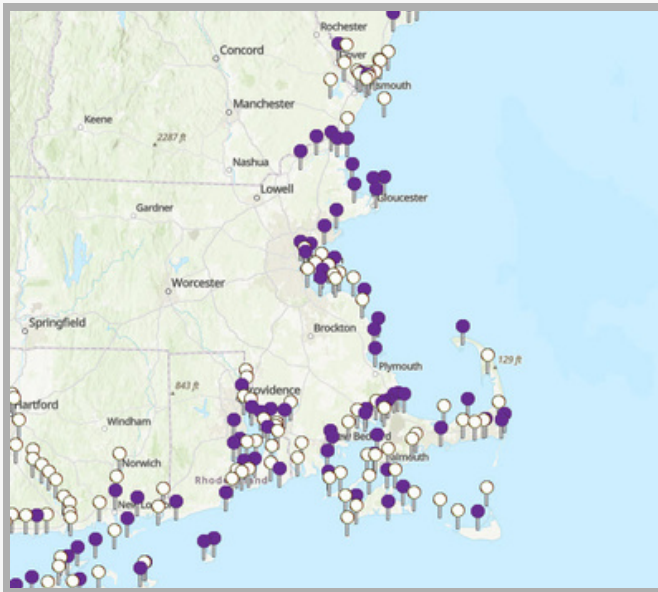


tide.predictions@noaa.gov

Two Types of Stations

CO-OPS displays tide predictions for *harmonic* and *subordinate* stations.

Harmonic Stations



Harmonic stations are labeled with purple pins on the map interface. They are locations with enough long-term tide data to establish *harmonic constants* and *tidal datums*. Predictions for these stations are based solely on the analysis of that data. Because predictions at these locations are based on harmonic constants, predictions can be generated for any interval, and can be adjusted to different tidal datums. CO-OPS has preselected the most common intervals (hourly, 15- and 6-minute) for data queries.

Subordinate Stations

Subordinate stations are short-term historic stations. They are labeled with white pins on the map interface (see *image to left*), and on the Tide Predictions interface page they are labeled “*Subordinate Station*” with their harmonic reference station also named.

Since subordinate stations collect data for shorter time periods, harmonic constants cannot be calculated at these locations. Because these stations do not have their own harmonic constants, they rely on nearby harmonic stations to generate predictions.

To do this, high and low tide predictions for the harmonic reference station are generated, and adjustments based on the location of the subordinate station relative to the harmonic station are applied to these predictions.

Since this process generates predictions for high and low tides only, any interval between these tides is an approximation.

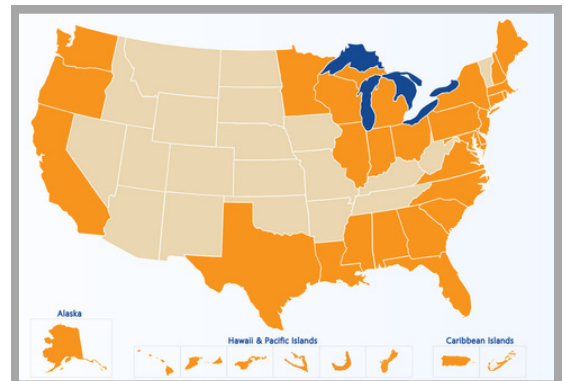
Accessing NOAA Tide Predictions for a location

On our website, www.tidesandcurrents.noaa.gov, there are two ways to access this information.

