

# NSW TIDE CHARTS

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November 22, 2018  
to  
January 1, 2020



Office of  
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and Heritage



Manly  
Hydraulics  
Laboratory

Technical data supplied by:

NSW Department of Finance, Services and Innovation  
Manly Hydraulics Laboratory  
110B King Street  
Manly Vale NSW 2093  
Australia  
T: (02) 9949 0200  
[W: www.mhl.nsw.gov.au](http://www.mhl.nsw.gov.au)  
Enquiries to: MHL Director

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NEW SOUTH WALES

# TIDE CHARTS

November 22, 2018 to January 1, 2020

The following pages of charted tidal predictions for New South Wales are based on data from water level recorders managed by the Planning and Risk Branch of the **NSW Office of Environment and Heritage**, and operated by **Manly Hydraulics Laboratory**, a business unit within the Government and Corporate Services Division of the NSW Department of Finance, Services and Innovation. The charts are produced by a Foreman<sup>1</sup> analysis of the historical water levels recorded by the tide gauge located at Middle Head, Sydney Harbour (Latitude 33°50' South; Longitude 151°15' East; Time Zone 1000).

Manly Hydraulics Laboratory has adopted the Middle Head gauge as the primary reference station for obtaining and monitoring tidal data in NSW. The time differences between the primary and secondary locations in NSW were obtained from an analysis of levels recorded by the gauges at each of the secondary locations. The secondary locations and their respective time differences are tabled at the back of this booklet.

**DO NOT ADJUST FOR DAYLIGHT SAVING TIMES. Chart times are stated to Australian Eastern Standard Time or Daylight Saving Time where applicable.** Daylight Saving periods begin on the first Sunday in October and end on the first Sunday in April.

Sunrise, Sunset, Moonrise and Moonset times for Sydney are included in this booklet. The corresponding times for the secondary locations throughout NSW will vary from those at Sydney. Tide levels are listed in metres. Predicted tidal levels for NSW ocean locations will vary from those at Sydney but the variation will generally not be more than 0.2 metres. The actual tide may differ from the predicted tide due to meteorological and oceanographic conditions. Zero on the tide charts is approximately Indian Spring Low Water.

The tidal analyses have been carried out using data from the Sydney gauge at Middle Head (for the period 1995 to 2014) and the secondary ocean and river gauges to determine the approximate time differences of high and low water from those at Sydney. For each river basin, locations are generally given starting from a downstream location on the estuary/river and working progressively upstream. Locations are on the main estuary, river or channel arm unless otherwise stated. In general, the time differences will progressively increase and tidal ranges will progressively decrease the higher the secondary location is upstream in estuaries, rivers and lakes.

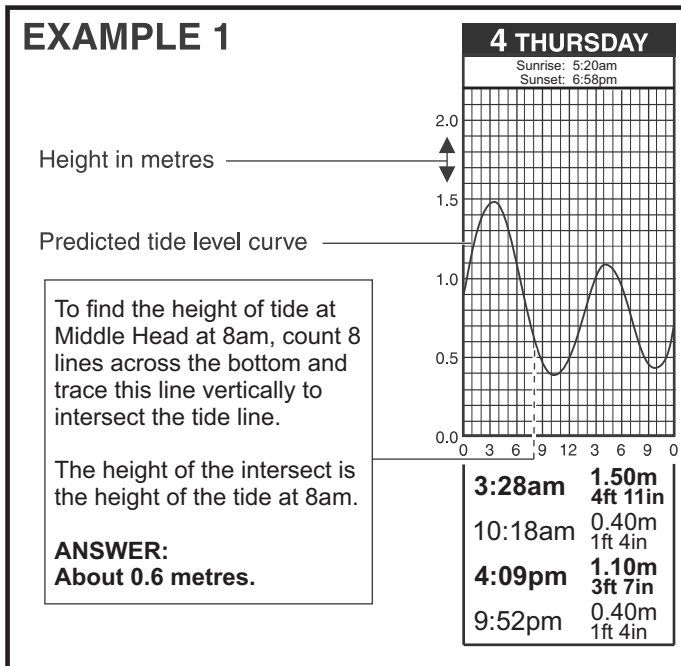
The time differences for the secondary locations are average values over the lunar cycle and will vary throughout that cycle and throughout the year. Other variations may occur at the primary location or the secondary locations, or both, due to unpredictable meteorological, oceanographic and hydrological conditions. The following tidal predictions and accompanying table for secondary locations must therefore be regarded as a guide only.

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1. Foreman, M.G.G., 1977. Manual for Tidal Heights Analysis and Prediction. Pacific Marine Science Report 77-10, Institute of Ocean Sciences, Patricia Bay, Sidney, B.C., 58 pp. (2004 revision).

# HOW TO GET THE BEST FROM THESE CHARTS

These charts, based on data obtained from the primary tide gauge located at Middle Head, Sydney Harbour, enable the user to predict the height of tide at any time on any day at Middle Head or one of the secondary locations tabled at the back of this booklet. The charts show the range or height of tide measured in metres, scaled vertically at left from 0.0 metres to 2.2 metres in increments of 0.1 metre (one decimetre). Every 0.5 metres of scale is shown with a thicker line. Each day begins from midnight and is scaled in hourly increments marked horizontally across the bottom of each day's chart, with every three-hourly interval numbered, e.g. 0 = midnight, 12 = midday, the first 6 = 6am, the second 6 = 6pm, etc. Every three-hour period is shown with a thicker line. All times in these examples are to Australian Eastern Standard Time (AEST).



## EXAMPLE 1: Primary Location

To determine the height of tide at the primary reference location, Middle Head in Sydney Harbour, at 8am on Thursday, the 4th: Count 8 vertical lines across from the zero at left on that day's chart and trace up the line to where it intersects the tide line. The intersect marks the height of tide at this time, which can be read off the vertical scale – about 0.6 metres. The flow of the tide curve chronologically from left to right indicates the tide is falling. Counting down from the intersect to the horizontal line intersecting the bottom of the tide curve shows the tide has about another 0.2 metres to fall to reach low tide.

## EXAMPLE 2: To find the tide height at Nelson Bay at 8:00am

### 2A

Add the time difference for Nelson Bay shown in the table at the back of this book, in this case the first high of 1.5 metres at 3:28am.

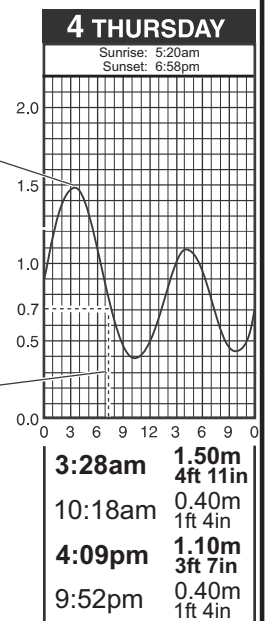
The difference for Nelson Bay = +0:30.  
Time of corresponding tide at Nelson Bay = 3:28 + 0:30 = 3:58am.

### 2B

Calculating tidal position for Nelson Bay at 8:00am when referencing the Sydney tide, each square on the time axis stands for 1 hour, therefore +0:30 means 30 minutes lag behind Sydney = 7:30am = 0.5 squares backwards.

Draw vertically until line intersects curve.

**ANSWER:** falling tide approximately 0.7 metres



## EXAMPLE 2: Secondary Locations

### 2A

Time differences for secondary locations are located in the Secondary Locations table at the back of this booklet. The plus (+) values should be added to and minus (-) values subtracted from the stated tide times on the charts to find the predicted time for the secondary location.

Look up Nelson Bay in the Secondary Locations table (listed as part of the Hunter River Basin). Nelson Bay's time difference is shown as +0:30 (zero hours and thirty minutes). Add this to the time of the required high or low for the day shown on the chart, in the case of the first high of 1.5 metres at 03:28 hours. The time for the corresponding tide at Nelson Bay then becomes 3:58am.

### 2B

It is not recommended that this method be used to estimate tidal heights for upstream stations, but rather as a means of estimating the occurrence of high or low tide. However, where the time difference from Sydney is 60 minutes or less, the method may be used to gain an approximation of the tidal level.

Explaining the example above for tidal stage reference, I stand at Nelson Bay at 8:00am and want to know what stage the tide is when looking at the tide book. Using the time lag of 0.5 hours and by acknowledging each square on the horizontal axis stands for 1 hour I can move 0.5 squares back in time, as +0:30 stands for lag in time behind Sydney. Drawing a line vertical to the tide trace from my new frame of reference time of 7:30am I get an approximate value of 0.7m.

# TIDAL TERMS

**Australian Height Datum (AHD):** is a geodetic datum for altitude measurement in Australia. According to Geoscience Australia, in 1971 the mean sea level for 1966–1968 was assigned a value of zero on the Australian Height Datum for 30 tide gauges around the coast of the Australian continent. The resulting datum surface has been termed the Australian Height Datum (AHD) and was adopted by the National Mapping Council as the datum to which all vertical control for mapping is to be referred.

**Charted Depth:** is the vertical measurement of water from the ocean floor to a standard level from which the soundings printed on charts are calculated, known as Datum.

**Datum:** is the zero reference point from which tidal heights (measured up) and chart soundings (measured down) are calculated.

**Depth of Water:** can be calculated at any given time in any given place by adding the height of tide at that time and place to the Charted Depth as recorded on the chart for that place.

**Diurnal Tides:** occur once a day, i.e. one high tide and one low tide on average in any one 24-hour period.

**Highest Astronomical Tide (HAT):** is the highest tide which can be predicted under any combination of astronomical conditions and average meteorological conditions. Higher tides can occur under extreme meteorological and oceanographic conditions.

**Indian Spring Low Water (ISLW):** is the elevation depressed below mean sea level by the amount equal to the sum of amplitudes of the four main harmonic constituents: M2, S2, K1 and O1.

**King Tide:** is a layman's term for the highest of the Spring tides which usually occurs during the day on the New or Full Moon in January and again, at night, on the New or Full Moon in July.

**Lowest Astronomical Tide (LAT):** is the lowest tide which can be predicted under any combination of astronomical conditions and average meteorological conditions. Lower tides can occur.

**Mean High Water Springs (MHWS):** is the average level of the Spring high tides.

**Mean Low Water Springs (MLWS):** is the average of the Spring low tides.

**Mean High Water Neaps (MHWN):** is the average level of the Neap high tides.

**Mean Low Water Neaps (MLWN):** is the average level of the Neap low tides.

**Mean Sea Level (MSL):** is the average level of the sea surface over a 19-year period, and is approximately the level where the water would settle if there were no tides.

**Neap Tides:** are those which occur on the Quarter moons (first or last) when the high tides are relatively small (a low 'high') and the low tides are relatively high (a high 'low').

**Semi-diurnal Tides:** occur twice a day, i.e., two high tides and two low tides on average in any one 24-hour period. Of the two highs, one will be higher than the other (daytime in summer, night time in winter). Of the two lows, one will be lower than the other.

**Slack Water:** is when a tidal current ceases to flow before reversing direction. It does not necessarily occur at the same time as the time of high or low tide. It is governed by geographical and hydrological influences as well as the tide itself.

**Spring Tides:** are those which occur on the New or Full Moon when the high tides are very high (a high 'high') and the low tides are very low (a low 'low'). Not to be confused with the season also known as spring.

**Tidal Current:** is the horizontal movement of water caused by the rise or fall of the tide.

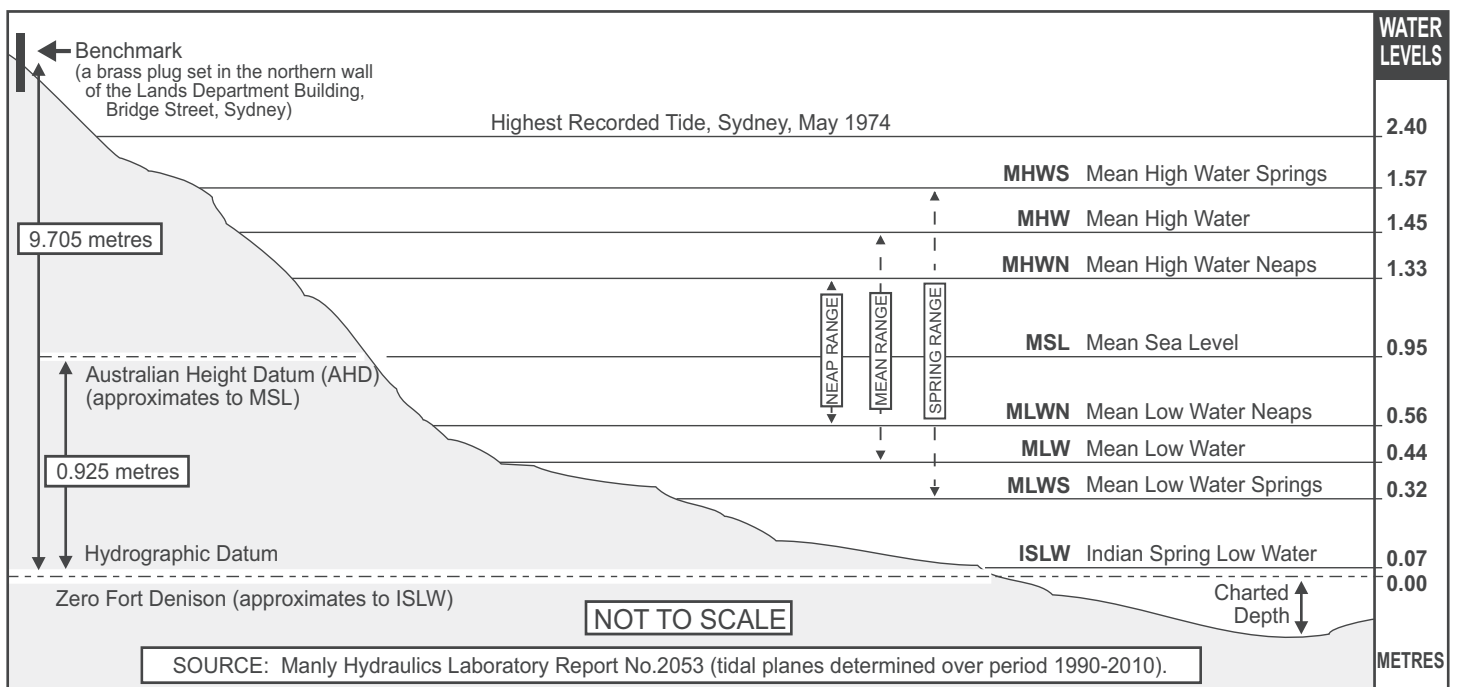
**Tidal Epoch:** has been set in Australia as a 20-year period (based on the Lunar Cycle of 18.6 Earth years) over which all recordings of tidal variations and influences are analysed and reviewed.

**Tidal Range:** is the difference in height between two sequential tidal extremes (a low tide of 0.29 metres followed by a high tide of 1.63 metres will cause a tidal range of 1.34 metres ( $1.63 - 0.29 = 1.34$ )).

## DAYLIGHT SAVING PERIODS

Daylight Saving Time began in New South Wales, the Australian Capital Territory, Victoria, Tasmania and South Australia at 2am on Sunday, October 7, 2018, when clocks should have been turned forward one hour to read 3am. Daylight Saving Time ends at 3am on Sunday, April 7, 2019, when clocks should be turned back one hour to read 2am. In 2019, Daylight Saving Time begins in New South Wales, the Australian Capital Territory, Victoria, South Australia and Tasmania at 2am on Sunday, October 6. Daylight Saving Time ends at 3am on Sunday, April 5, 2020. Queensland, Western Australia and the Northern Territory do not participate in Daylight Saving Time.

**NOTE:** Prediction times in this book are to Australian Eastern Standard Time or Daylight Saving Time where applicable. No adjustment is needed.



## JANUARY 2019

DAY	MOON RISE	MOON SET	NOTES
1	2:19 am	3:39 pm	
2	2:54 am	4:39 pm	
3	3:32 am	5:37 pm	
4	4:13 am	6:33 pm	
5	4:58 am	7:26 pm	
6	5:46 am	8:16 pm	●
7	6:37 am	9:01 pm	
8	7:30 am	9:41 pm	
9	8:24 am	10:18 pm	
10	9:18 am	10:52 pm	
11	10:13 am	11:23 pm	
12	11:07 am	11:53 pm	
13	12:02 pm		
14	12:58 pm	12:23 am	◐
15	1:56 pm	12:54 am	
16	2:57 pm	1:28 am	
17	4:00 pm	2:05 am	
18	5:06 pm	2:47 am	
19	6:12 pm	3:37 am	
20	7:15 pm	4:34 am	
21	8:14 pm	5:39 am	○
22	9:06 pm	6:49 am	
23	9:52 pm	8:01 am	
24	10:33 pm	9:12 am	
25	11:10 pm	10:21 am	
26	11:46 pm	11:27 am	
27		12:31 pm	
28	12:20 am	1:33 pm	◑
29	12:56 am	2:33 pm	
30	1:33 am	3:32 pm	
31	2:13 am	4:28 pm	

## FEBRUARY 2019

DAY	MOON RISE	MOON SET	NOTES
1	2:56 am	5:22 pm	
2	3:42 am	6:13 pm	
3	4:32 am	6:59 pm	
4	5:24 am	7:41 pm	
5	6:18 am	8:19 pm	●
6	7:13 am	12:00 am	
7	8:07 am	12:25 am	
8	9:02 am	12:56 am	
9	9:56 am	10:25 pm	
10	10:51 am	10:55 pm	
11	11:47 am	11:27 pm	
12	12:45 pm		
13	1:46 pm	12:01 am	◐
14	2:48 pm	12:40 am	
15	3:51 pm	1:24 am	
16	4:54 pm	2:16 am	
17	5:54 pm	3:15 am	
18	6:49 pm	4:21 am	
19	7:39 pm	5:32 am	
20	12:00 am	6:45 am	○
21	12:03 am	7:57 am	
22	12:41 am	9:07 am	
23	10:17 pm	10:14 am	
24	10:53 pm	11:20 am	
25	11:31 pm	12:23 pm	
26		1:24 pm	◑
27	12:11 am	2:23 pm	
28	12:53 am	3:18 pm	

Moon phases: ● New Moon ◐ 1st Quarter ○ Full Moon ◑ 3rd Quarter

## MARCH 2019

DAY	MOON RISE	MOON SET	NOTES
1	1:39 am	4:10 pm	
2	2:28 am	4:57 pm	
3	3:19 am	5:40 pm	
4	4:13 am	6:19 pm	
5	5:07 am	6:55 pm	
6	6:02 am	7:27 pm	
7	6:56 am	7:58 pm	●
8	7:51 am	8:28 pm	
9	8:47 am	8:58 pm	
10	9:43 am	9:29 pm	
11	10:40 am	10:02 pm	
12	11:39 am	10:38 pm	
13	12:39 pm	11:19 pm	
14	1:41 pm		☾
15	2:42 pm	12:07 am	
16	3:41 pm	1:01 am	
17	4:36 pm	2:02 am	
18	5:26 pm	3:09 am	
19	6:12 pm	4:19 am	
20	6:54 pm	5:30 am	
21	7:32 pm	6:41 am	☽
22	8:09 pm	7:51 am	
23	8:46 pm	8:59 am	
24	9:24 pm	10:05 am	
25	10:04 pm	11:09 am	
26	10:47 pm	12:11 pm	
27	11:33 pm	1:10 pm	
28		2:04 pm	☾
29	12:22 am	2:54 pm	
30	1:13 am	3:39 pm	
31	2:06 am	4:19 pm	

