TIDE DATA PROTOCOL

Knowing what is happening with the tides is important for all aspects of SHARP field work and essential to certain types of data analysis. This SOP provides information on how to obtain tide data for a given study site and sets standards that will be used throughout the SHARP project.

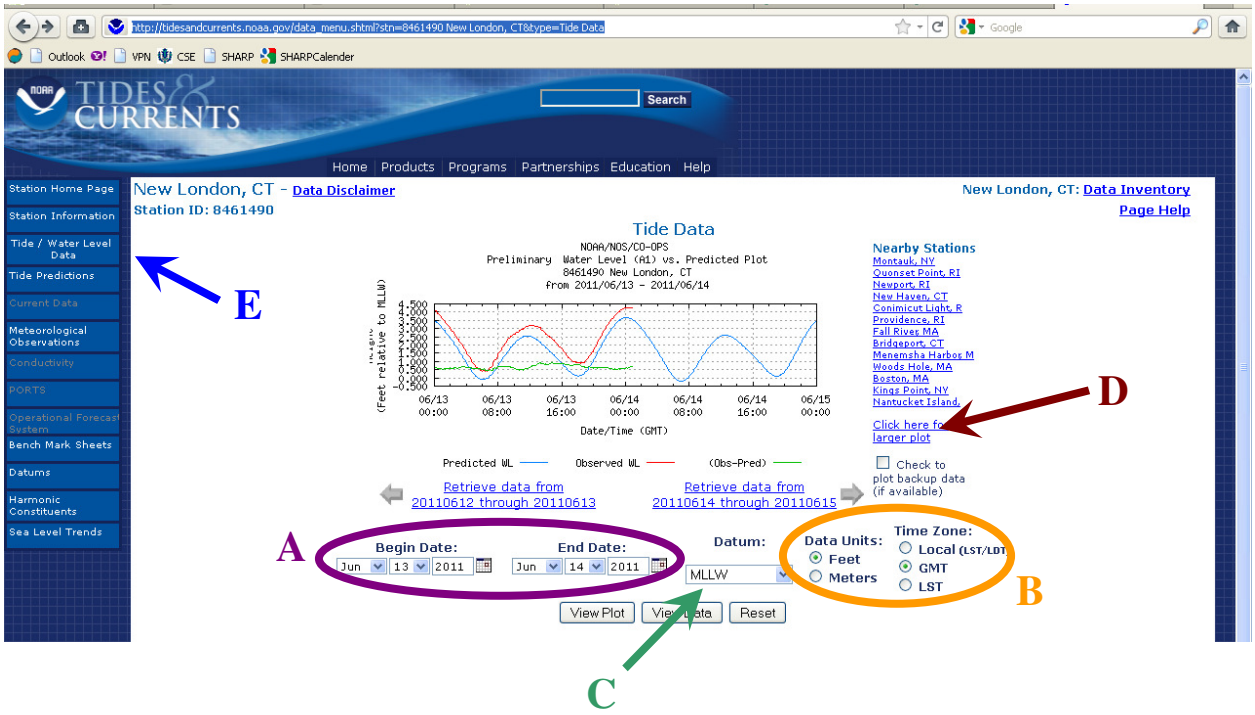
Tracking tides

1. Tide information can be obtained from the NOAA "Tides and Currents" web site. To obtain information for a given marsh, pick the tide gauge that is nearest your study site here:

http://tidesandcurrents.noaa.gov/station_retrieve.shtml?type=Tide+Data

2. The default settings will give you tide data for the previous two days. You can adjust this as appropriate by selecting the date range of interest (see A in example below).

3. The default settings use GMT for times, so I always switch to Local (LST/LDT) to make the times match those on my watch. If your work spans both standard time and daylight time, then LST is probably better. I also switch the units from feet to meters. If you are generating data for use in publications changing the units is essential. If you are just getting data for day-to-day use in the field, and feet are more familiar to you, then it is up to you what units you use. Getting used to thinking about tides in meters isn't a bad idea though. (See B in example below.)