1

Through the Map Interface

Read on pages 4-6



2

Through the Station Listing

Read on page 7

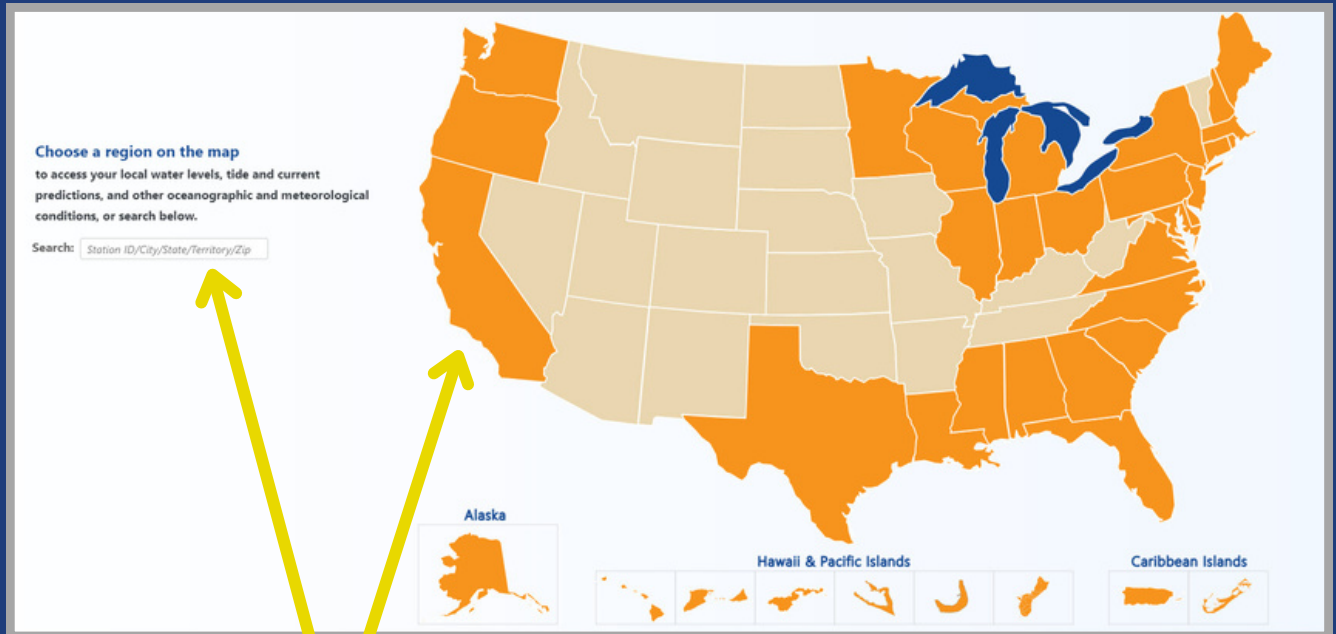
NOAA Tide Predictions

Choose a station using our Tides and Currents Map, click on a state below, or search by station name, ID, or latitude/longitude.

Or search: search help

West Coast	East Coast	Gulf Coast	Pacific	Caribbean Islands
California	Maine	Alabama	Northern Marianas Islands	Bermuda Islands
Oregon	New Hampshire	Mississippi	Palau	Bahamas
Washington	Massachusetts	Louisiana	Federated States of Micronesia	Cuba
Alaska	Rhode Island	Texas	Marshall Islands	Jamaica
	Connecticut		Hawaii	Haiti and Dominican Republic
	New York		Kiribati	Puerto Rico
	New Jersey		Tokelau	Lesser Antilles & Virgin Islands
	Delaware		American Samoa	
	Pennsylvania		French Polynesia	
	Maryland		Cook Islands	
	Virginia		Fiji	
	Washington DC			
	North Carolina			
	South Carolina			
	Georgia			
	Florida			

