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# (E5) Exercise #5: Exploring Tidal Data

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## Goals

The purpose of this exercise is to help you read tide charts, and understand tides & the forces that generate them.

## The Data

For this exercise, we will be using NOAA data on tides from their [Tides and Currents website](#). This site gives users tidal predictions from active US tidal stations. We will use current data from this site; but I will provide you with the data, as this website has been known to have errors.

We will be using data for March 23-24 for sites 1 and 2, and for the entire month of March for site 3. On these graphs, NOTE: "MLLW" = "Mean Lower Low Water Level," is given as a height of 0.0 ft as a point of reference.

## The Exercise

Using the data available at the links below, answer the following questions. Most of these questions (except where indicated) will be presented as multiple-choice questions within the Canvas Quizzes.

### Site 1: Admiralty Head, Washington

Examine the tide prediction for Admiralty Head in Puget Sound on page 4 of this exercise worksheet and answer the following questions:

- 1. How many high tides and how many low tides are there in each day (24 hour period)?**
- 2. What type of tidal cycle does Admiralty Head, Washington experience?**
- 3. You're planning on going on a low tide beach walk to look at sea life on March 23; you can see the tidal pools at tide levels of 2 feet and lower. At what time should you go for your beach walk?**

### Site 2: Pensacola, Florida

Examine the tide prediction for Pensacola, Florida on page 5 of this worksheet and answer the following questions:

- 4. How many high tides and how many low tides are there in each day (24 hour period)?**
- 5. What type of tidal cycle does Pensacola experience?**
- 6. In what ways do the tidal ranges of Pensacola and Admiralty Head locations differ? What factors might account for these differences?** Use your textbook and module terminology to answer this question. Your answer should be 3-5 sentences in length and should be specific in contrasting the tides in the two locations. (NOTE: This question will require a short answer in the Canvas Quizzes tool)

## Site 3: Portland, Maine

Examine the [tide prediction for the entire month of March for Portland, Maine](#) on page 6 of this worksheet. Notice that the graph looks a bit different – each day has a set of numbers giving the predicted height of high and low tides for that day. In this graph, each horizontal gridline of the graph equals one day.

If you want to see the month in a slightly different format, visit this interactive tidal calendar:  
<http://www.ezfsn.com/tides/usa/oregon/portland,%20willamette%20river/March/2015>

Please answer these questions regarding the data:

7. ***What is the minimum level of the lowest tide in Portland and on what date does it occur?***
8. ***What is the maximum level of the highest tide in Portland and on what date does it occur?***
9. ***During what date(s) are the tidal ranges (difference between high and low tide) largest or most extreme?***
10. ***During what date(s) are the tidal ranges (difference between high and low tide) smallest or least extreme?***
11. ***What evidence of spring and neap tides do you see on this monthly chart? Be specific and use your answers to questions 7-10 to support your answer.*** Use your textbook and module terminology to answer this question. Your answer should be 3-5 sentences in length. (NOTE: This question will require a short answer in the Canvas Quizzes tool)
12. ***Using this website of lunar phases for the month of March 2015, in what way do the spring and neap tides correlate with lunar phases? Why do we expect this relationship?*** Use your textbook and module terminology to answer this question. Your answer should be 3-5 sentences in length. (NOTE: This question will require a short answer in the Canvas Quizzes tool)

## Extra Credit:

Go to the [Tides and Currents website](#) and research answers to the following questions. Use the diagrams on the most recent tidal data for each location:

- EC1. ***What type of tidal cycle is found in San Diego, California? What is the range of tidal height given, from the lowest to the highest tide (use most recent given over the last 2 days)?*** Be sure to give units.
- EC2. ***What type of tidal cycle is found in Dauphin Island, Alabama? What is the range of tidal height?***
- EC3: ***What type of tidal cycle is found at the Brooklyn Bridge, New York? What is the range of tidal height?***
- EC4: ***Now compare your answers above with Figure 9.16 on pg. 279 in your textbook. What type of tidal cycles would you expect for each location? Does this match your observations?*** Note any differences in your observations, and be sure to explain these using tide terminology.