## APRIL 2019

DAY	MOON RISE	MOON SET	NOTES
1	3:00 am	4:55 pm	
2	3:55 am	5:29 pm	
3	4:50 am	6:00 pm	
4	5:45 am	6:30 pm	
5	6:40 am	7:00 pm	●
6	7:37 am	7:31 pm	
7	7:34 am	7:03 pm	
8	8:33 am	7:39 pm	
9	9:34 am	8:18 pm	
10	10:35 am	9:03 pm	
11	11:36 am	9:55 pm	
12	12:35 pm	10:52 pm	
13	1:30 pm	11:55 pm	☾
14	2:21 pm		
15	3:06 pm	1:02 am	
16	3:48 pm	2:11 am	
17	4:26 pm	3:20 am	
18	5:03 pm	4:28 am	
19	5:39 pm	5:36 am	☽
20	6:16 pm	6:43 am	
21	6:56 pm	7:50 am	
22	7:38 pm	8:54 am	
23	8:23 pm	9:56 am	
24	9:12 pm	10:54 am	
25	10:03 pm	11:47 am	
26	10:57 pm	12:35 pm	
27	11:51 pm	1:17 pm	☾
28		1:55 pm	
29	12:46 am	2:30 pm	
30	1:41 am	3:01 pm	

Moon phases: ● New Moon ☾ 1st Quarter ☽ Full Moon ☾ 3rd Quarter

## MAY 2019

DAY	MOON RISE	MOON SET	NOTES
1	2:36 am	3:32 pm	
2	3:31 am	4:01 pm	
3	4:27 am	4:31 pm	
4	5:25 am	5:03 pm	
5	6:24 am	5:38 pm	●
6	7:25 am	6:16 pm	
7	8:28 am	7:00 pm	
8	9:31 am	7:50 pm	
9	10:31 am	8:46 pm	
10	11:28 am	9:48 pm	
11	12:20 pm	10:53 pm	
12	1:06 pm		☾
13	1:47 pm	12:00 am	
14	2:25 pm	1:08 am	
15	3:01 pm	2:14 am	
16	3:36 pm	3:20 am	
17	4:12 pm	4:26 am	
18	4:49 pm	5:32 am	
19	5:29 pm	6:37 am	☽
20	6:13 pm	7:40 am	
21	7:01 pm	8:40 am	
22	7:52 pm	9:37 am	
23	8:45 pm	10:28 am	
24	9:40 pm	11:13 am	
25	10:36 pm	11:53 am	
26	11:31 pm	12:29 pm	
27		1:02 pm	☾
28	12:25 am	1:32 pm	
29	1:20 am	2:02 pm	
30	2:16 am	2:31 pm	
31	3:12 am	3:02 pm	

## JUNE 2019

DAY	MOON RISE	MOON SET	NOTES
1	4:11 am	3:35 pm	
2	5:12 am	4:12 pm	
3	6:15 am	4:54 pm	●
4	7:19 am	5:42 pm	
5	8:22 am	6:38 pm	
6	9:22 am	7:39 pm	
7	10:17 am	8:45 pm	
8	11:06 am	9:52 pm	
9	11:49 am	11:00 pm	
10	12:27 pm		☾
11	1:03 pm	12:07 am	
12	1:38 pm	1:12 am	
13	2:12 pm	2:16 am	
14	2:48 pm	3:20 am	
15	3:26 pm	4:24 am	
16	4:07 pm	5:27 am	
17	4:53 pm	6:28 am	☽
18	5:42 pm	7:26 am	
19	6:35 pm	8:19 am	
20	7:29 pm	9:07 am	
21	8:25 pm	9:50 am	
22	9:20 pm	10:28 am	
23	10:15 pm	11:02 am	
24	11:10 pm	11:33 am	
25		12:02 pm	☾
26	12:04 am	12:31 pm	
27	1:00 am	1:01 pm	
28	1:56 am	1:32 pm	
29	2:55 am	2:07 pm	
30	3:57 am	2:46 pm	

Moon phases: ● New Moon ☾ 1st Quarter ☽ Full Moon ☾ 3rd Quarter

## JULY 2019

DAY	MOON RISE	MOON SET	NOTES
1	5:01 am	3:31 pm	
2	6:05 am	4:24 pm	
3	7:08 am	5:24 pm	●
4	8:07 am	6:30 pm	
5	9:00 am	7:39 pm	
6	9:47 am	8:49 pm	
7	10:28 am	9:58 pm	
8	11:05 am	11:05 pm	
9	11:40 am		◐
10	12:15 pm	12:10 am	
11	12:49 pm	1:14 am	
12	1:26 pm	2:17 am	
13	2:05 pm	3:19 am	
14	2:49 pm	4:20 am	
15	3:36 pm	5:18 am	
16	4:27 pm	6:13 am	
17	5:21 pm	7:02 am	◑
18	6:16 pm	7:47 am	
19	7:12 pm	8:26 am	
20	8:07 pm	9:02 am	
21	9:02 pm	9:34 am	
22	9:56 pm	10:04 am	
23	10:50 pm	10:32 am	
24	11:45 pm	11:01 am	
25		11:31 am	◑
26	12:42 am	12:03 pm	
27	1:41 am	12:39 pm	
28	2:42 am	1:20 pm	
29	3:46 am	2:09 pm	
30	4:49 am	3:05 pm	
31	5:50 am	4:09 pm	

## AUGUST 2019

DAY	MOON RISE	MOON SET	NOTES
1	6:47 am	5:18 pm	●
2	7:38 am	6:30 pm	
3	8:23 am	7:41 pm	
4	9:03 am	8:51 pm	
5	9:40 am	9:59 pm	
6	10:15 am	11:05 pm	
7	10:50 am		
8	11:27 am	12:27 am	◐
9	12:06 pm	1:13 am	
10	12:48 pm	2:14 am	
11	1:33 pm	3:13 am	
12	2:23 pm	4:08 am	
13	3:15 pm	4:59 am	
14	4:10 pm	5:45 am	
15	5:05 pm	6:26 am	◑
16	6:00 pm	7:02 am	
17	6:55 pm	7:35 am	
18	7:50 pm	8:06 am	
19	8:44 pm	8:35 am	
20	9:38 pm	9:03 am	
21	10:33 pm	9:32 am	
22	11:30 pm	10:03 am	
23		10:36 am	
24	12:29 am	11:14 am	◑
25	1:30 am	11:58 am	
26	2:32 am	12:49 pm	
27	3:33 am	1:47 pm	
28	4:31 am	2:53 pm	
29	5:24 am	4:04 pm	
30	6:12 am	5:16 pm	●
31	6:55 am	6:29 pm	

Moon phases: ● New Moon ◐ 1st Quarter ◑ Full Moon ◒ 3rd Quarter

## SEPTEMBER 2019

DAY	MOON RISE	MOON SET	NOTES
1	7:34 am	7:40 pm	
2	8:11 am	8:49 pm	
3	8:48 am	9:57 pm	
4	9:25 am	11:03 pm	
5	10:03 am		
6	10:45 am	12:07 am	☾
7	11:30 am	1:08 am	
8	12:19 pm	2:05 am	
9	1:11 pm	2:57 am	
10	2:05 pm	3:44 am	
11	3:00 pm	4:26 am	
12	3:55 pm	5:04 am	
13	4:50 pm	5:37 am	
14	5:45 pm	6:08 am	☽
15	6:39 pm	6:38 am	
16	7:33 pm	7:06 am	
17	8:28 pm	7:35 am	
18	9:25 pm	8:04 am	
19	10:22 pm	8:36 am	
20	11:21 pm	9:12 am	
21		9:53 am	
22	12:21 am	10:39 am	☾
23	1:21 am	11:33 am	
24	2:18 am	12:34 pm	
25	3:12 am	1:40 pm	
26	4:00 am	2:51 pm	
27	4:45 am	4:02 pm	
28	5:25 am	5:14 pm	
29	6:03 am	6:26 pm	☾
30	6:40 am	7:36 pm	

## OCTOBER 2019

DAY	MOON RISE	MOON SET	NOTES
1	7:18 am	8:45 pm	
2	7:57 am	9:52 pm	
3	8:39 am	10:56 pm	
4	9:24 am	11:57 pm	
5	10:12 am		
6	12:04 pm	1:52 am	☾
7	12:58 pm	2:42 am	
8	1:54 pm	3:26 am	
9	2:49 pm	4:05 am	
10	3:44 pm	4:40 am	
11	4:39 pm	5:11 am	
12	5:33 pm	5:41 am	
13	6:28 pm	6:09 am	
14	7:23 pm	6:38 am	☽
15	8:19 pm	7:07 am	
16	9:17 pm	7:38 am	
17	10:16 pm	8:13 am	
18	11:16 pm	8:51 am	
19		9:36 am	
20	12:15 am	10:26 am	
21	1:12 am	11:23 am	☾
22	2:06 am	12:26 pm	
23	2:55 am	1:33 pm	
24	3:39 am	2:42 pm	
25	4:19 am	3:51 pm	
26	4:57 am	5:01 pm	
27	5:33 am	6:11 pm	
28	6:10 am	7:21 pm	☾
29	6:48 am	8:30 pm	
30	7:29 am	9:38 pm	
31	8:13 am	10:42 pm	

Moon phases: ● New Moon ☾ 1st Quarter ○ Full Moon ☽ 3rd Quarter

## NOVEMBER 2019

DAY	MOON RISE	MOON SET	NOTES
1	9:01 am	11:42 pm	
2	9:53 am		
3	10:48 am	12:36 am	
4	11:44 am	1:23 am	☾
5	12:40 pm	2:04 am	
6	1:36 pm	2:41 am	
7	2:31 pm	3:13 am	
8	3:25 pm	3:43 am	
9	4:20 pm	4:12 am	
10	5:15 pm	4:40 am	
11	6:11 pm	5:09 am	
12	7:09 pm	5:39 am	
13	8:09 pm	6:13 am	☽
14	9:10 pm	6:50 am	
15	10:11 pm	7:33 am	
16	11:09 pm	8:22 am	
17		9:18 am	
18	12:04 am	10:19 am	
19	12:53 am	11:23 am	
20	1:38 am	12:30 pm	☾
21	2:18 am	1:37 pm	
22	2:55 am	2:45 pm	
23	3:30 am	3:52 pm	
24	4:05 am	5:00 pm	
25	4:41 am	6:08 pm	
26	5:20 am	7:16 pm	
27	6:02 am	8:22 pm	☀
28	6:48 am	9:26 pm	
29	7:39 am	10:24 pm	
30	8:34 am	11:15 pm	

## DECEMBER 2019

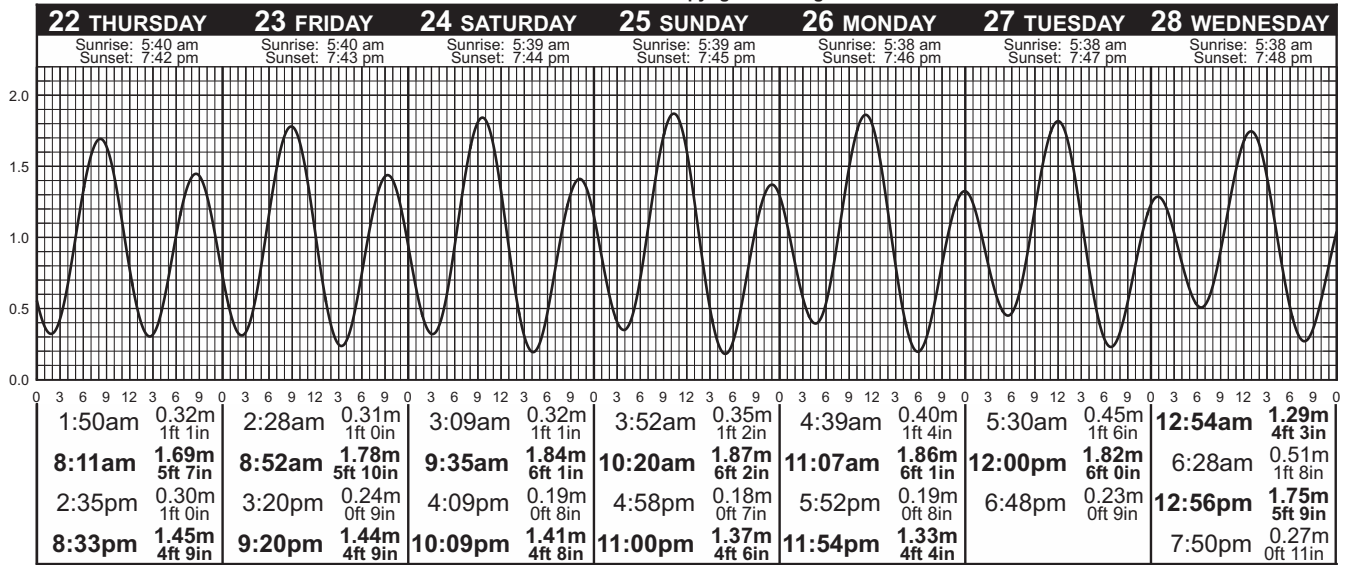
DAY	MOON RISE	MOON SET	NOTES
1	9:31 am		
2	10:28 am	12:00 am	
3	11:25 am	12:53 am	
4	12:21 pm	1:13 am	☾
5	1:16 pm	1:44 am	
6	2:10 pm	2:13 am	
7	3:04 pm	2:41 am	
8	4:00 pm	3:09 am	
9	4:57 pm	3:39 am	
10	5:57 pm	4:11 am	
11	6:58 pm	4:46 am	
12	8:00 pm	5:28 am	☽
13	9:01 pm	6:15 am	
14	9:59 pm	7:10 am	
15	10:51 pm	8:10 am	
16	11:38 pm	9:15 am	
17		10:23 am	
18	12:20 am	11:30 am	
19	12:57 am	12:37 pm	☾
20	1:32 am	1:43 pm	
21	2:06 am	2:48 pm	
22	2:40 am	3:54 pm	
23	3:16 am	5:00 pm	
24	3:56 am	6:06 pm	
25	4:39 am	7:10 pm	
26	5:27 am	8:10 pm	☀
27	6:20 am	9:04 pm	
28	7:17 am	9:53 pm	
29	8:14 am	10:35 pm	
30	9:12 am	11:11 pm	
31	10:09 am	11:44 pm	

Moon phases: ● New Moon ☾ 1st Quarter ☽ Full Moon ☀ 3rd Quarter

# November 22-28, 2018

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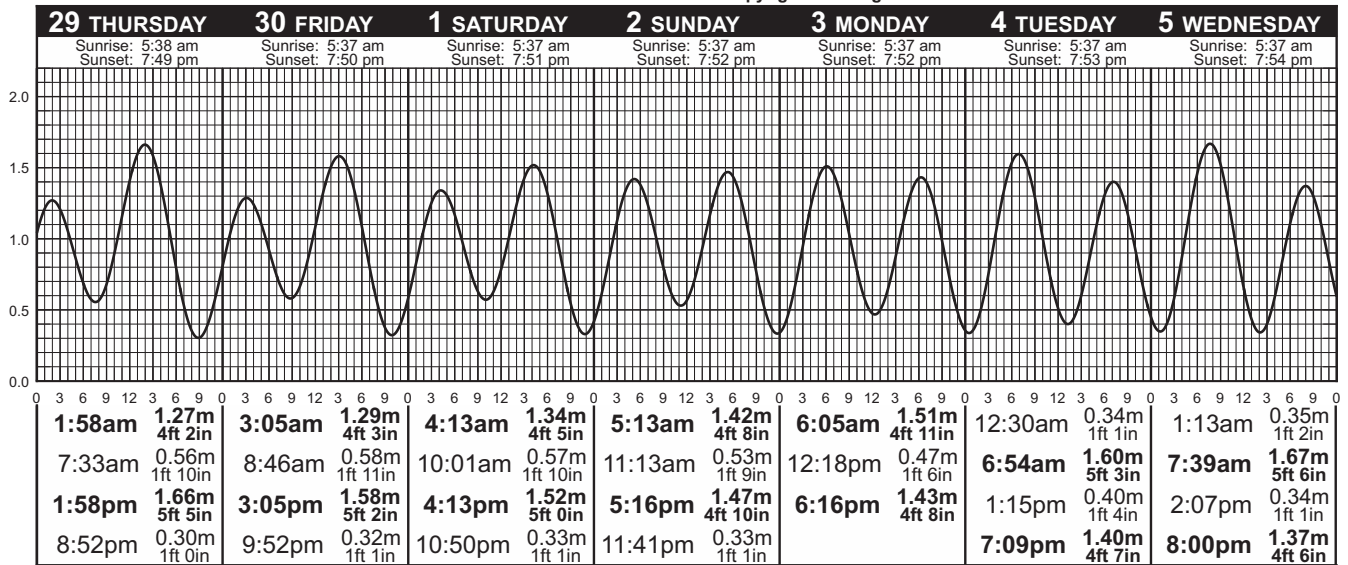
○ Full Moon Nov 23



# November 29 - December 5, 2018

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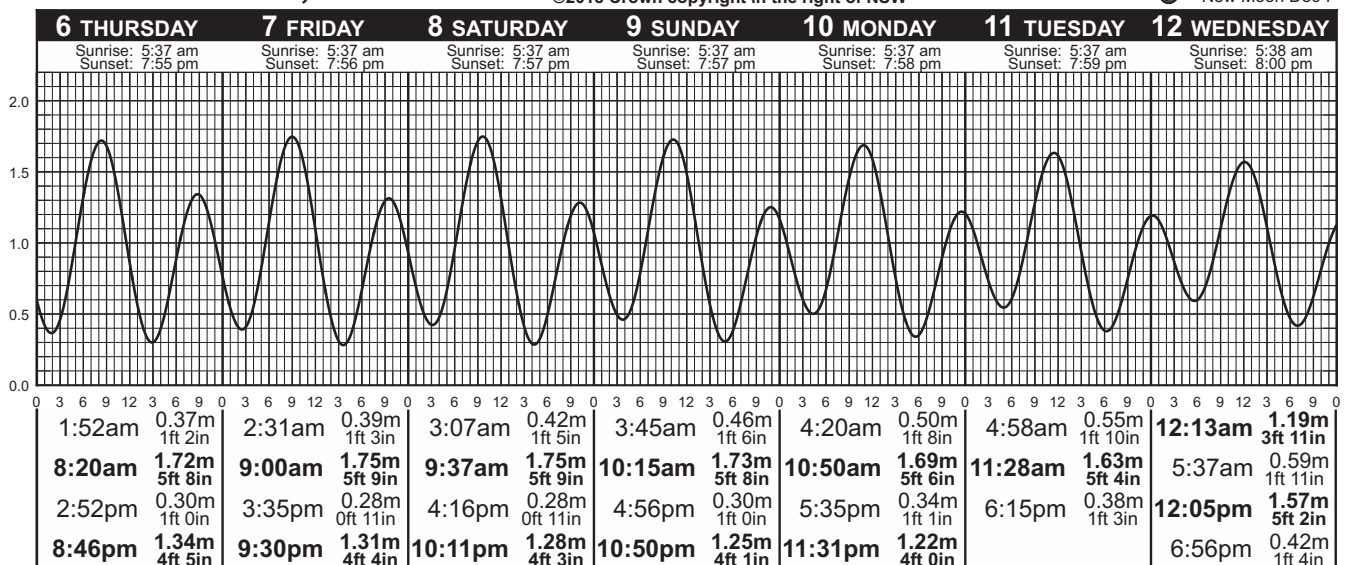
● 3rd Quarter Nov 30