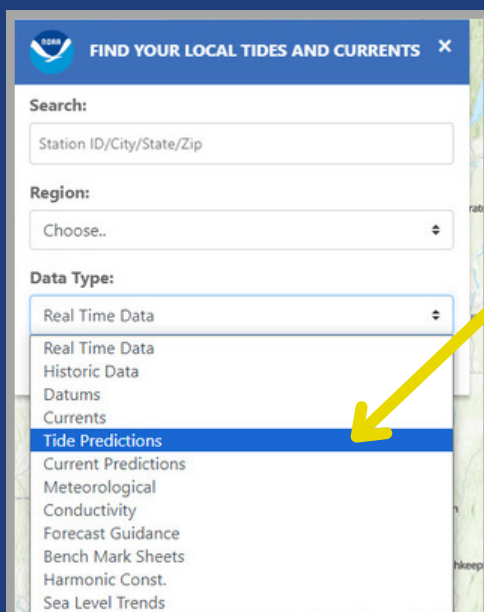
Through the Map Interface



From the [Tides and Currents homepage](#), you can locate a station by:

1. clicking on a state on the map to bring up all the pins for that state, or
2. entering a city, state, or zip code to get results within a general area.

Stations that are currently in operation are also searchable by their station ID.



To ensure that you are accessing only stations that generate NOAA Tide Predictions, from the map interface you will need to select:

- “Advanced” within the top left search box
- Then, in the Data Type dropdown, select “Tide Predictions”

You can now choose from purple pins (harmonic stations) or white pins (subordinate stations) that populate the map to get information on that station.

Refer to the section [“Types of Stations”](#) (on page 2 of this document) for more information on harmonic and subordinate stations.

1

Through the Map Interface *Continued...*

There are two ways to get NOAA Tide Predictions for a station once you are looking at the station's pop-up window, called the **station dashboard**.

Map Option 1: From this station dashboard, click on the *"More Data"* button to reveal a dropdown. Select *"Tide Predictions"* from the list.

This selection will take you directly to the Tide Predictions page (see below image) for that specific station.



Time	Tide	Height
4:26 AM	low	0.23 ft
10:39 AM	high	11.17 ft
5:05 PM	low	-0.91 ft
11:19 PM	high	9.71 ft