## Submitting your answers

You will submit your answers to this exercise in a Quiz called (E5) Exercise #5 Quiz. Here are a few details on the quiz:

- You will have 60 minutes to complete the quiz from the time you open it. **COMPLETE THE EXERCISE QUESTIONS BEFORE OPENING THE QUIZ!**
- The password for this quiz is **tidesdata**
- Work through the quiz by answering the questions with a paragraph response. You will be answering all of the questions in the Quizzes tool.
  - Questions will be presented as a combination of multiple-choice and short answer questions.
  - For short answer questions, use complete sentences and your own words.

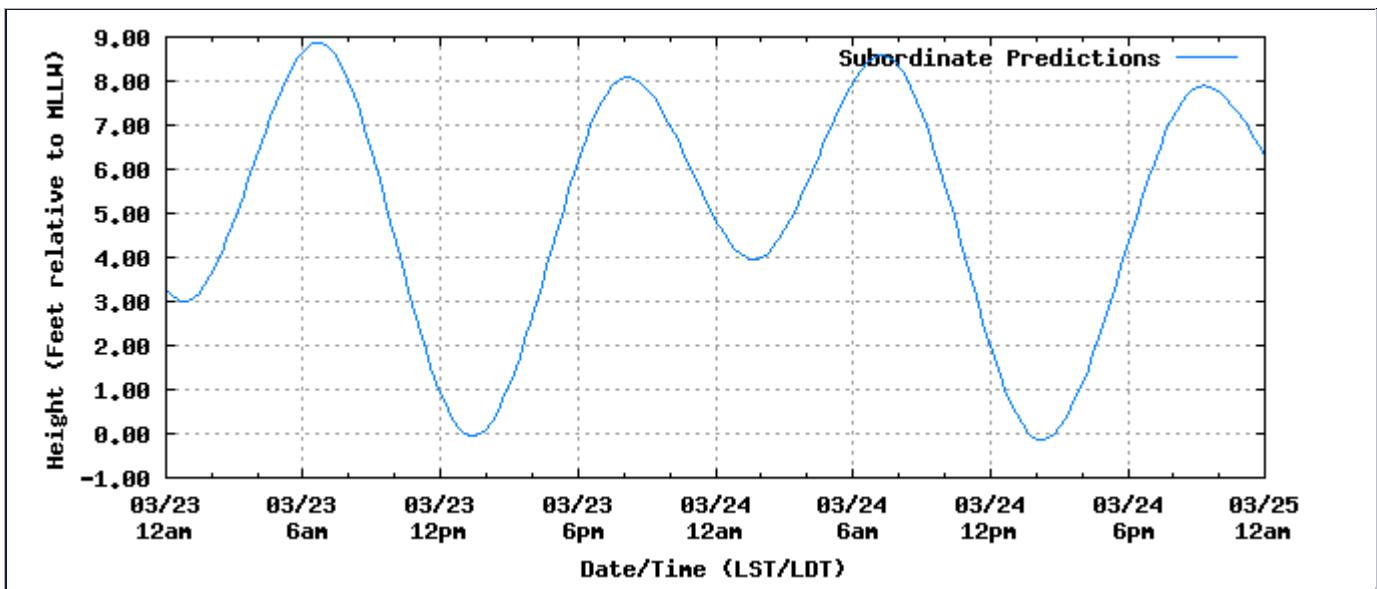
Your instructor will manually grade parts of this quiz. You may not see a score immediately. Once your instructor finishes grading this exercise you will receive a notification advising you that feedback is available.

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**NOAA/NOS/CO-OPS**  
**Daily Tide Prediction for Admiralty Head, WA**  
**StationId 9447905**  
**From: 2015/03/23 - 2015/03/24**  
**Units: Feet Time Zone: LST/LDT Datum: MLLW**

Referenced to Station: PORT TOWNSEND ( 9444900 )

Time offset in mins (high:-11 low: 20) Height offset in feet (high:+0.00 low: -0.10)



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.