# December 6-12, 2018

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● New Moon Dec 7

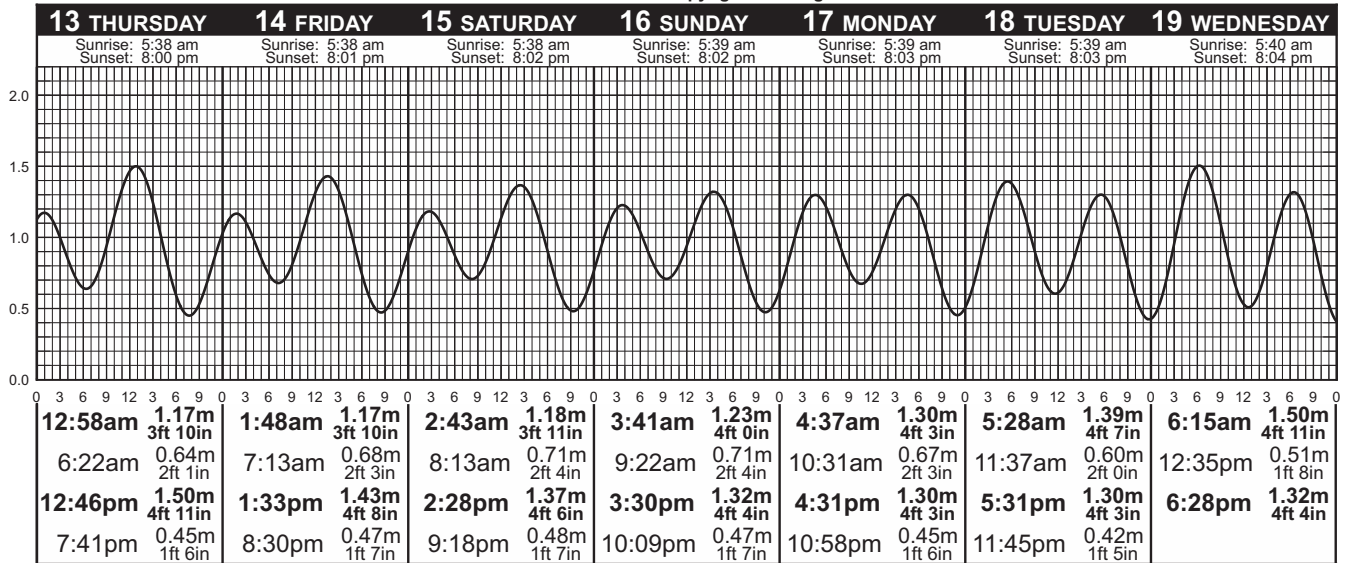


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# December 13-19, 2018

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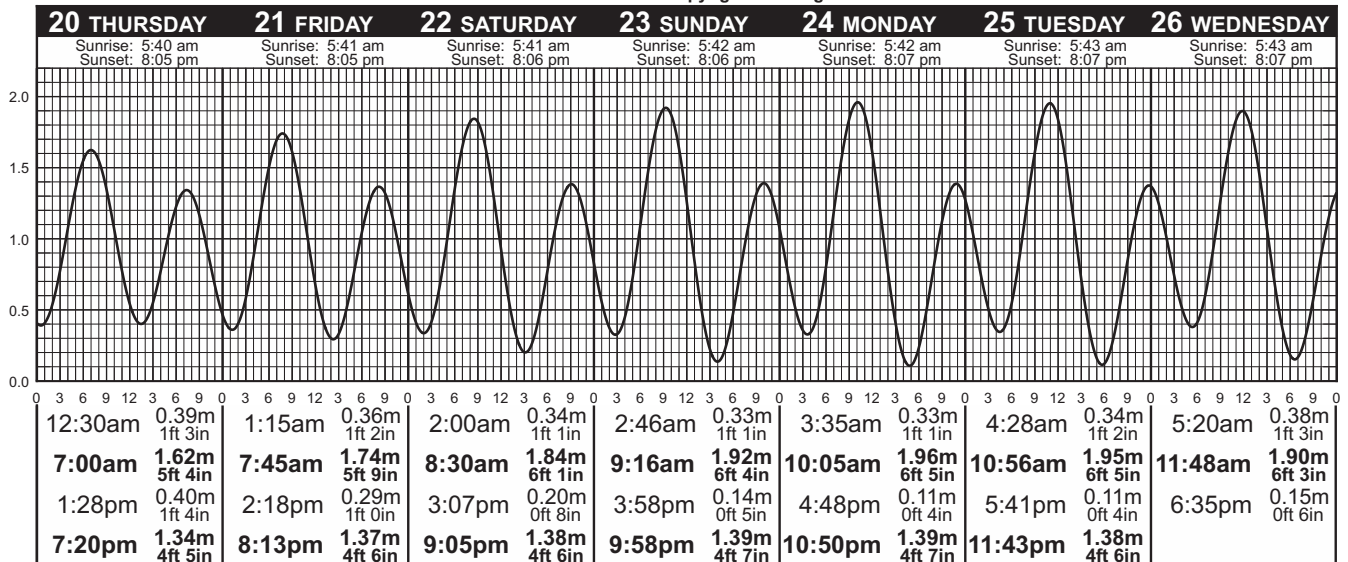
1st Quarter Dec 15



# December 20-26, 2018

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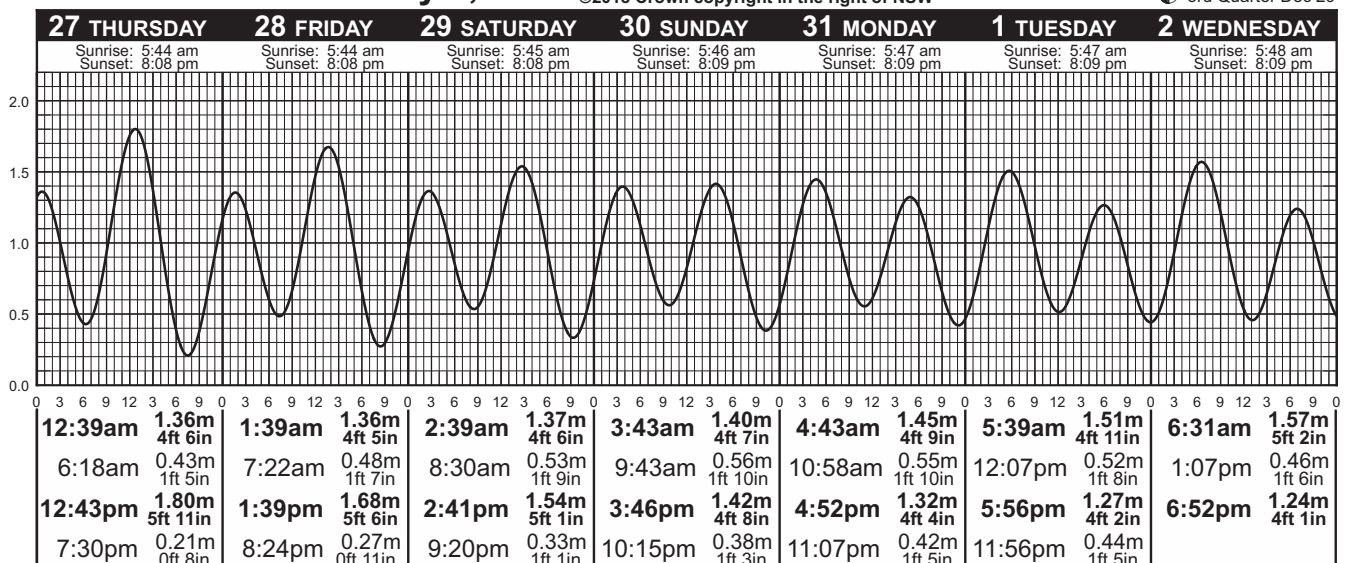
Full Moon Dec 23



# December 27 - January 2, 2019

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3rd Quarter Dec 29

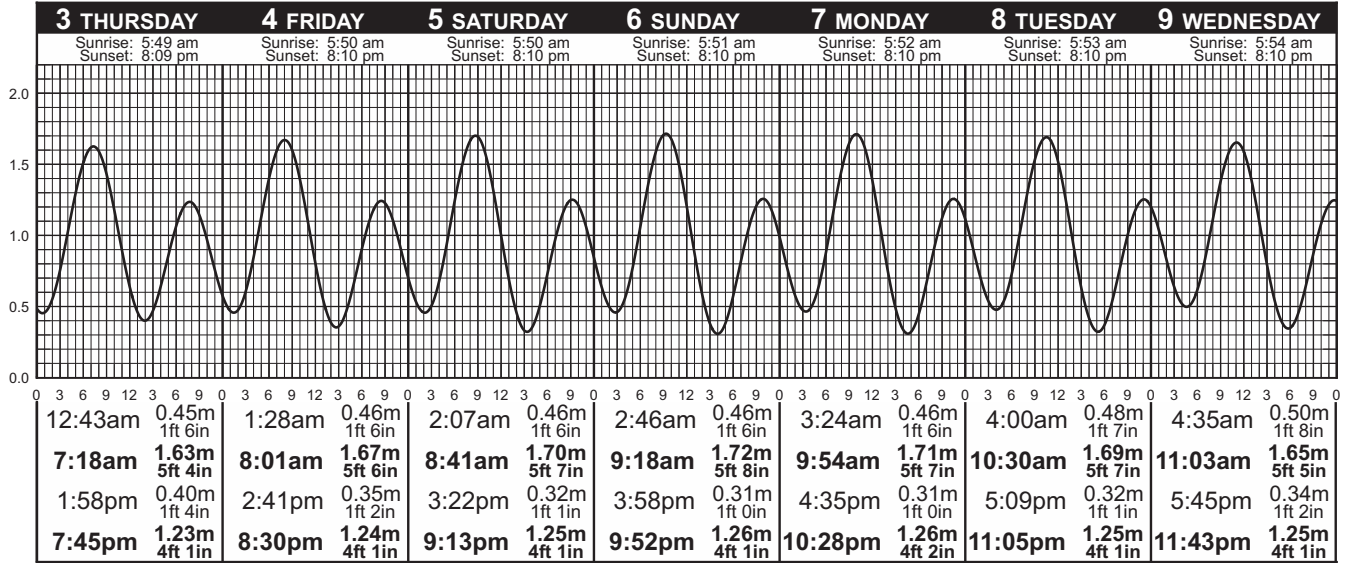


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# January 3-9, 2019

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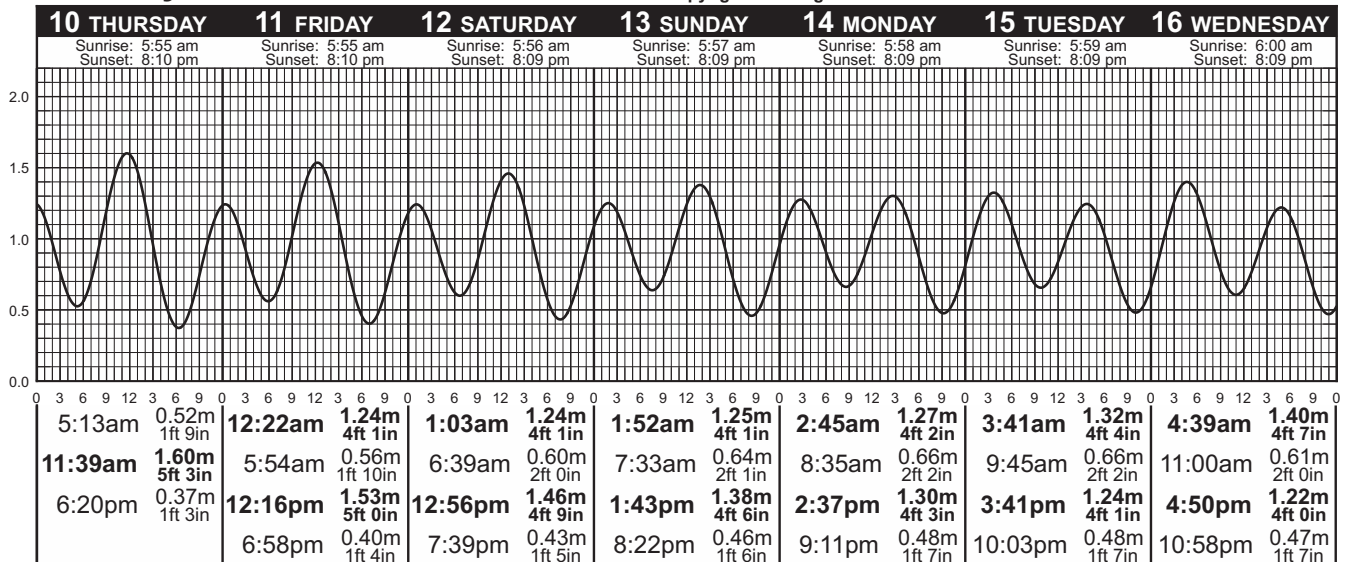
● New Moon Jan 6



# January 10-16, 2019

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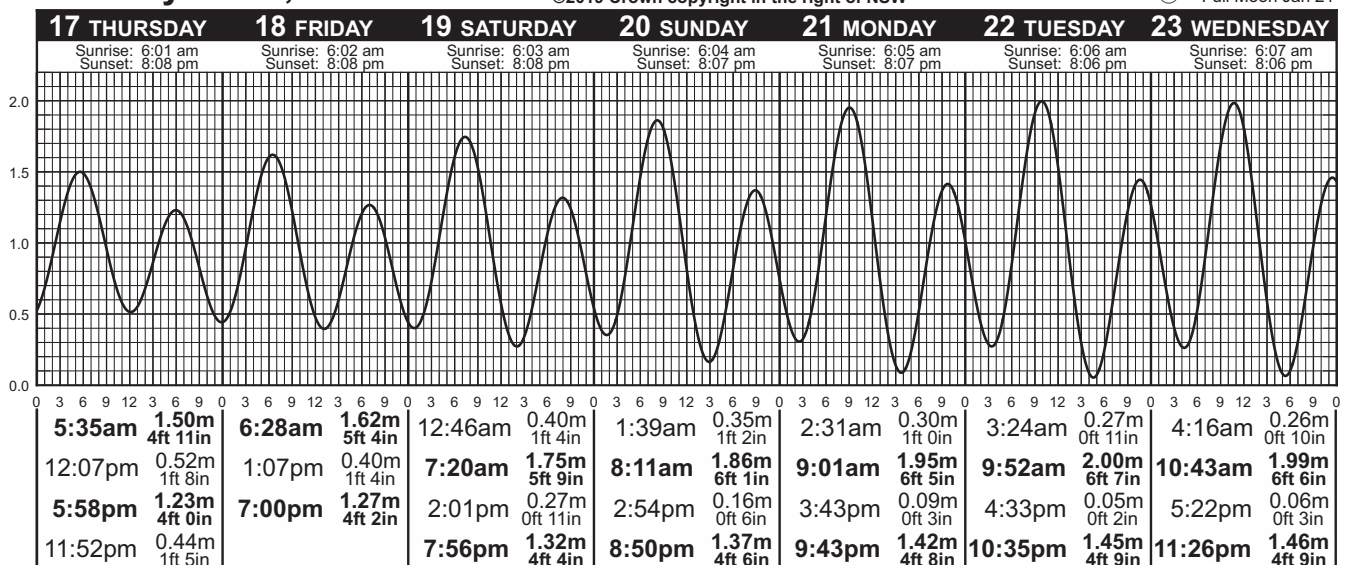
● 1st Quarter Jan 14



# January 17-23, 2019

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○ Full Moon Jan 21

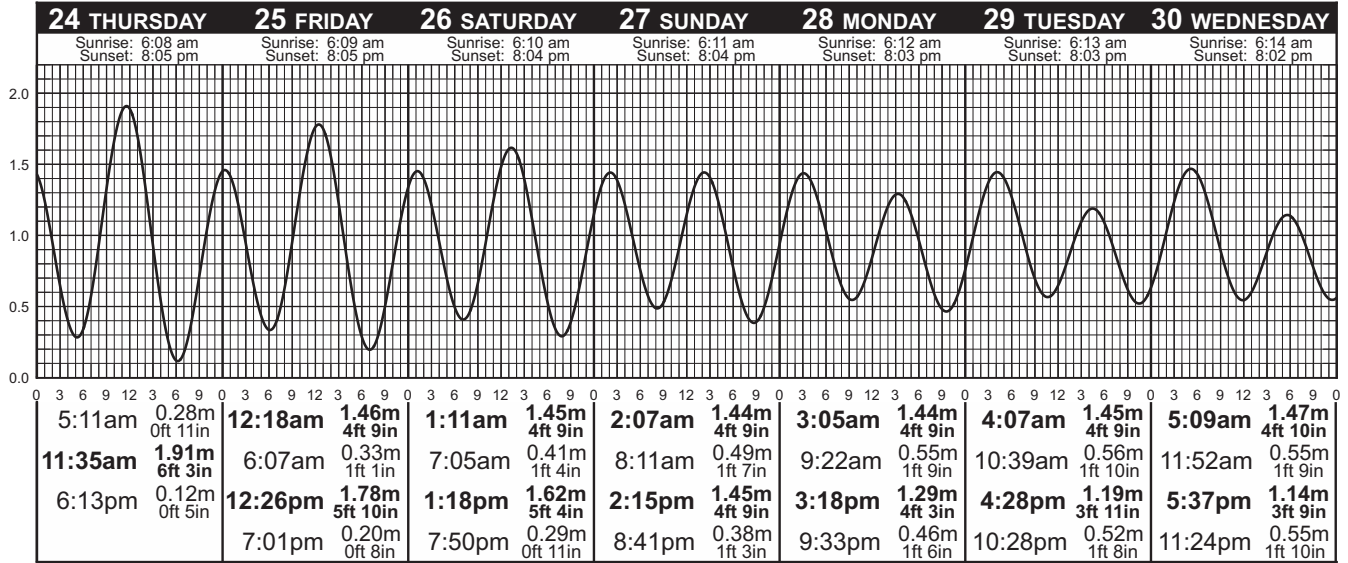


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# January 24-30, 2019

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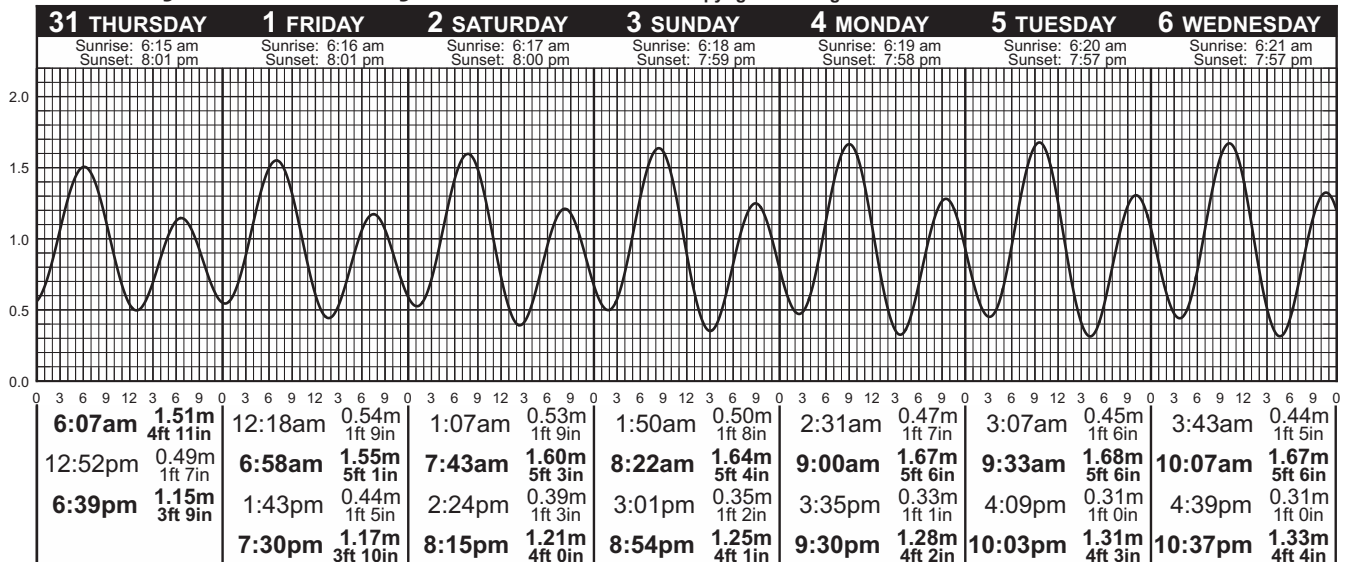
3rd Quarter Jan 28