Image: Station Dashboard for Boston, MA

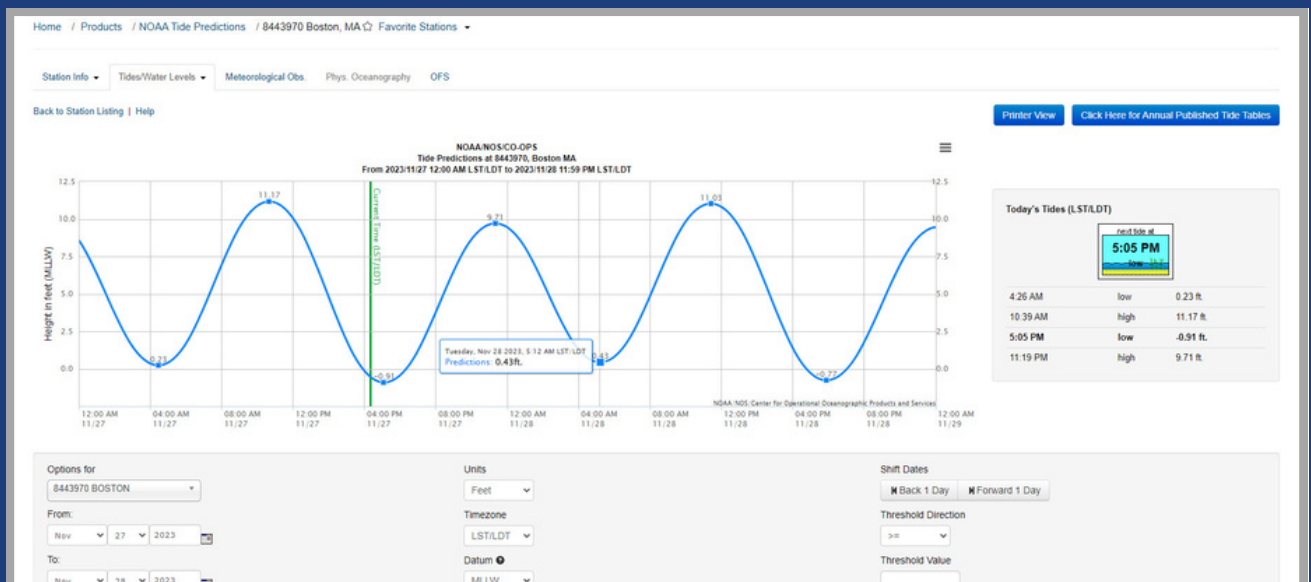


Image: Tide Predictions page for Boston, MA

1

Through the Map Interface *Continued...*

Map Option 2: Alternatively, from a station dashboard you can also click on the “*Station Home*” button to be taken directly to that station’s homepage.

Once on the station homepage (see below image), open the top left dropdown entitled “*Tides/Water Levels.*”

From the dropdown list, select “*NOAA Tide Predictions.*”

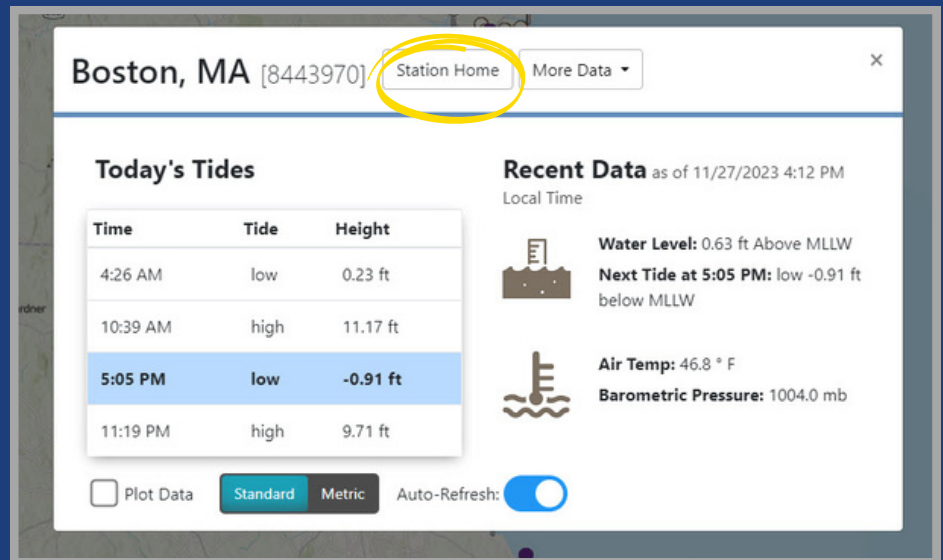


Image: Station Dashboard for Boston, MA

This will open the Tide Predictions page for that station.