**Note: For predictions of Subordinate stations, the solid blue line depicts a curve fit between the high and low values and approximates the segments between.**

### High/Low Tide Predictions

**Station Name: Admiralty Head, WA**

**Parameter: Daily**

**Product: Tide Prediction**

**Start Date & Time: 2015/03/23 12:00AM**

**End Date & Time: 2015/03/24 11:59PM**

**Source: NOAA/NOS/CO-OPS**

**Prediction Type: Subordinate**

**Datum: MLLW**

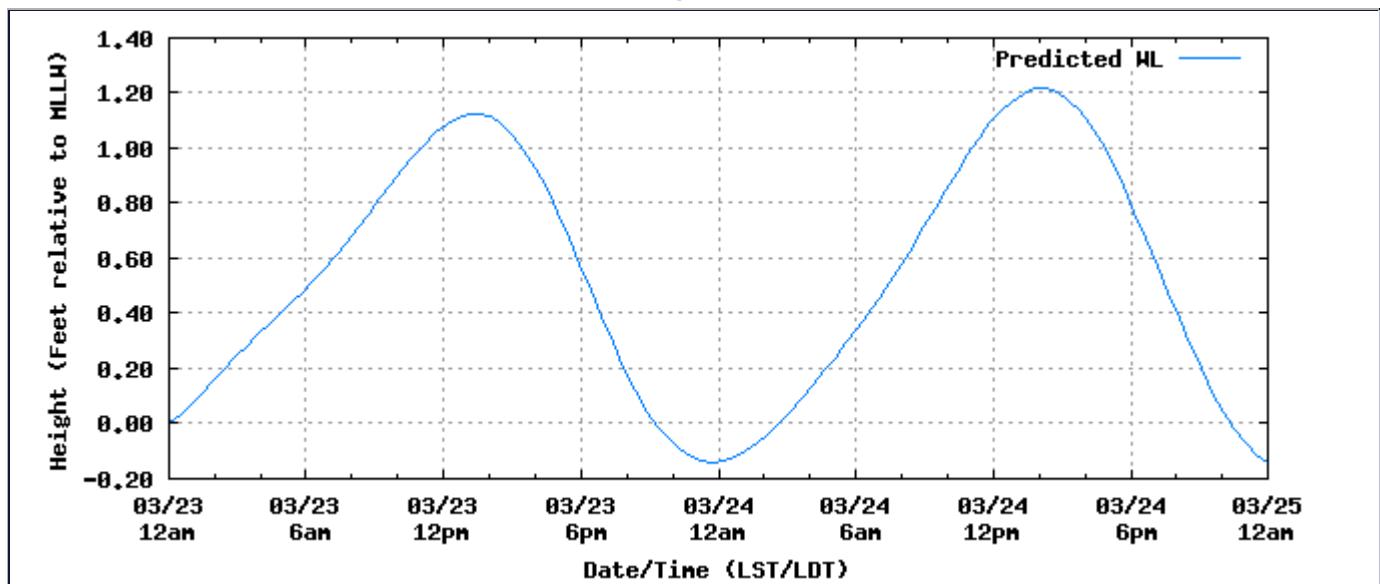
**Height Units: Feet**

**Time Zone: LST/LDT**

| Date       | Day | Time     | Hgt    | Time     | Hgt    | Time     | Hgt     | Time     | Hgt    |
|------------|-----|----------|--------|----------|--------|----------|---------|----------|--------|
| 2015/03/23 | Mon | 12:49 AM | 3.01 L | 06:40 AM | 8.87 H | 01:23 PM | -0.07 L | 08:08 PM | 8.08 H |
| 2015/03/24 | Tue | 01:40 AM | 3.96 L | 07:18 AM | 8.59 H | 02:14 PM | -0.14 L | 09:17 PM | 7.89 H |

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**NOAA/NOS/CO-OPS**  
**Daily Tide Prediction for PENSACOLA,FL**  
**StationId 8729840**  
**From: 2015/03/23 - 2015/03/24**  
**Units: Feet Time Zone: LST/LDT Datum: MLLW**



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.