# January 31 - February 6, 2019

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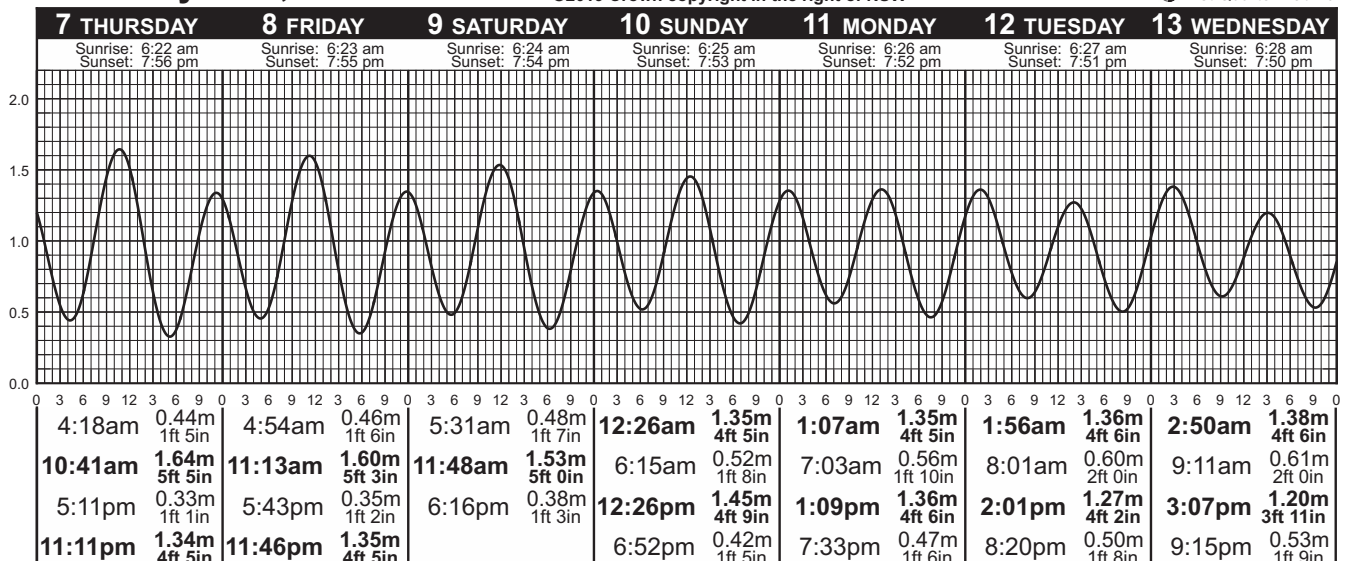
New Moon Feb 5



# February 7-13, 2019

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1st Quarter Feb 13

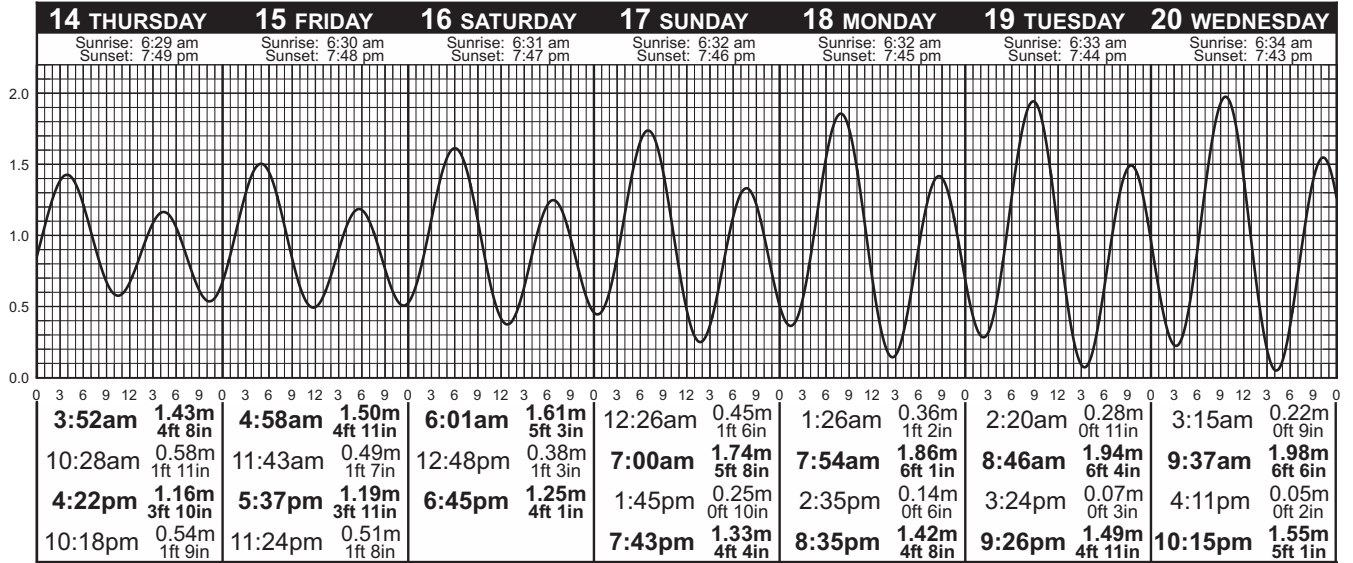


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# February 14-20, 2019

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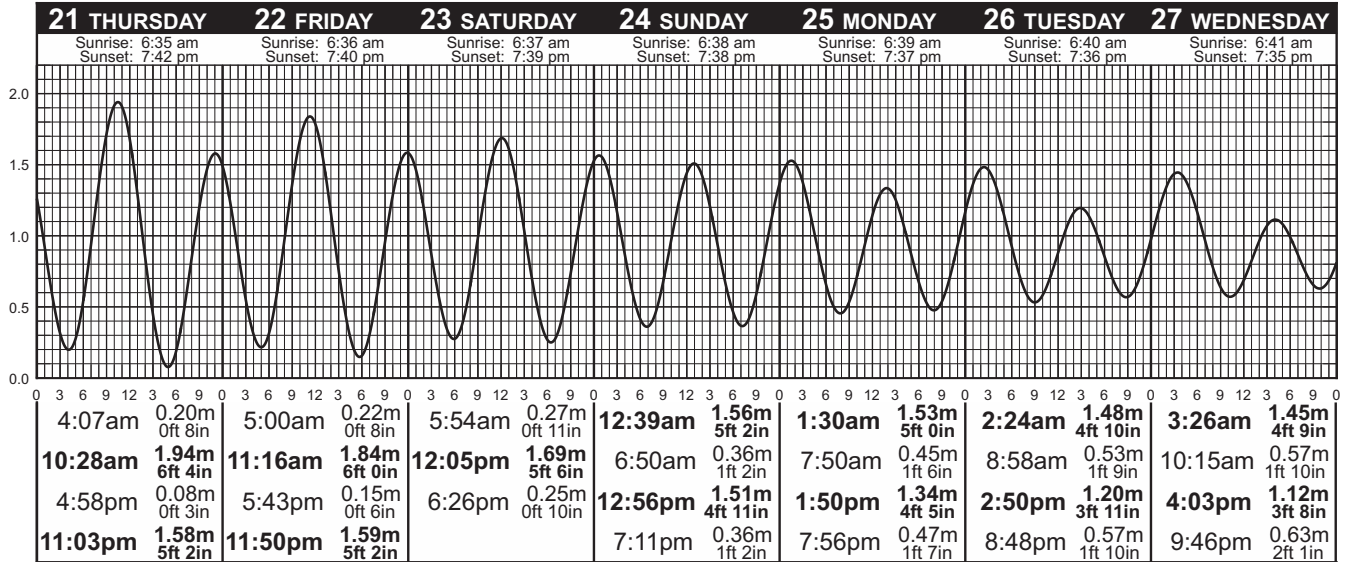
○ Full Moon Feb 20



# February 21-27, 2019

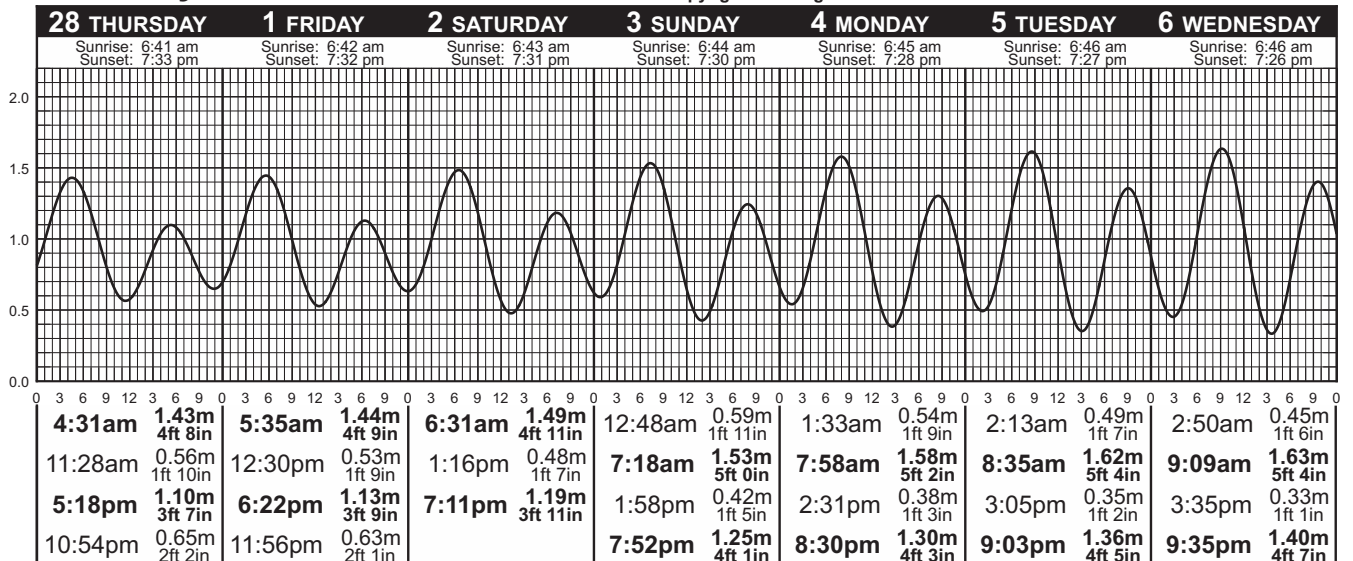
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● 3rd Quarter Feb 26



# February 28 - March 6, 2019

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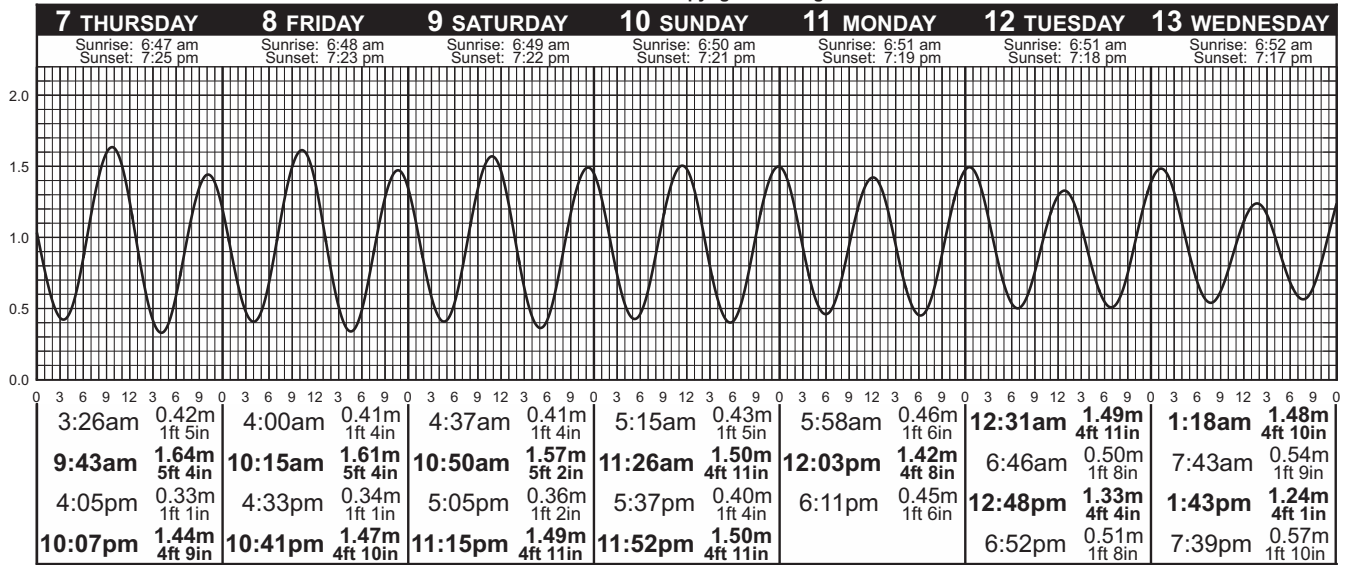


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# March 7-13, 2019

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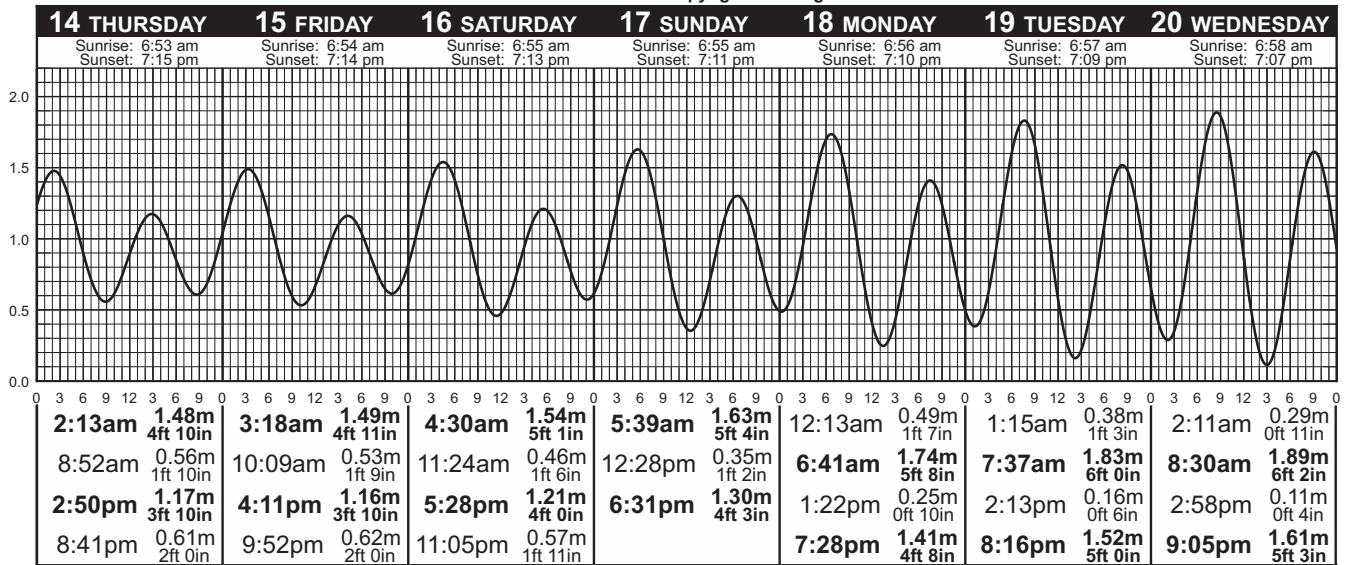
● New Moon Mar 7