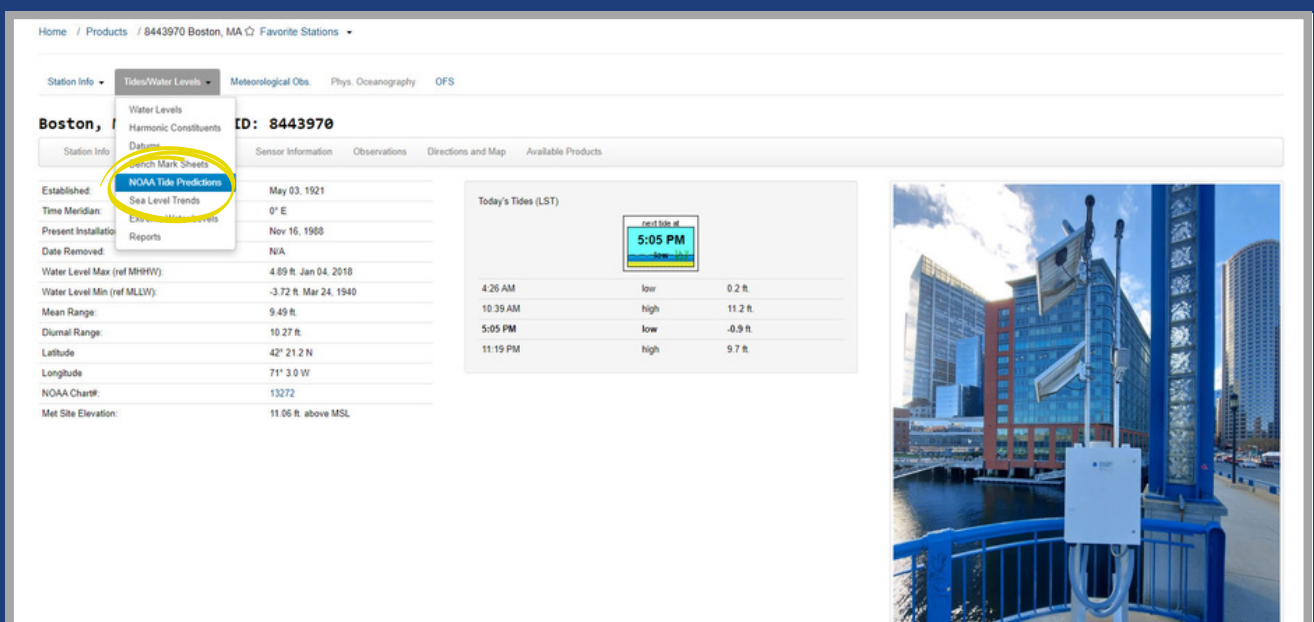


Image: Station homepage for Boston, MA

Through the Station Listing

You can also access a list of stations with tide-predicting capabilities from anywhere on the CO-OPS website by hovering your cursor over or selecting the “[Data & Product Products](#)” dropdown, then selecting “[Tides and Water Levels](#),” and on the subsequent webpage selecting “[NOAA Tide Predictions](#).”

The screenshot shows the NOAA Tides & Currents website. The navigation menu at the top includes 'Home', 'About', 'Data & Products' (highlighted with a yellow circle), 'Newsroom', and 'Education & Outreach'. Below the navigation, the page title is 'Tides & Great Lakes Water Levels'. The main content area is divided into several sections: 'NOAA Tide Predictions' (highlighted with a yellow circle), 'Water Levels', 'Tsunami Capable Tide Stations', and 'Datums'. A large image of a water level observation station is shown on the right side of the page.

From here, click on a state or territory to see all the stations available in that region.

The screenshot shows the NOAA Tide Predictions page. It features a search bar with a 'Go' button and a 'search help' link. Below the search bar is a table of stations listed by region:

West Coast	East Coast	Gulf Coast	Pacific	Caribbean Islands
California	Maine	Alabama	Northern Marianas Islands	Bermuda Islands
Oregon	New Hampshire	Mississippi	Federated States of Micronesia	Bahamas
Washington	Massachusetts	Louisiana	Marshall Islands	Cuba
Alaska	Rhode Island	Texas	Hawaii	Jamaica
	Connecticut		Kiribati	Haiti and Dominican Republic
	New York		Tokelau	Puerto Rico
	New Jersey		American Samoa	Lesser Antilles & Virgin Islands
	Delaware		French Polynesia	
	Pennsylvania		Cook Islands	
	Maryland		Fiji	
	Virginia			
	Washington DC			

On the East and Gulf Coasts, stations are listed geographically from north to south, while on the West Coast they are listed south to north.

Selecting a station from one of these lists will take you directly to that station’s Tide Predictions page.