### High/Low Tide Predictions

**Station Name: PENSACOLA,FL**

**Source: NOAA/NOS/CO-OPS**

**Parameter: Daily**

**Prediction Type: Harmonic**

**Product: Tide Prediction**

**Datum: MLLW**

**Start Date & Time: 2015/03/23 12:00AM**

**Height Units: Feet**

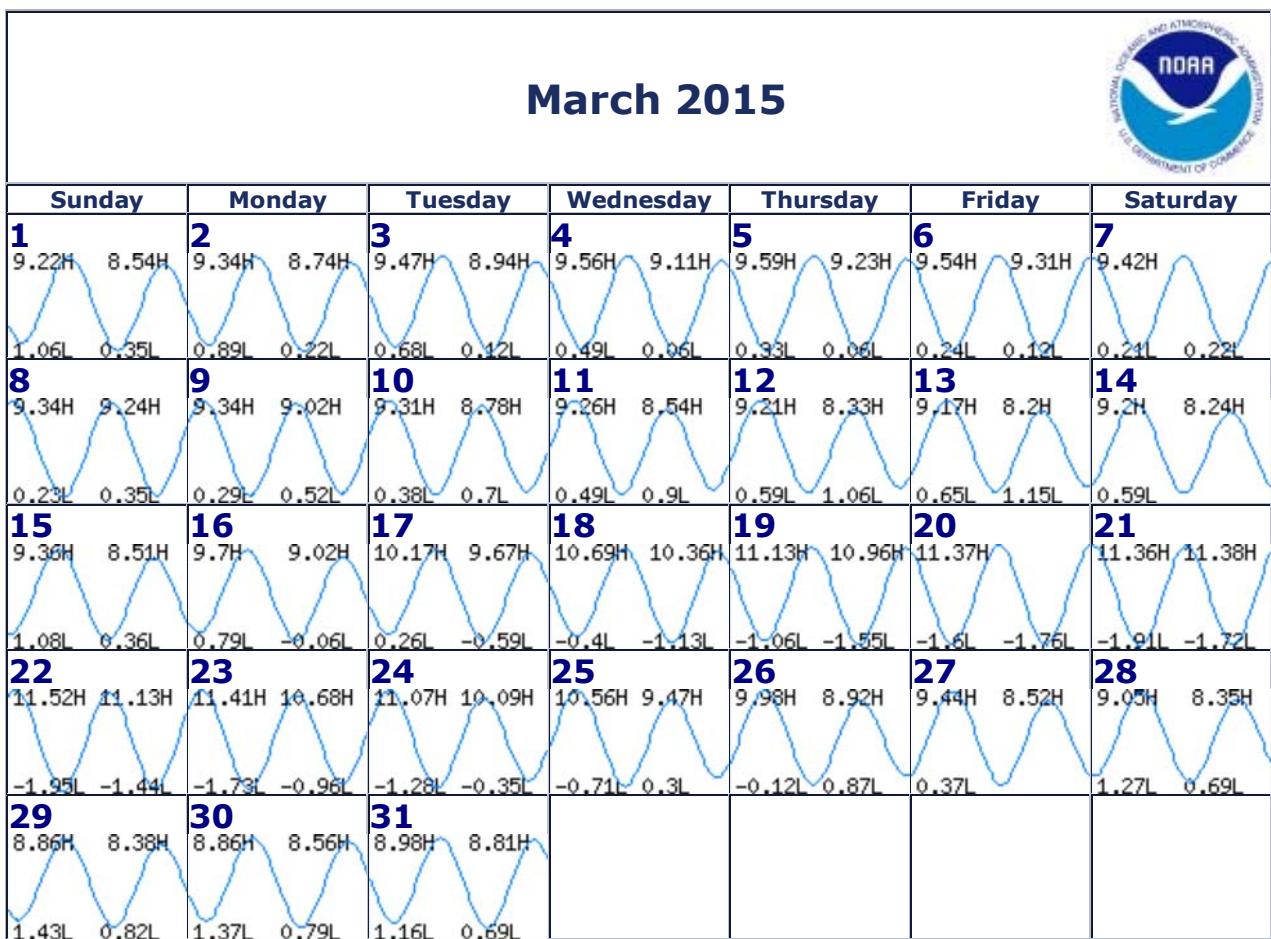
**End Date & Time: 2015/03/24 11:59PM**

**Time Zone: LST/LDT**

| Date       | Day | Time     | Hgt    | Time     | Hgt     | Time | Hgt | Time | Hgt |
|------------|-----|----------|--------|----------|---------|------|-----|------|-----|
| 2015/03/23 | Mon | 01:21 PM | 1.13 H | 11:42 PM | -0.14 L |      |     |      |     |
| 2015/03/24 | Tue | 02:05 PM | 1.22 H |          |         |      |     |      |     |

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**NOAA/NOS/CO-OPS**  
**Monthly Tide Prediction for PORTLAND, ME**  
**StationId: 8418150**  
**From: 2015/03/01 - 20150331**  
**Units: Feet Time Zone: LST/LDT Datum: MLLW**



Disclaimer: These data are based upon the latest information available as of the date of your request, and may differ from the published tide tables.

**High/Low Tide Predictions Prediction****Station Name: PORTLAND,ME****Source: NOAA/NOS/CO-OPS****Parameter: Monthly****Prediction Type: Harmonic****Product: Tide Prediction****Datum: MLLW****Start Date & Time: 2015/03/01 12:00AM****Height Units: Feet****End Date & Time: 2015/03/31 11:59PM****Time Zone: LST/LDT**