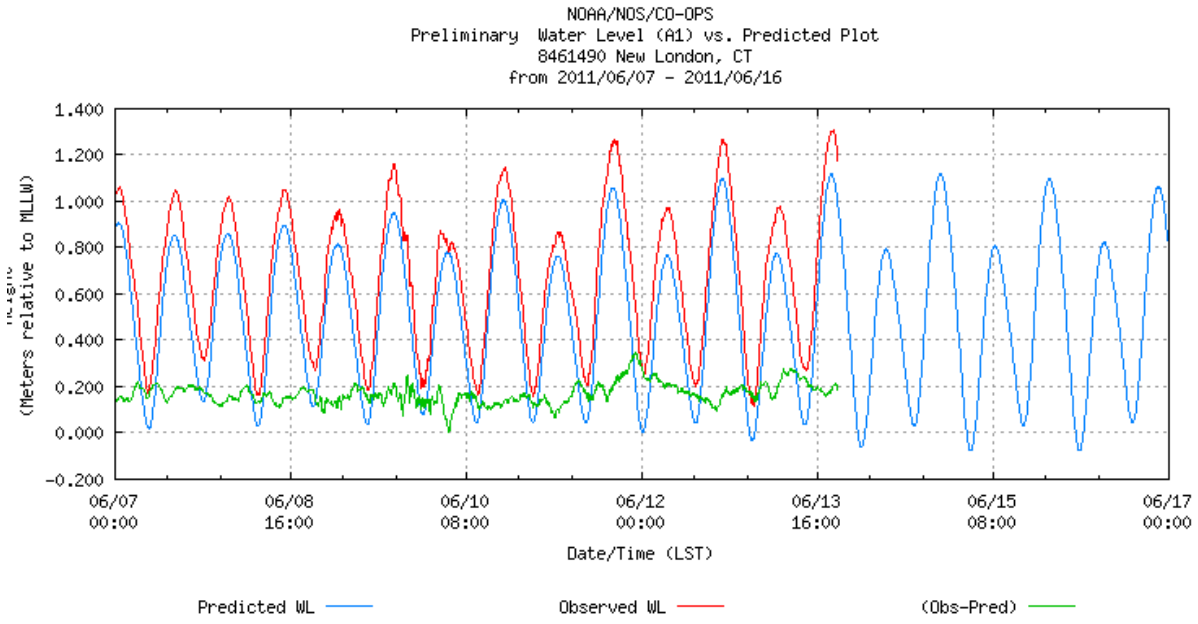


4. Next, it is important to set the datum against which tides are measured to MLLW (mean lower low-water); see C in example. The datum is simply the point in the tidal cycle against which tide height is referenced. The NOAA site provides several options, and conversions between them are relatively simple. For all SHARP related work, however, we will use the same datum to

ensure that everyone is generating data that can be directly compared and thereby reduce the risk of confusion.

5. Finally, if you want to see a bigger version of the plot, there is an option to do this, but it is easy to miss as it comes at the bottom of the list of nearby stations. See D in previous example.

Here's an example with data from New London, CT, showing the tides for the previous week and the next 3 days:



You can see that the actual tide heights (red line) are consistently elevated over prediction (blue line). This is expected because there was a lot of rain during the week that this period spans. This difference can really matter in terms of flooding effects on birds, especially when there is rain at the time of the spring tides (as is the case towards the end of the New London sequence). Notice in the example that the peak tides were almost 30 cm above prediction, with the height consistently 15-20 cm above (green line).

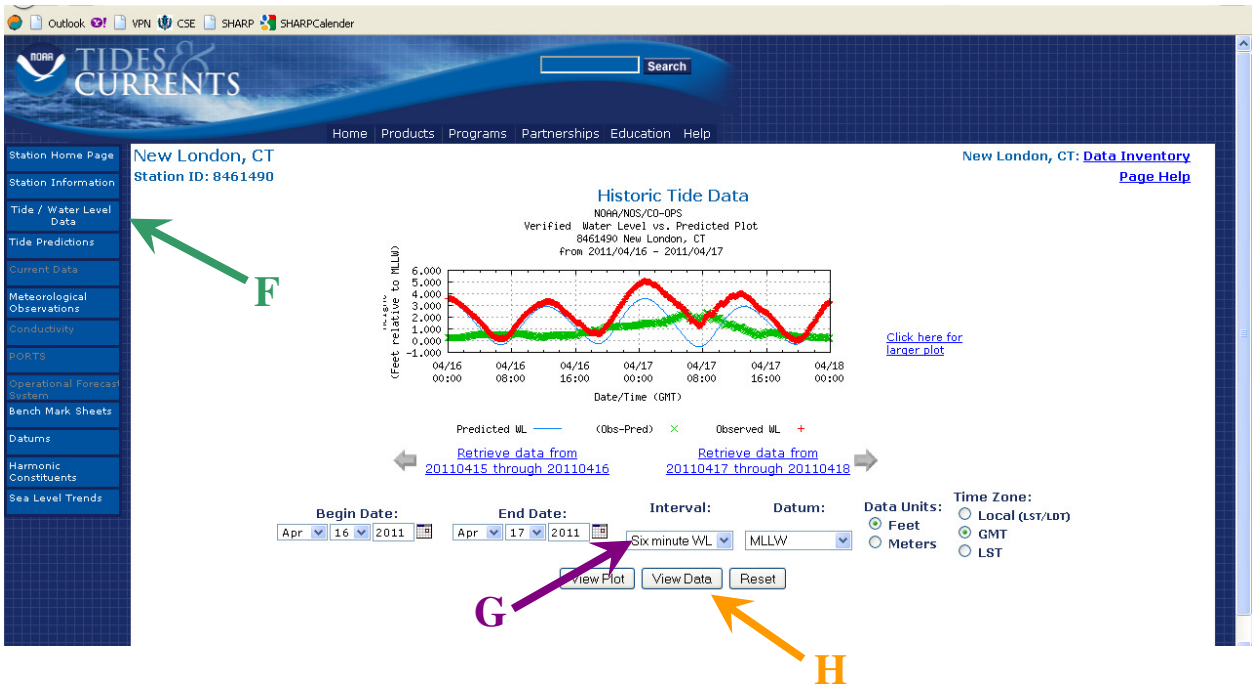
Note that all of the above refers to “preliminary data”. For use in any analysis it is important to wait until you can obtain “verified data”. There is a tab for this on the menu to the left. See E in previous example. Verification typically lags a couple of months behind the preliminary data becoming available.