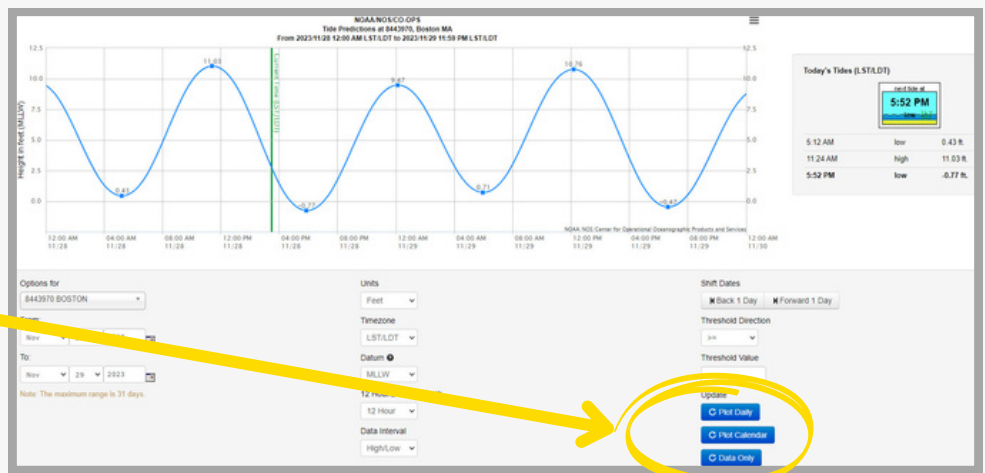
Navigating Our Tide Predictions Interface

You have now reached our **Tide Predictions interface**. Once here you will see a **plot displaying predictions** for the present day and the next day in local standard time with adjustments for daylight saving time (LST/LDT) and with heights in feet relative to mean lower low water (MLLW). These parameters can all be customized; however, the maximum amount of data that can be plotted at once is 31 days.

Displaying Data

There are several ways to display data within selected parameters.

The **blue buttons** under the graph allow you to display data in one of the following three ways.



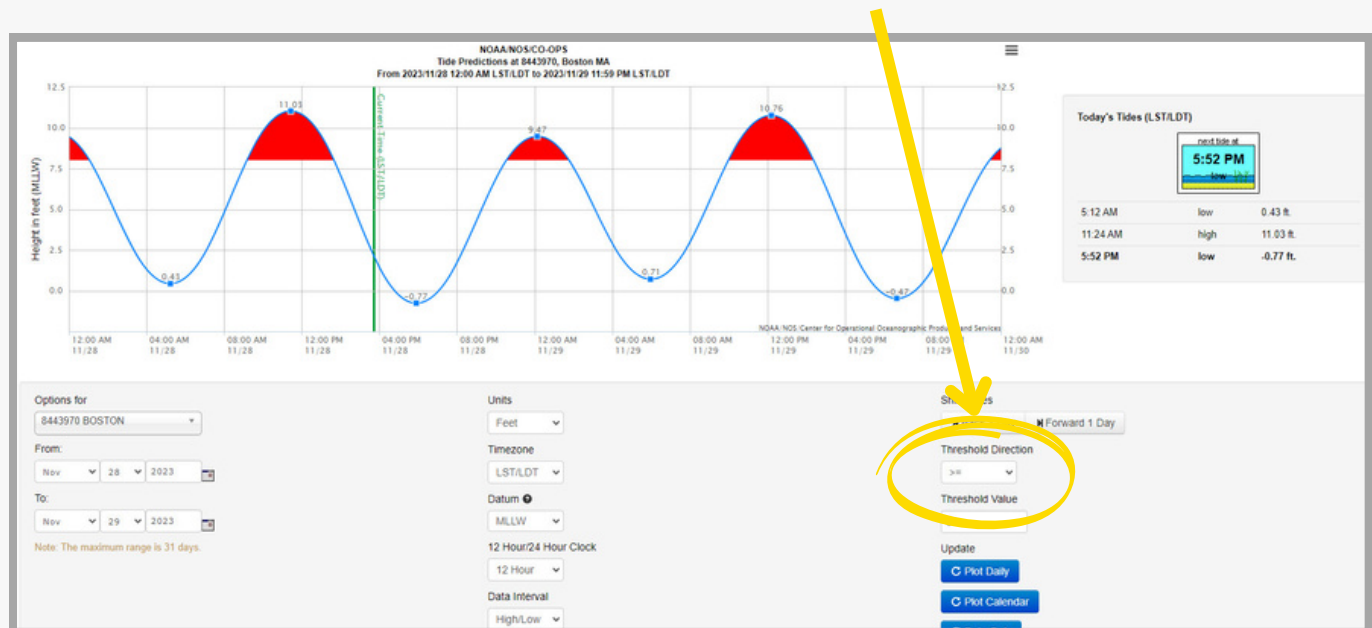
1. **“Plot Daily”** provides one plot showing the high and low tides for each day that you selected in the output parameters, up to 31 days. When using the **“Plot Daily”** function, you can also use the icon with three stacked lines on the upper right side of the plot to download an image of the plot in the format of your choice. This allows you to easily insert images of a particular tide plot into documents as needed.
2. **“Plot Calendar”** provides a calendar view of high and low tides for the dates you have selected. The output will only provide one calendar month at a time, and it will select the month pertaining to the start date you’ve selected. For example, selecting dates from June 10th - July 10th and selecting **“Plot Calendar”** will output the calendar month of June.
3. **“Data Only”** will provide the data you request in a table.