| <b>Date</b> | <b>Day</b> | <b>Time</b> | <b>Hgt</b> | <b>Time</b> | <b>Hgt</b> | <b>Time</b> | <b>Hgt</b> | <b>Time</b> | <b>Hgt</b> |
|-------------|------------|-------------|------------|-------------|------------|-------------|------------|-------------|------------|
| 2015/03/01  | Sun        | 01:47 AM    | 1.06 L     | 08:05 AM    | 9.22 H     | 02:28 PM    | 0.35 L     | 08:43 PM    | 8.54 H     |
| 2015/03/02  | Mon        | 02:41 AM    | 0.89 L     | 08:57 AM    | 9.34 H     | 03:17 PM    | 0.22 L     | 09:30 PM    | 8.74 H     |
| 2015/03/03  | Tue        | 03:28 AM    | 0.68 L     | 09:42 AM    | 9.47 H     | 03:59 PM    | 0.12 L     | 10:10 PM    | 8.94 H     |
| 2015/03/04  | Wed        | 04:10 AM    | 0.49 L     | 10:22 AM    | 9.56 H     | 04:36 PM    | 0.06 L     | 10:47 PM    | 9.11 H     |
| 2015/03/05  | Thu        | 04:47 AM    | 0.33 L     | 10:59 AM    | 9.59 H     | 05:10 PM    | 0.06 L     | 11:20 PM    | 9.23 H     |
| 2015/03/06  | Fri        | 05:22 AM    | 0.24 L     | 11:33 AM    | 9.54 H     | 05:42 PM    | 0.12 L     | 11:52 PM    | 9.31 H     |
| 2015/03/07  | Sat        | 05:56 AM    | 0.21 L     | 12:07 PM    | 9.42 H     | 06:13 PM    | 0.22 L     |             |            |
| 2015/03/08  | Sun        | 12:23 AM    | 9.34 H     | 07:30 AM    | 0.23 L     | 01:41 PM    | 9.24 H     | 07:45 PM    | 0.35 L     |
| 2015/03/09  | Mon        | 01:55 AM    | 9.34 H     | 08:05 AM    | 0.29 L     | 02:16 PM    | 9.02 H     | 08:19 PM    | 0.52 L     |
| 2015/03/10  | Tue        | 02:30 AM    | 9.31 H     | 08:43 AM    | 0.38 L     | 02:54 PM    | 8.78 H     | 08:56 PM    | 0.7 L      |
| 2015/03/11  | Wed        | 03:09 AM    | 9.26 H     | 09:25 AM    | 0.49 L     | 03:37 PM    | 8.54 H     | 09:38 PM    | 0.9 L      |
| 2015/03/12  | Thu        | 03:52 AM    | 9.21 H     | 10:12 AM    | 0.59 L     | 04:25 PM    | 8.33 H     | 10:26 PM    | 1.06 L     |
| 2015/03/13  | Fri        | 04:42 AM    | 9.17 H     | 11:06 AM    | 0.65 L     | 05:20 PM    | 8.2 H      | 11:21 PM    | 1.15 L     |
| 2015/03/14  | Sat        | 05:38 AM    | 9.2 H      | 12:06 PM    | 0.59 L     | 06:22 PM    | 8.24 H     |             |            |
| 2015/03/15  | Sun        | 12:23 AM    | 1.08 L     | 06:41 AM    | 9.36 H     | 01:10 PM    | 0.36 L     | 07:26 PM    | 8.51 H     |