# March 14-20, 2019

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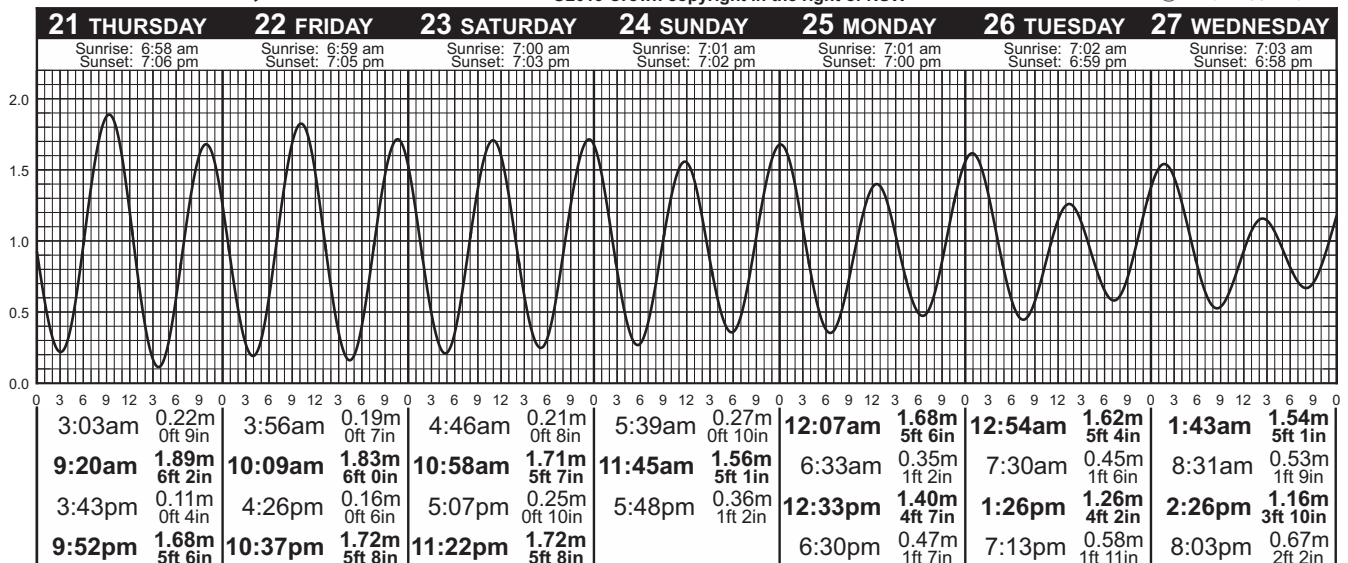
● 1st Quarter Mar 14



# March 21-27, 2019

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○ Full Moon Mar 21

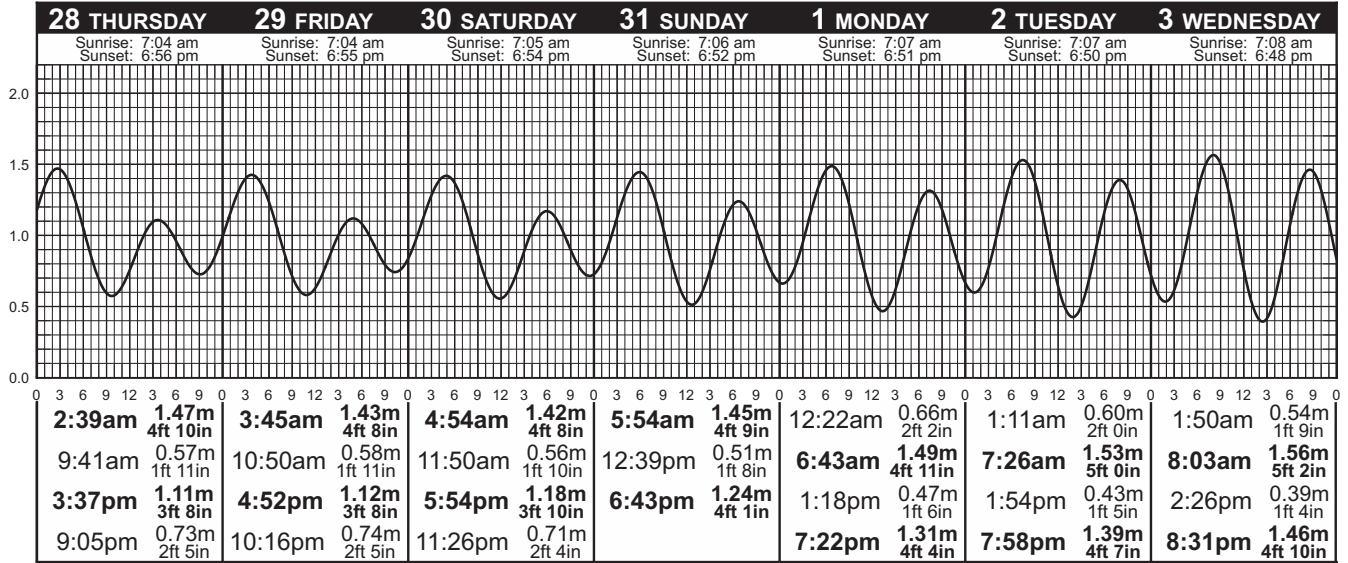


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# March 28 - April 3, 2019

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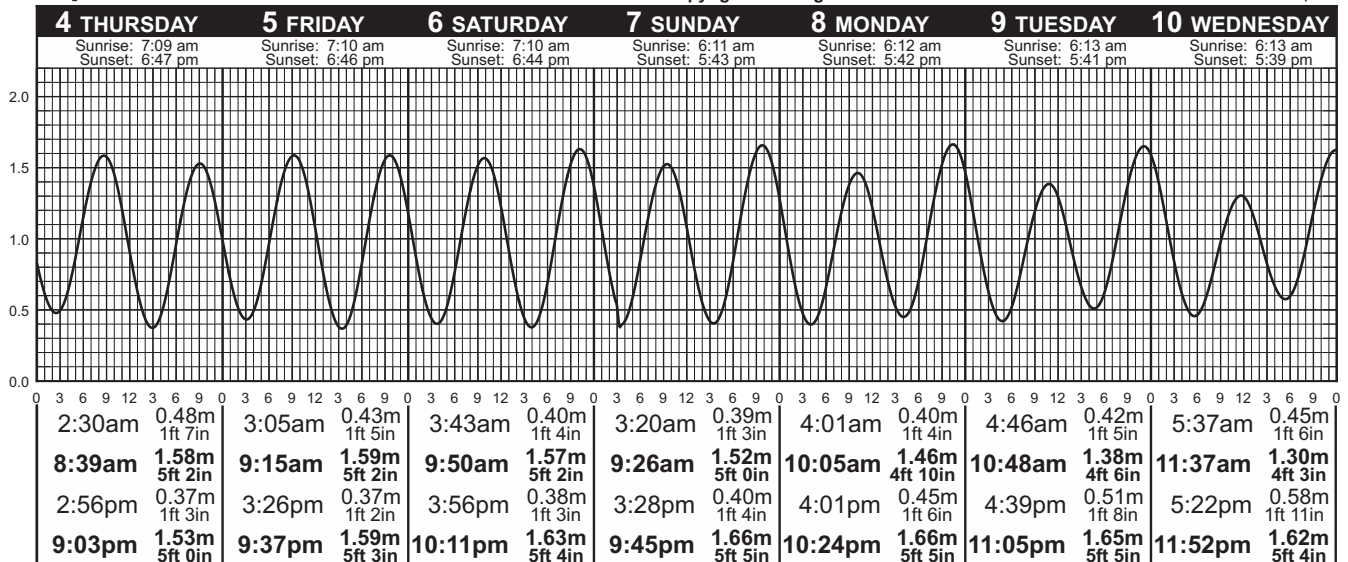
3rd Quarter Mar 28



# April 4-10, 2019

Daylight Saving Time adjustment ends Sunday April 7  
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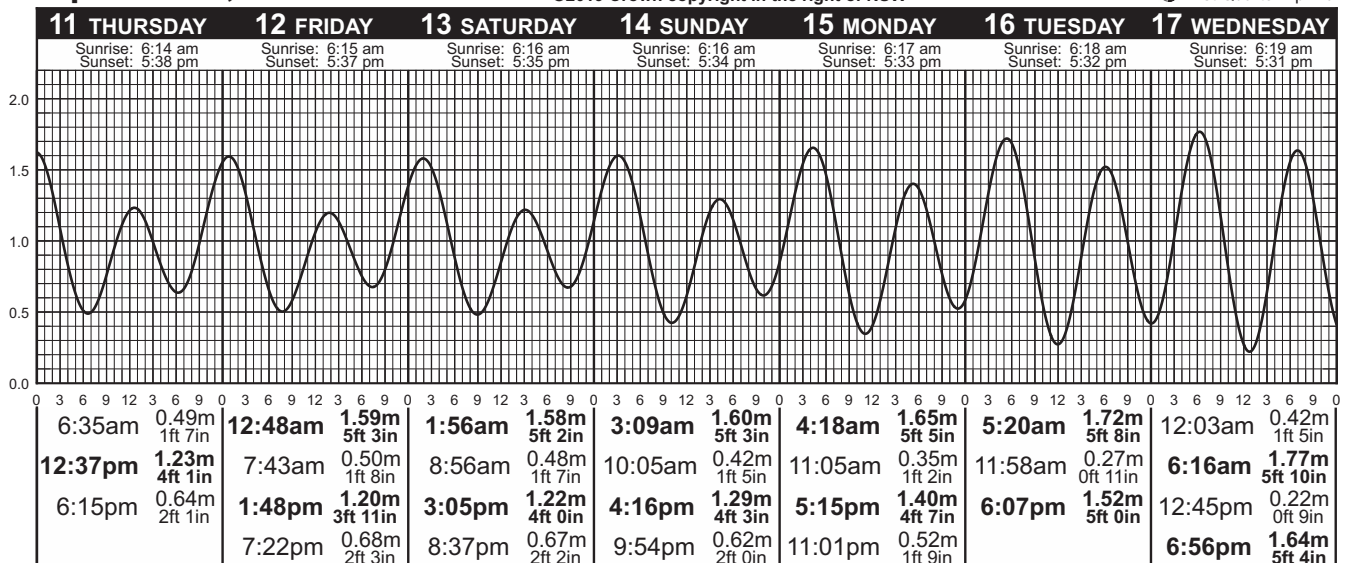
New Moon Apr 5



# April 11-17, 2019

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1st Quarter Apr 13

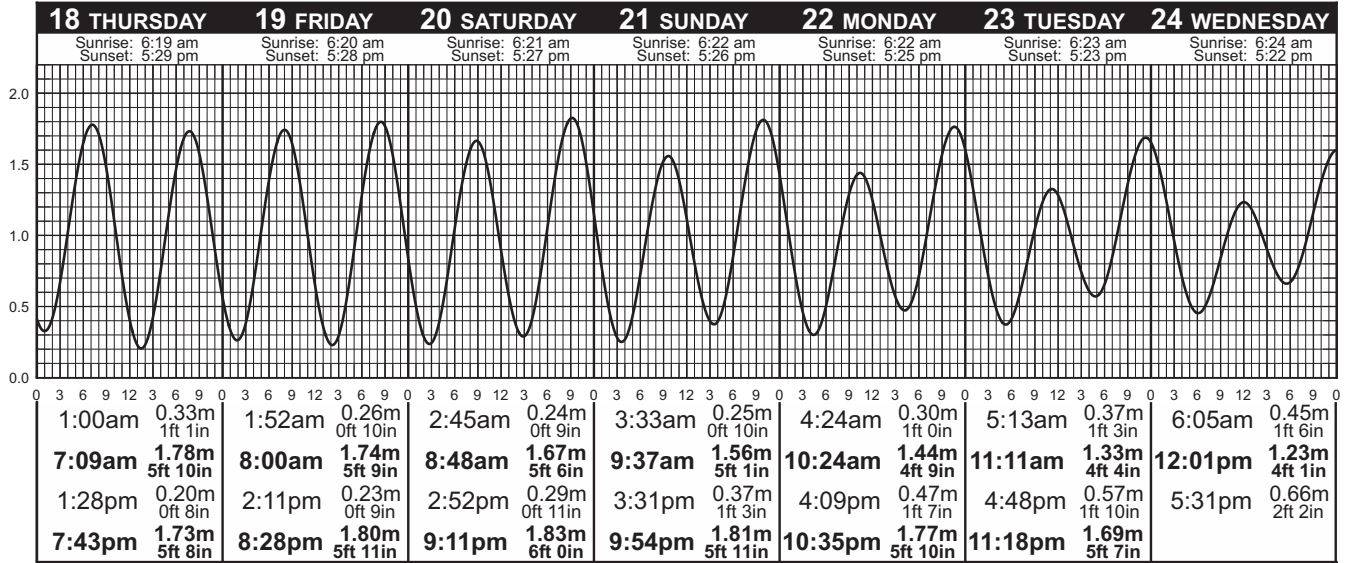


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# April 18-24, 2019

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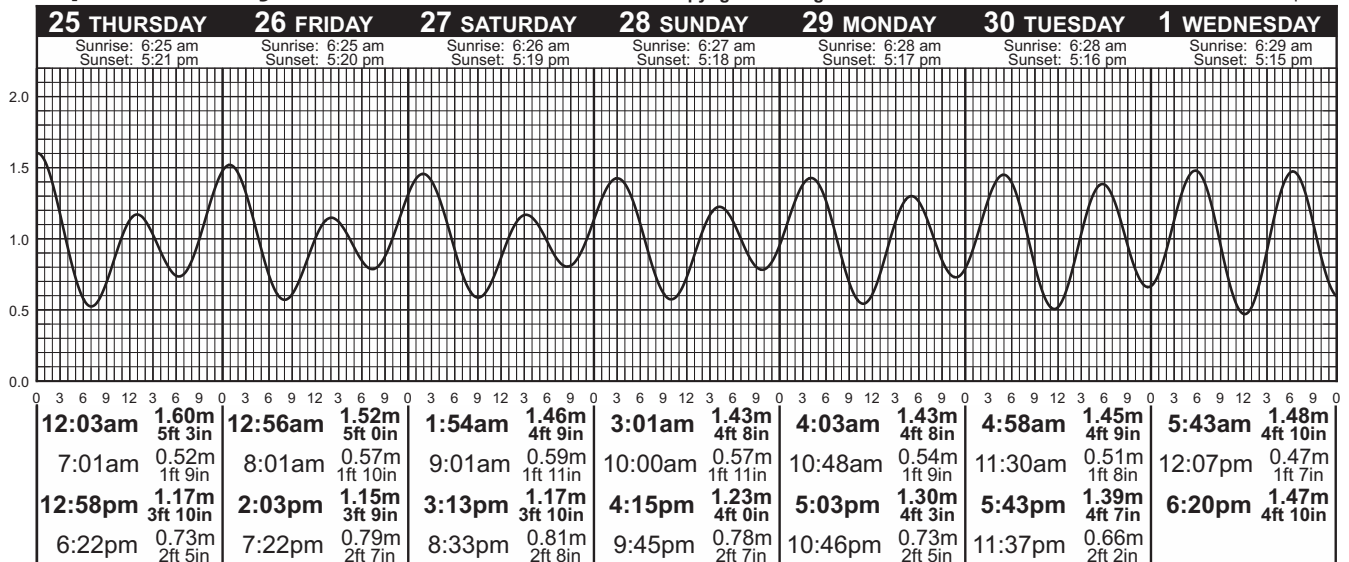
○ Full Moon Apr 19



# April 25 - May 1, 2019

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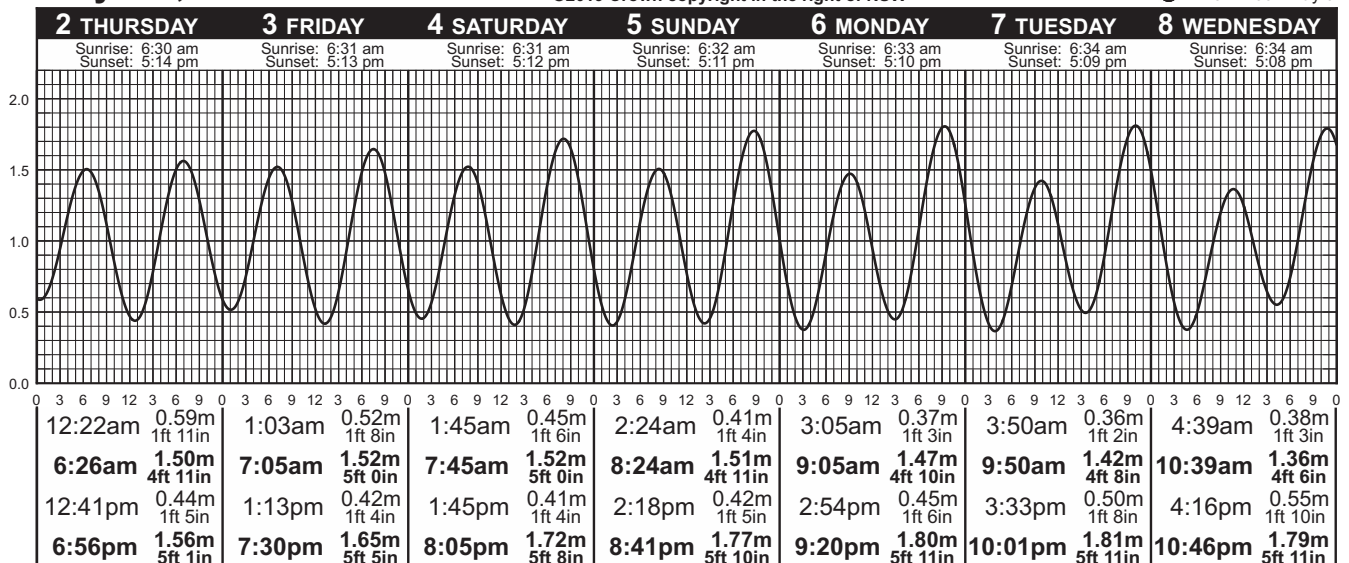
● 3rd Quarter Apr 27