Each output option has its own printer view. Once you have plotted the data you need, select **“Printer View”** from the upper right hand side of the page. In the preview, the layout for monthly predictions may appear distorted; however, this will print normally.

Navigating Our Tide Predictions Interface *Continued...*

Threshold Function

An additional function of the interface is to be able to highlight predicted tides above or below a user-identified threshold. The *“Threshold Direction”* option allows you to select whether you would like to highlight water levels greater than or less than a certain value.



Selecting a threshold direction, entering a value into the *“Threshold Value”* box, and clicking *“Plot Daily,” “Plot Calendar,”* or *“Data Only”* will highlight predictions that fall above or below the set parameters in red. This function is useful for highlighting high or low tides that may impact navigation or that indicate inundation.

Other parameters within the interface are also customizable. For example, time zone units, reference datum (harmonic stations only), time display, and data interval displayed (harmonic stations only) can all be edited as desired.



Update Schedule

NOAA Tide Prediction updates are applied every quarter: during the first two weeks of January, April, July, and October. These updates may include:

- The addition of new stations
- Upgrade of a station from subordinate to harmonic
- Changes to the adjustment values and reference station for subordinate stations
- The removal of superseded stations that may have been replaced by another station for improved prediction accuracy

Scan this QR Code
to visit our website.



For additional questions about NOAA Tide Predictions, or to suggest an update to this guide, please email tide.predictions@noaa.gov.

Glossary

Find these and more terms in our online [glossary](#).

Datum: A base elevation used as a reference from which to reckon heights or depths

Harmonic Analysis: The mathematical process by which the observed tide or tidal current at any place is separated into basic harmonic constituents

Harmonic Constants: The amplitudes and epochs of the harmonic constituents of the tide or tidal current at any place

Harmonic Constituent: One of the harmonic elements in a mathematical expression for the tide-producing force and in corresponding formulas for the tide or tidal current. Each constituent represents a periodic change or variation in the relative positions of the Earth, Moon, and Sun

Reference Station: A tide or current station for which independent daily predictions are given in the "Tide Tables" and "Tidal Current Tables," and from which corresponding predictions are obtained for subordinate stations by means of differences and ratios

Subordinate Tide Station: A tide station from which a relatively short series of observations is reduced by comparison with simultaneous observations from a tide station with a relatively long series of observations

Tide: The periodic rise and fall of a body of water resulting from gravitational interactions between Sun, Moon, and Earth. The vertical component of the particulate motion of a tidal wave

Tidal Datum: A datum that is defined in terms of a certain phase of the tide

Tide (Water Level) Station: The geographic location at which tidal observations are conducted. Also, the facilities used to make tidal observations. These may include a tide house, tide (water level) gauge, tide staff, and tidal bench marks