| 2015/03/16  | Mon        | 01:28 AM    | 0.79 L     | 07:46 AM    | 9.7 H      | 02:13 PM    | -0.06 L    | 08:30 PM    | 9.02 H     |
| 2015/03/17  | Tue        | 02:33 AM    | 0.26 L     | 08:50 AM    | 10.17 H    | 03:13 PM    | -0.59 L    | 09:29 PM    | 9.67 H     |
| 2015/03/18  | Wed        | 03:33 AM    | -0.4 L     | 09:49 AM    | 10.69 H    | 04:08 PM    | -1.13 L    | 10:23 PM    | 10.36 H    |
| 2015/03/19  | Thu        | 04:30 AM    | -1.06 L    | 10:45 AM    | 11.13 H    | 05:00 PM    | -1.55 L    | 11:15 PM    | 10.96 H    |
| 2015/03/20  | Fri        | 05:24 AM    | -1.6 L     | 11:39 AM    | 11.37 H    | 05:50 PM    | -1.76 L    |             |            |
| 2015/03/21  | Sat        | 12:04 AM    | 11.36 H    | 06:16 AM    | -1.91 L    | 12:31 PM    | 11.38 H    | 06:40 PM    | -1.72 L    |
| 2015/03/22  | Sun        | 12:54 AM    | 11.52 H    | 07:08 AM    | -1.95 L    | 01:23 PM    | 11.13 H    | 07:29 PM    | -1.44 L    |
| 2015/03/23  | Mon        | 01:44 AM    | 11.41 H    | 08:00 AM    | -1.73 L    | 02:16 PM    | 10.68 H    | 08:20 PM    | -0.96 L    |
| 2015/03/24  | Tue        | 02:35 AM    | 11.07 H    | 08:54 AM    | -1.28 L    | 03:10 PM    | 10.09 H    | 09:12 PM    | -0.35 L    |
| 2015/03/25  | Wed        | 03:28 AM    | 10.56 H    | 09:50 AM    | -0.71 L    | 04:08 PM    | 9.47 H     | 10:08 PM    | 0.3 L      |
| 2015/03/26  | Thu        | 04:25 AM    | 9.98 H     | 10:50 AM    | -0.12 L    | 05:09 PM    | 8.92 H     | 11:08 PM    | 0.87 L     |
| 2015/03/27  | Fri        | 05:26 AM    | 9.44 H     | 11:53 AM    | 0.37 L     | 06:13 PM    | 8.52 H     |             |            |
| 2015/03/28  | Sat        | 12:13 AM    | 1.27 L     | 06:30 AM    | 9.05 H     | 12:58 PM    | 0.69 L     | 07:17 PM    | 8.35 H     |
| 2015/03/29  | Sun        | 01:18 AM    | 1.43 L     | 07:34 AM    | 8.86 H     | 02:00 PM    | 0.82 L     | 08:17 PM    | 8.38 H     |
| 2015/03/30  | Mon        | 02:19 AM    | 1.37 L     | 08:34 AM    | 8.86 H     | 02:55 PM    | 0.79 L     | 09:10 PM    | 8.56 H     |
| 2015/03/31  | Tue        | 03:14 AM    | 1.16 L     | 09:27 AM    | 8.98 H     | 03:43 PM    | 0.69 L     | 09:57 PM    | 8.81 H     |



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