# May 2-8, 2019

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● New Moon May 5

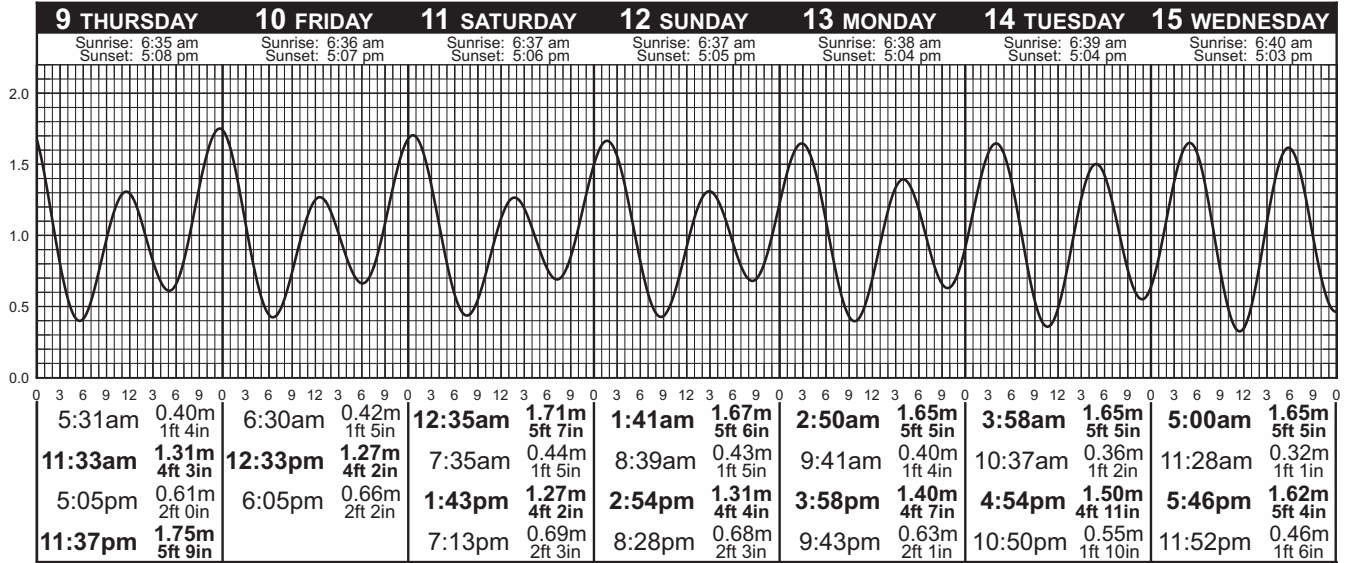


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# May 9-15, 2019

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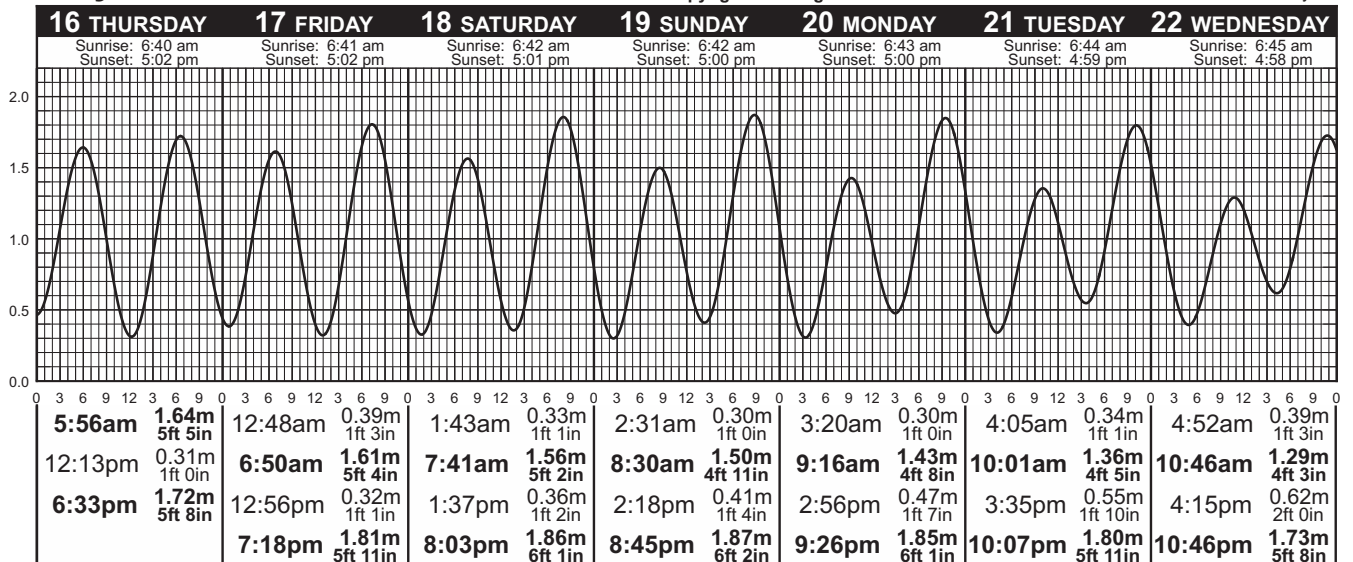
1st Quarter May 12



# May 16-22, 2019

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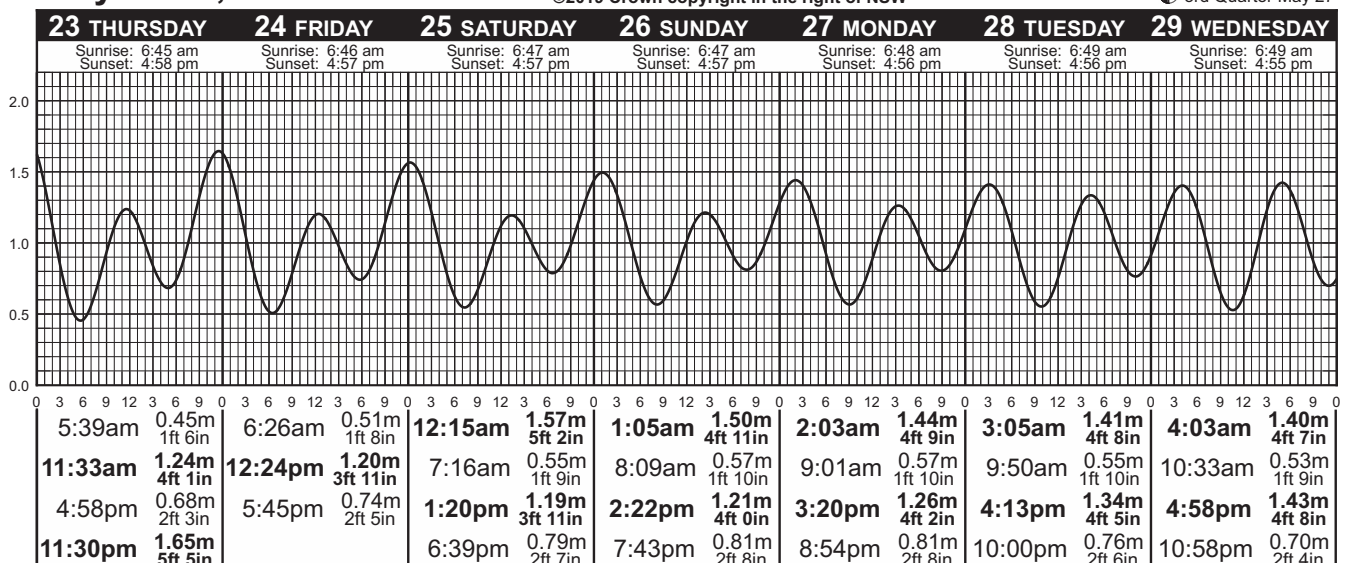
Full Moon May 19



# May 23-29, 2019

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3rd Quarter May 27

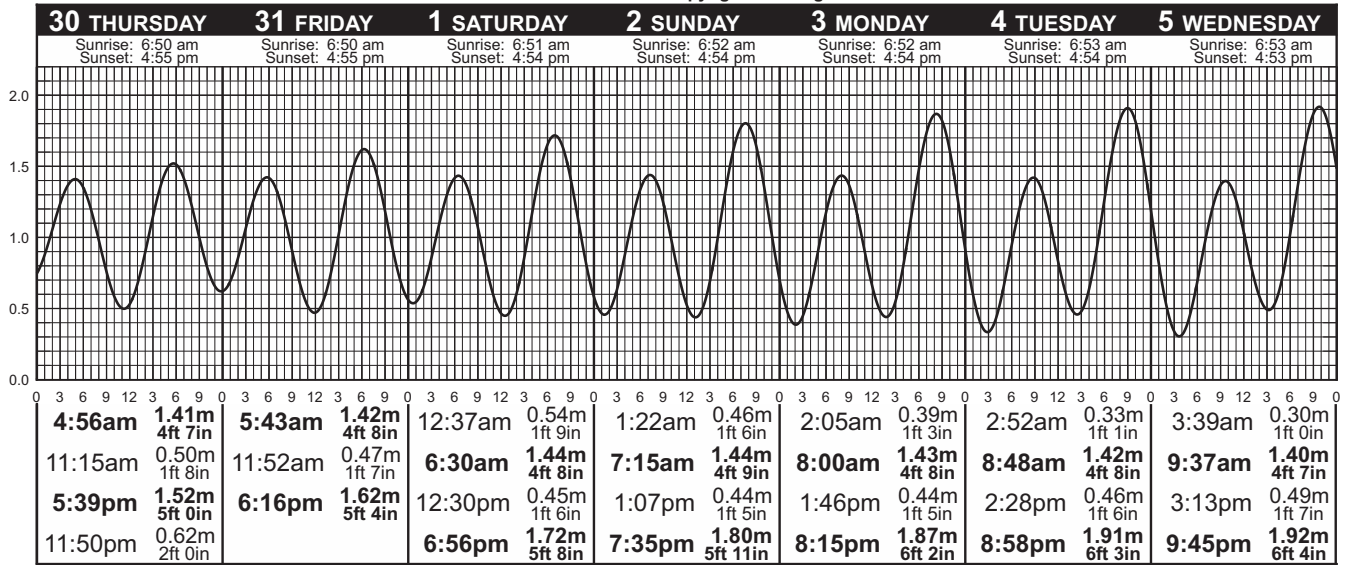


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# May 30 - June 5, 2019

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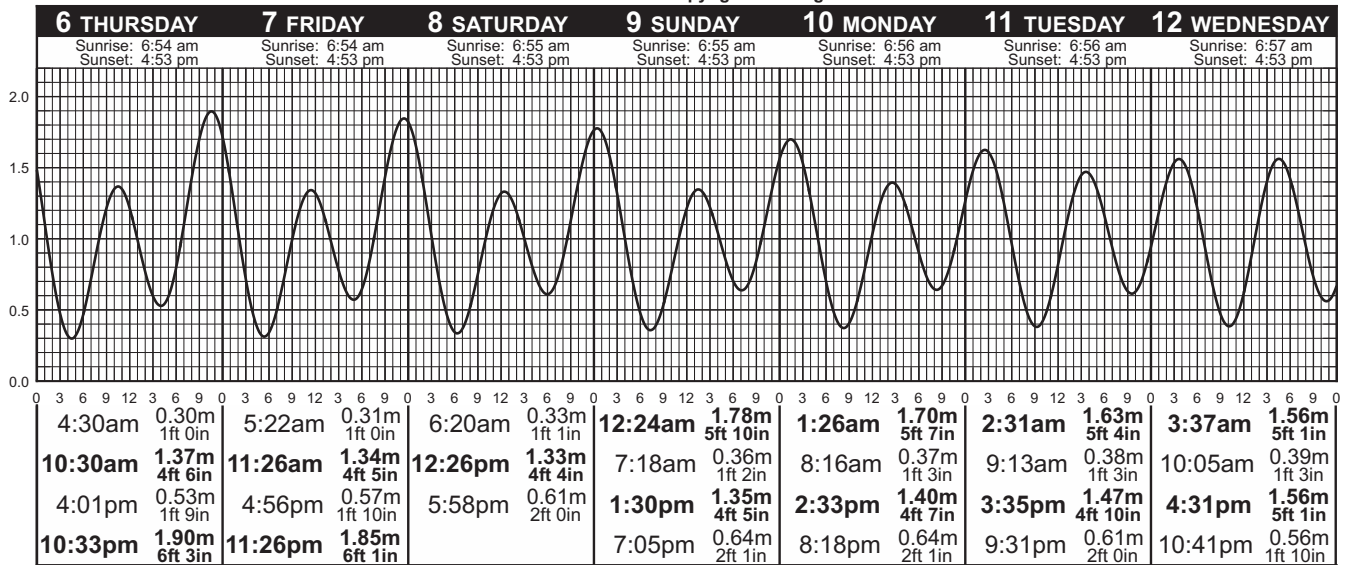
● New Moon Jun 3



# June 6-12, 2019

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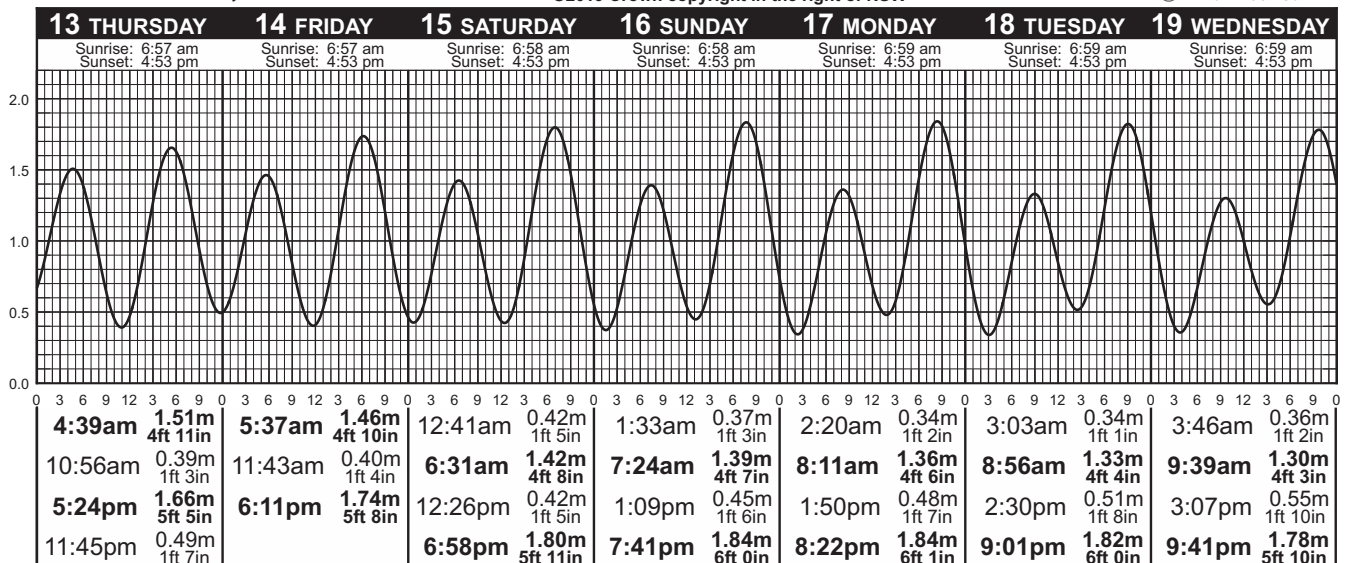
● 1st Quarter Jun 10



# June 13-19, 2019

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○ Full Moon Jun 17

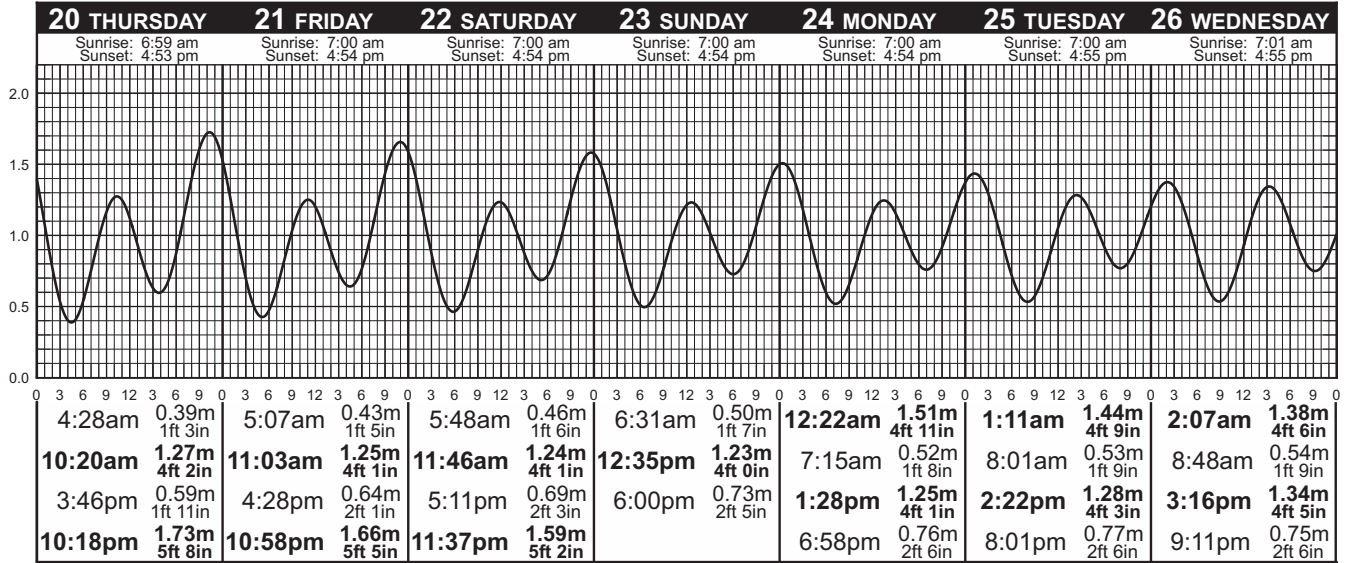


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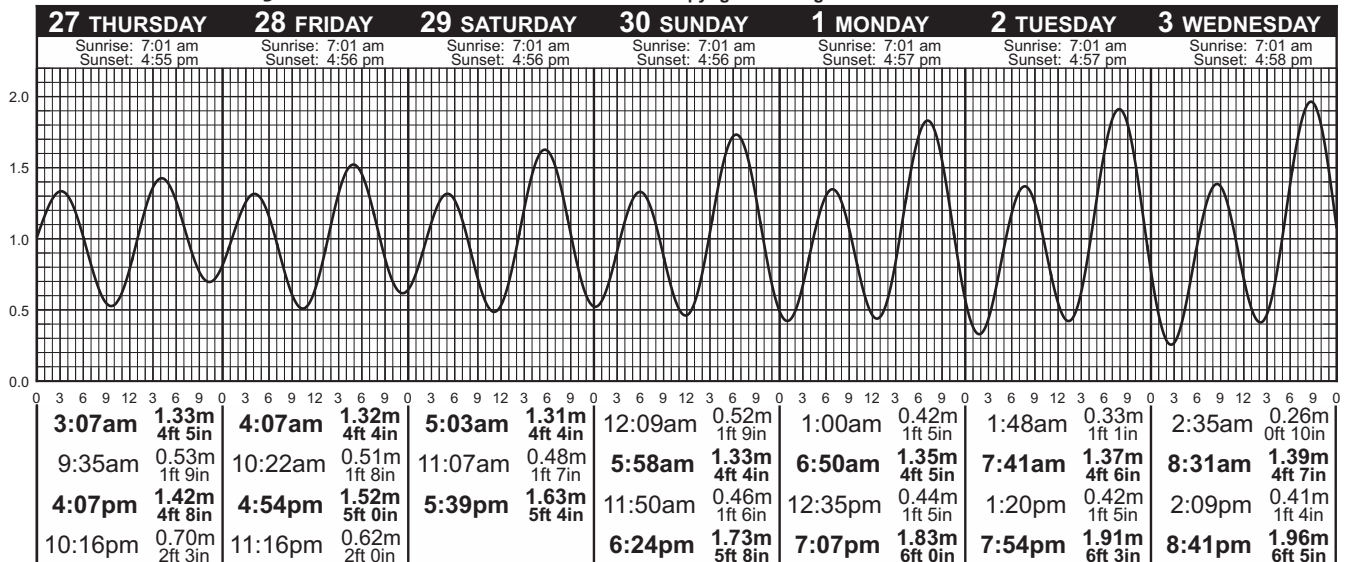
3rd Quarter Jun 25