Obtaining the actual data

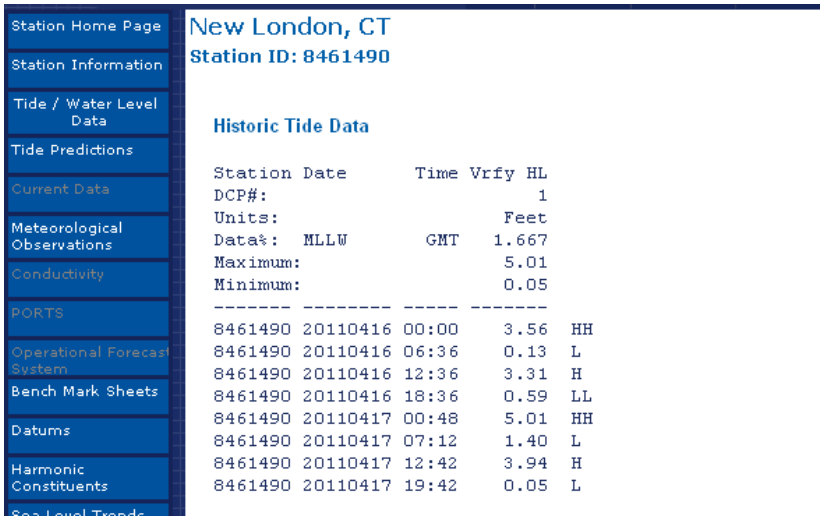
The data used to create the plots described above can also be viewed and obtained from the NOAA site. An example of the use of these data for SHARP-related work is given in Bayard and Elphick (2011. Auk 128:393-403).

To see the data for a selected date range, simply click on the “View Data” button below the plot. The default is to provide tide heights at 6 minute intervals, but you can change this if you do not

need such high temporal resolution. If you have selected "Verified data" from the menu on the left (see F in example below), the screen will be slightly different to that for "Preliminary data", and an additional option will be "Interval" (see G in example below). Your other options are hourly data, highs and lows, and monthly extremes. In most cases, the highs and lows will probably be most useful.



If you click on the "View Data" button (H in example), you will get output that looks like this:



The first number in each row is the station ID number, then comes the date, the time, and the tide height. In the final column, HH refers to the higher of the two high tides within a 24-hour period, H to the lower of the two highs, L to the higher of the two lows, and LL to the lower of the lows.

Note that in this example the times are given as GMT and the tide heights in feet. These are the defaults, but should be changed before the data are used for analysis.

No simple data export function is available from this page, but you can move the data into a spreadsheet by using the following steps (there's probably better methods, but this will work):

- select all of the required rows,
- copy them (CTRL-C),
- go to a Word document (or equivalent),
- paste the selected rows (CTRL-V),
- reselect the rows now that they are in Word,
- go to the "Table" menu, select "Convert", and then "Text to Table",
- under "Separate text at", select "Other" and put a single space in the box.

The resulting table will have a couple of blank columns because there are multiple spaces between certain columns of data. You can avoid this by removing the extra spaces before going through the steps above, or you can simply delete the extraneous columns after you have created the table. These steps will give you a table that looks like this:

8461490	20110416	00:00	3.56	HH
8461490	20110416	06:36	0.13	L
8461490	20110416	12:36	3.31	H
8461490	20110416	18:36	0.59	LL
8461490	20110417	00:48	5.01	HH
8461490	20110417	07:12	1.40	L
8461490	20110417	12:42	3.94	H
8461490	20110417	19:42	0.05	L

The table can then be selected, copied, and pasted into an Excel spreadsheet (or equivalent) for use in analyses.