# June 27 - July 3, 2019

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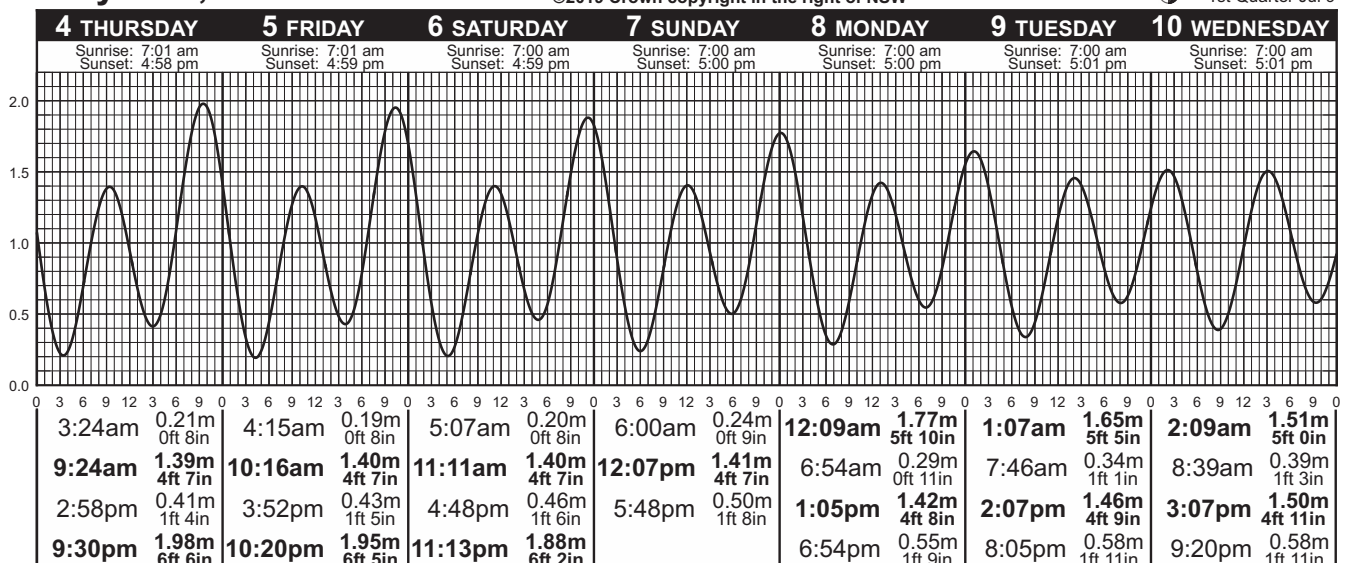
New Moon Jul 3



# July 4-10, 2019

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1st Quarter Jul 9

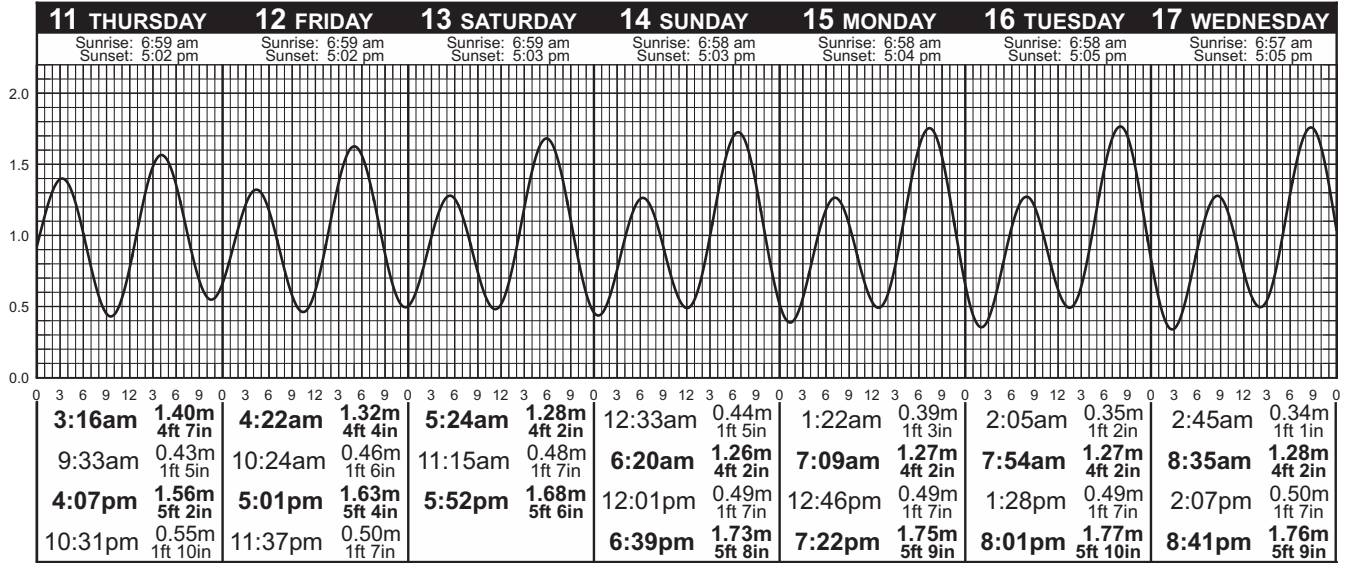


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# July 11-17, 2019

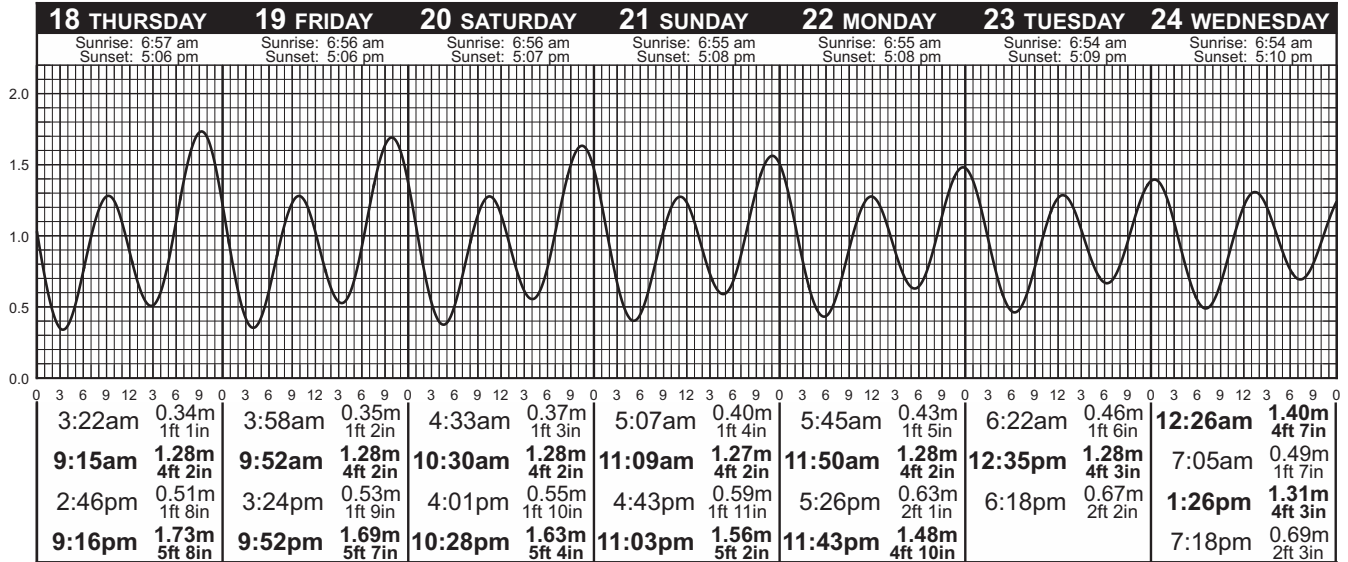
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○ Full Moon Jul 17



# July 18-24, 2019

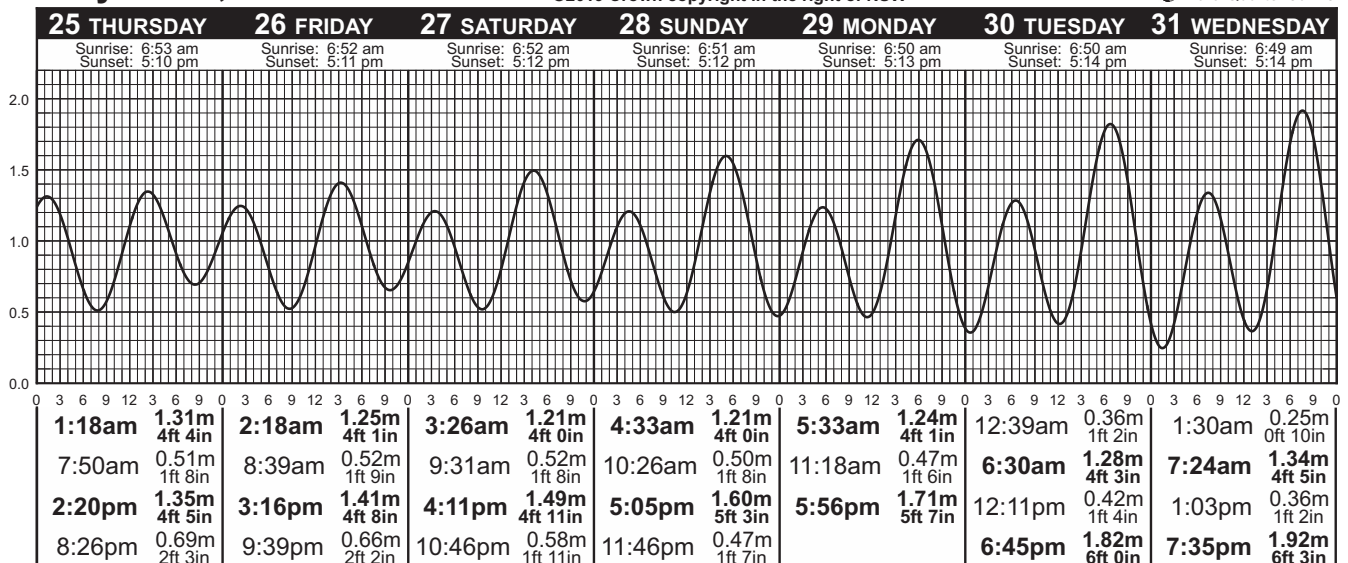
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# July 25-31, 2019

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● 3rd Quarter Jul 25

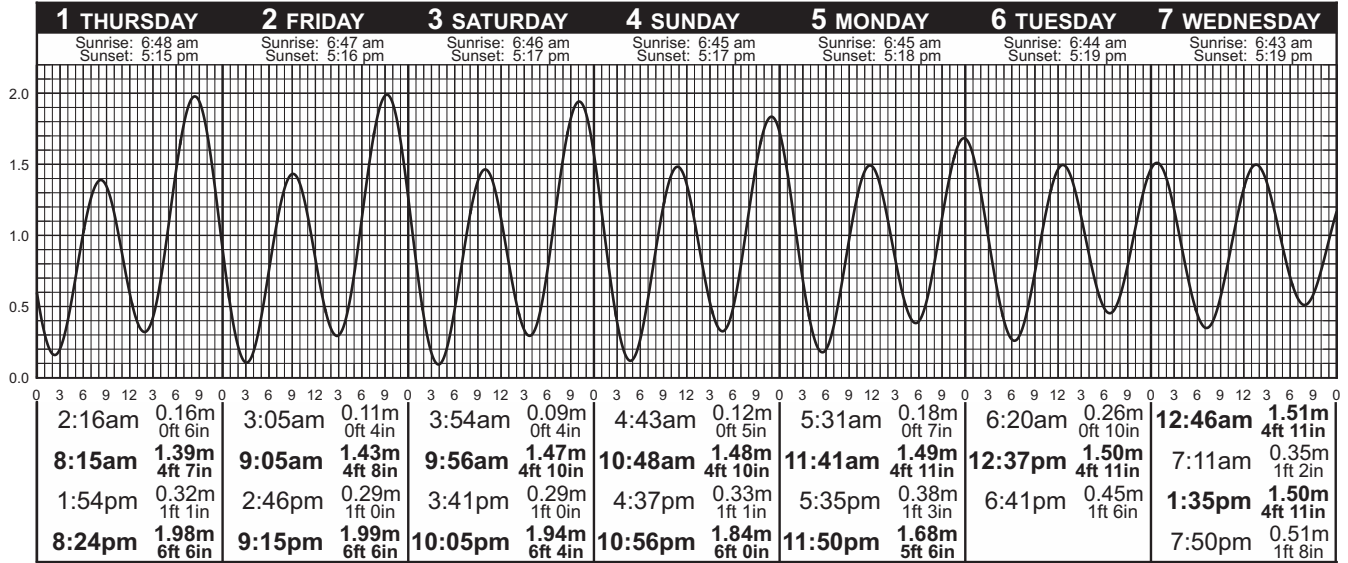


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# August 1-7, 2019

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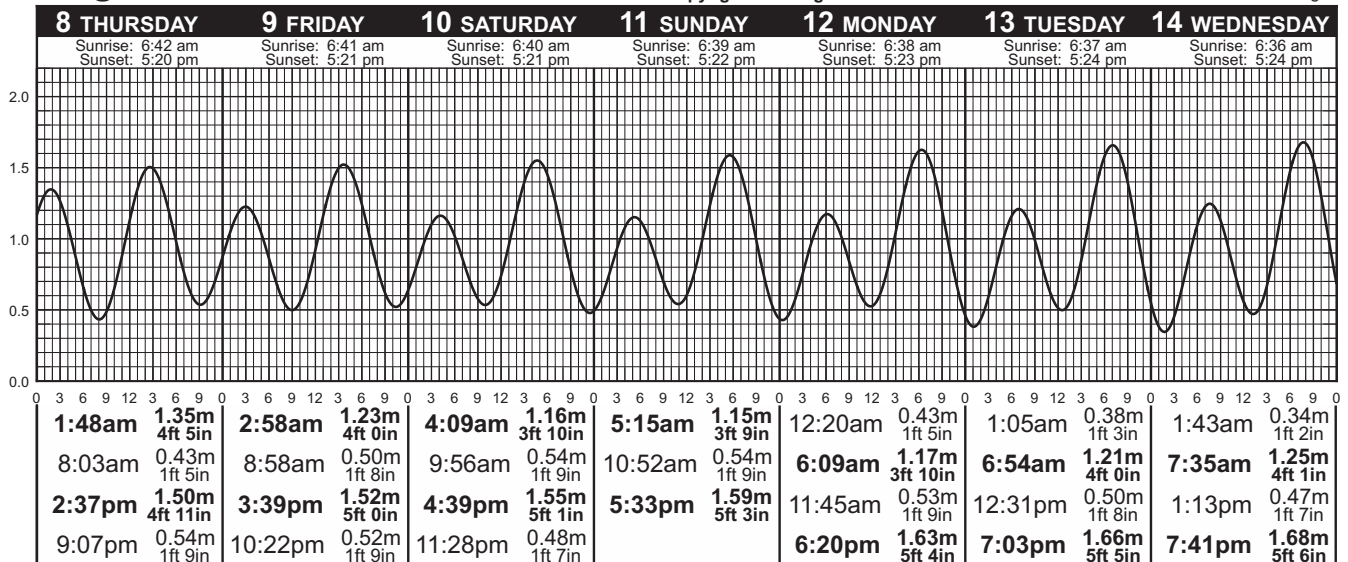
● New Moon Aug 1



# August 8-14, 2019

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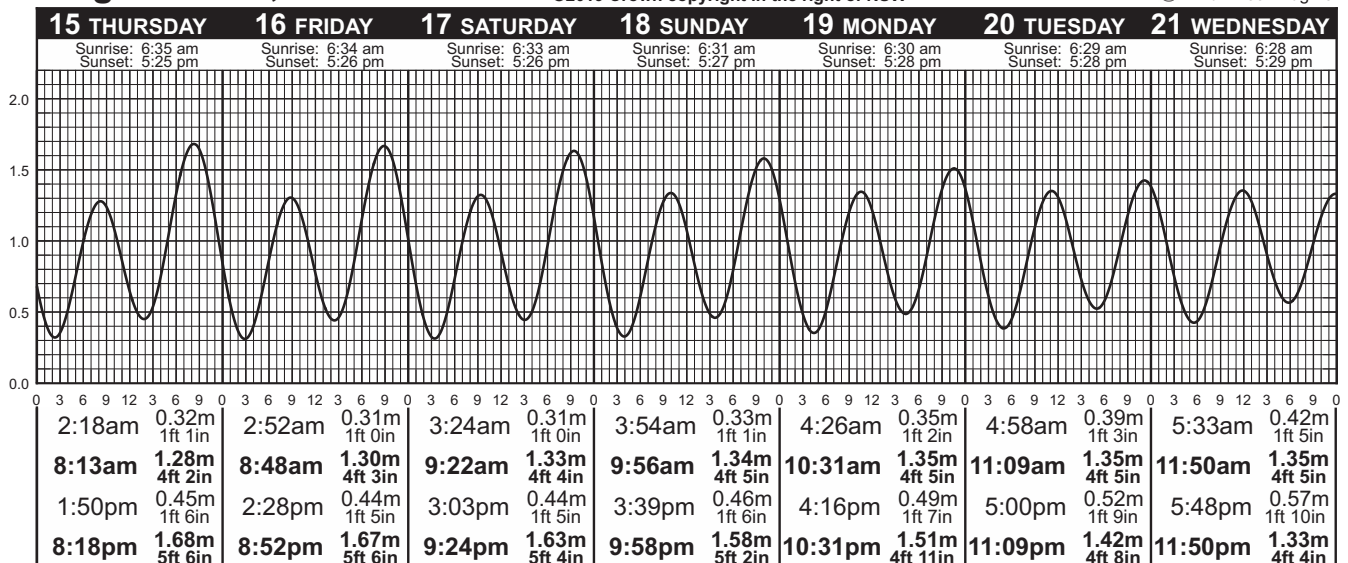
● 1st Quarter Aug 8



# August 15-21, 2019

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○ Full Moon Aug 15

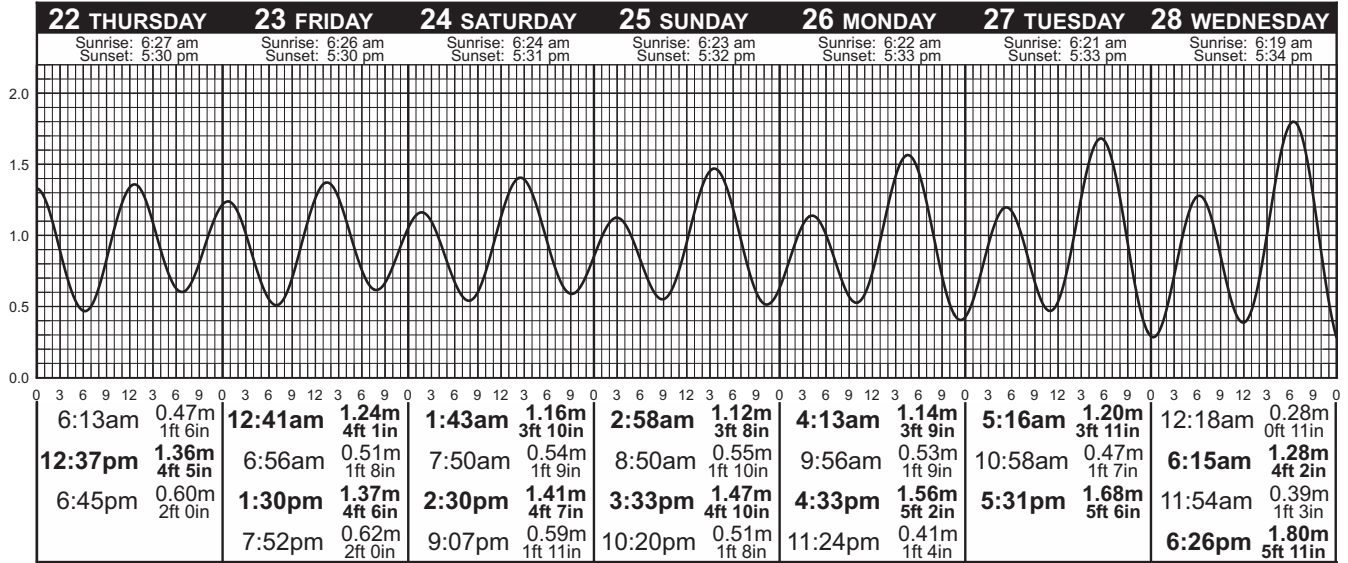


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# August 22-28, 2019

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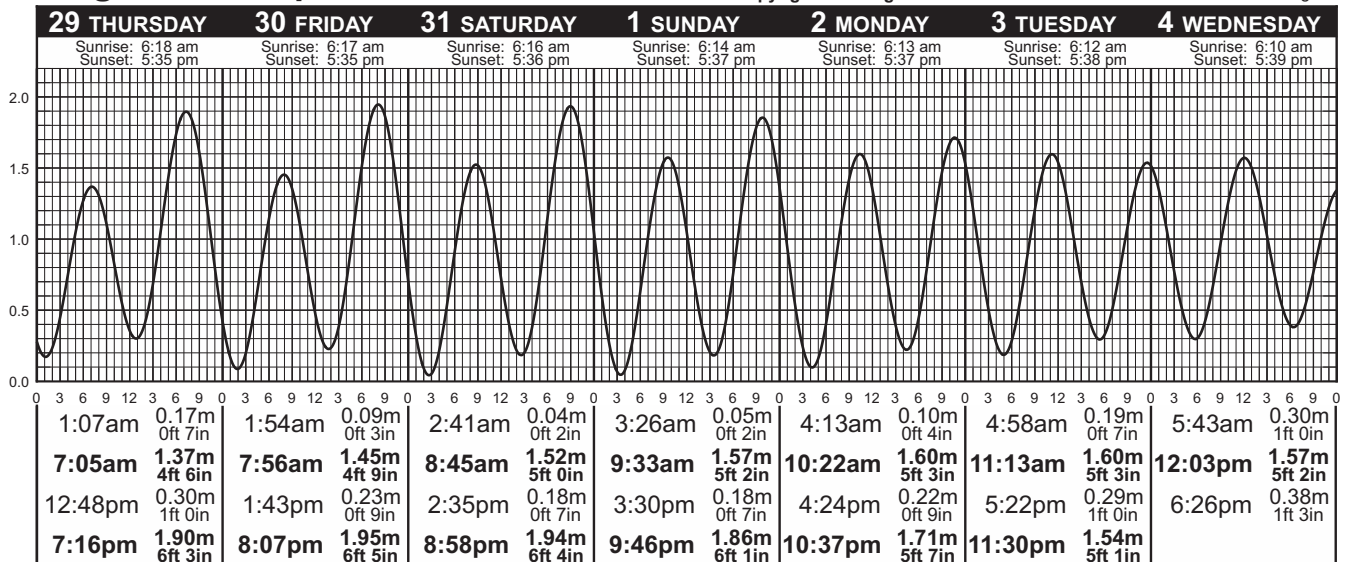
3rd Quarter Aug 24



# August 29 - September 4, 2019

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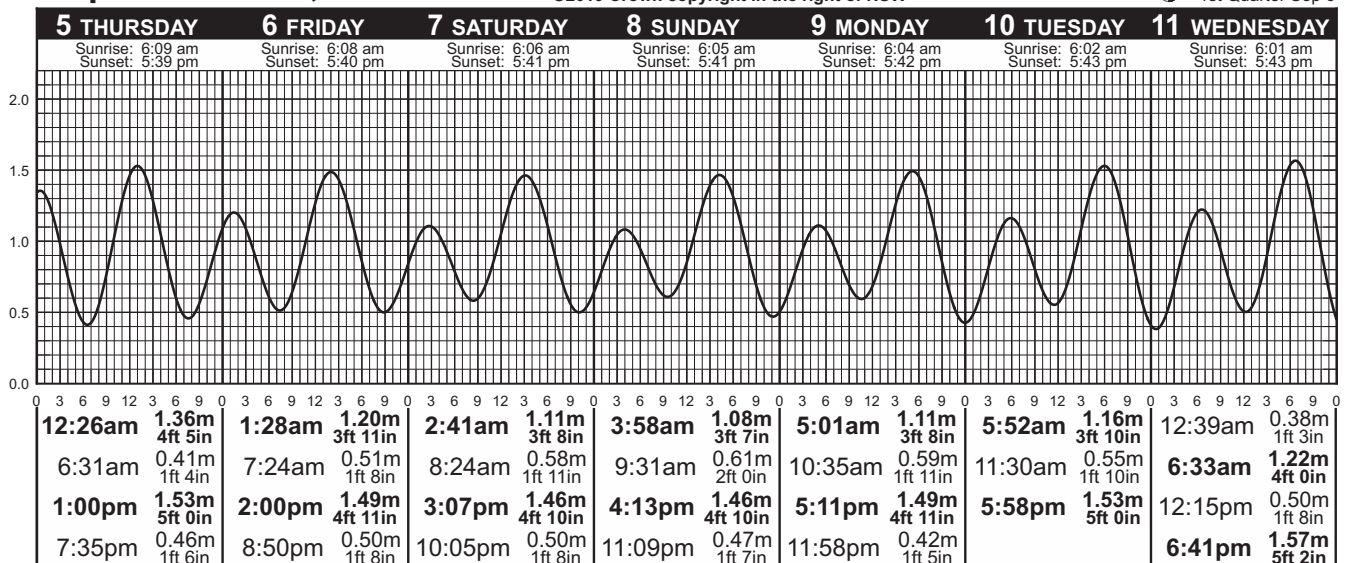
New Moon Aug 30



# September 5-11, 2019

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1st Quarter Sep 6

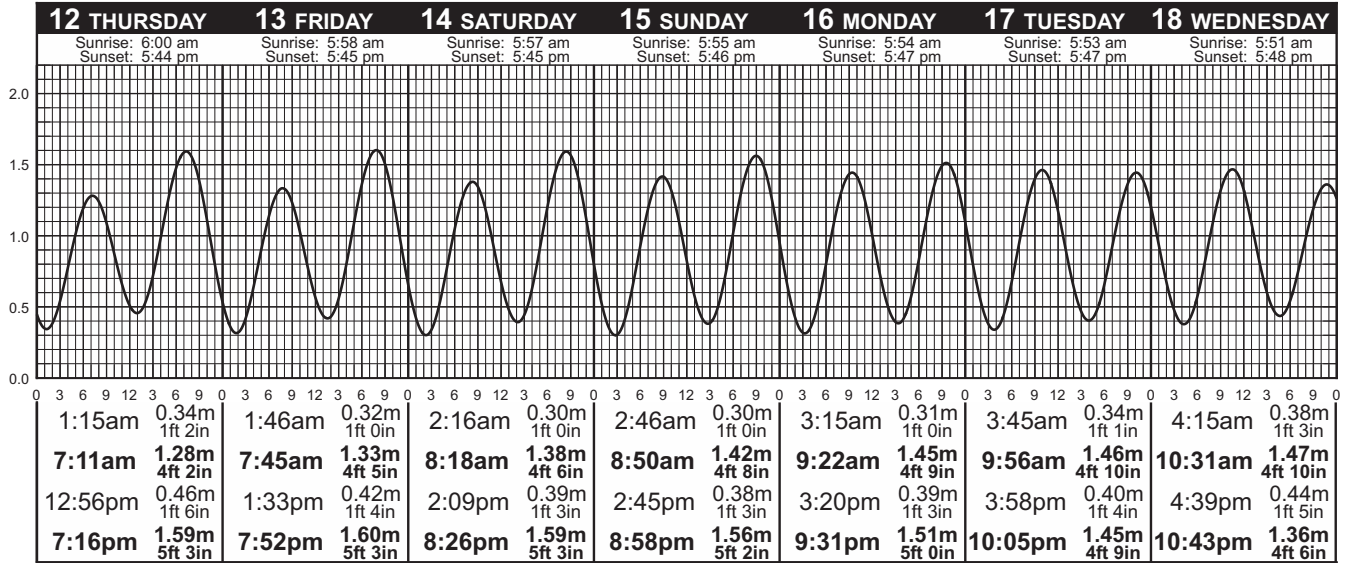


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# September 12-18, 2019

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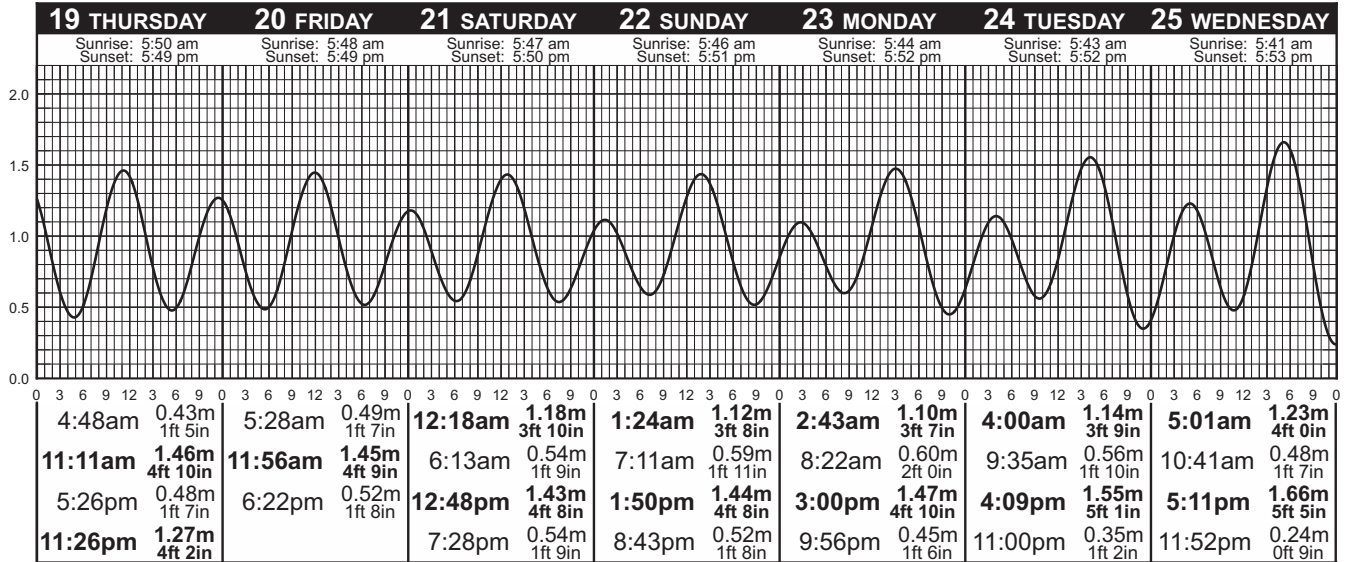
○ Full Moon Sep 14



# September 19-25, 2019

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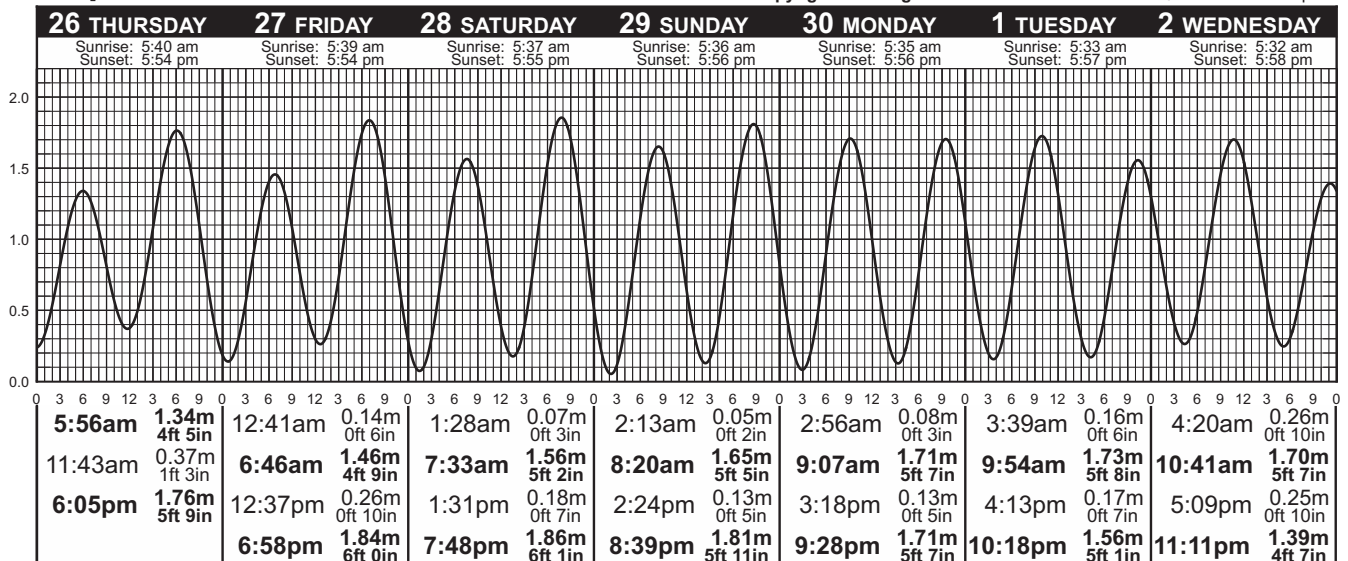
● 3rd Quarter Sep 22



# September 26 - October 2, 2019

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● New Moon Sep 29

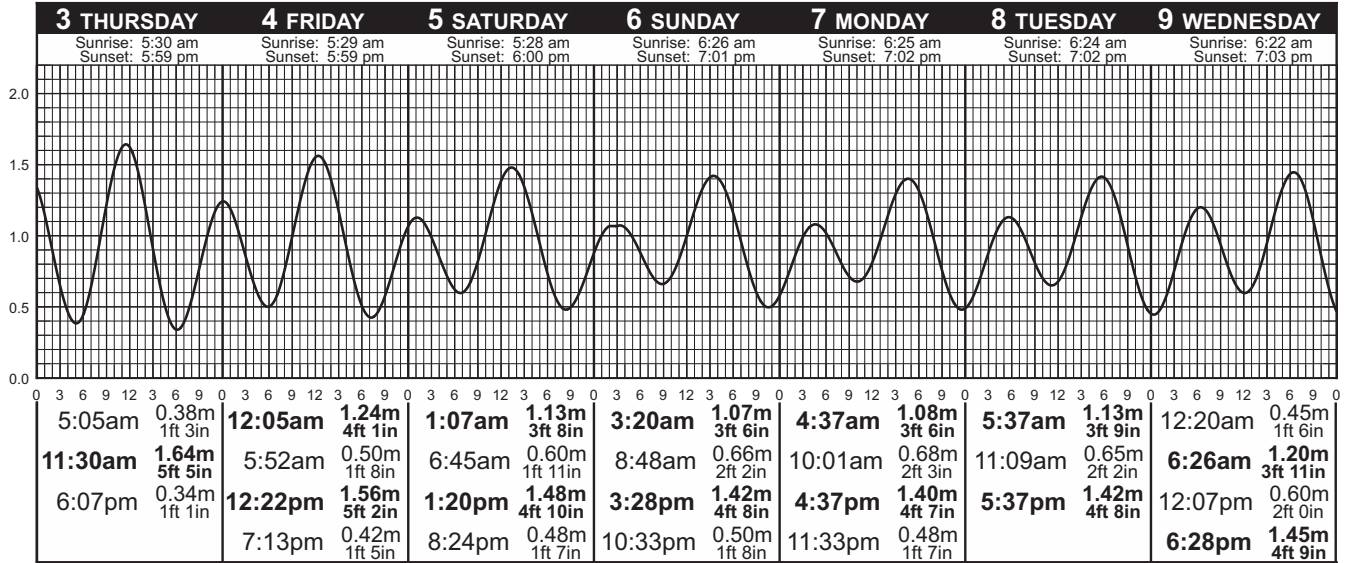


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# October 3-9, 2019

Daylight Saving Time adjustment starts Sunday October 6  
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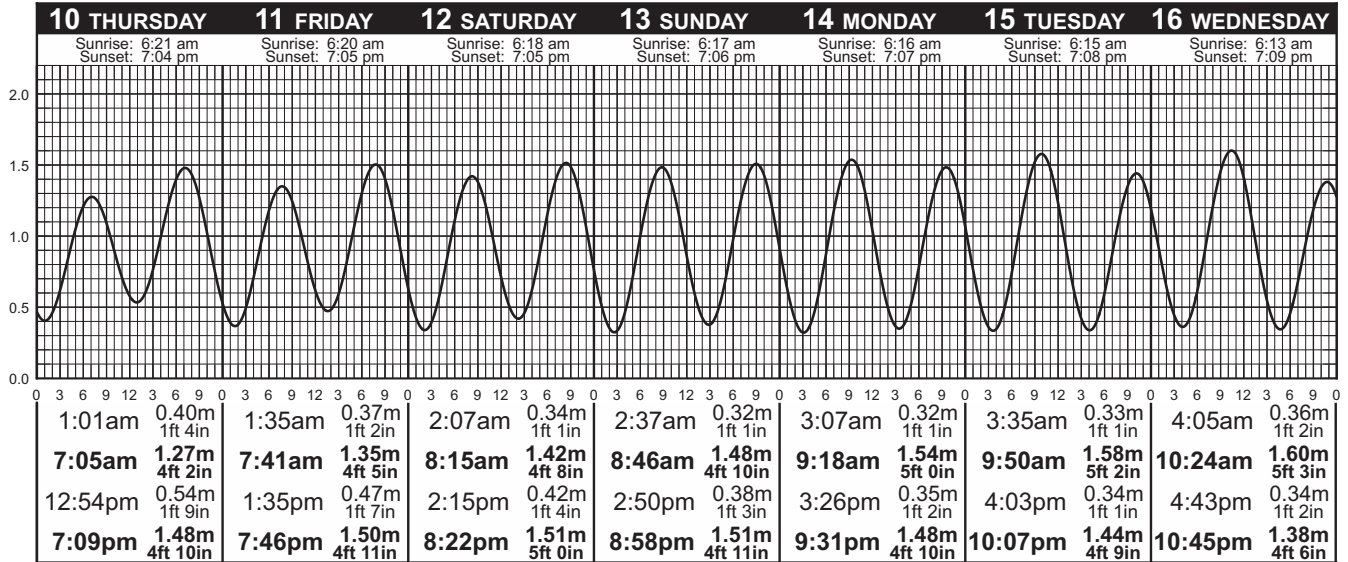
1st Quarter Oct 6



# October 10-16, 2019

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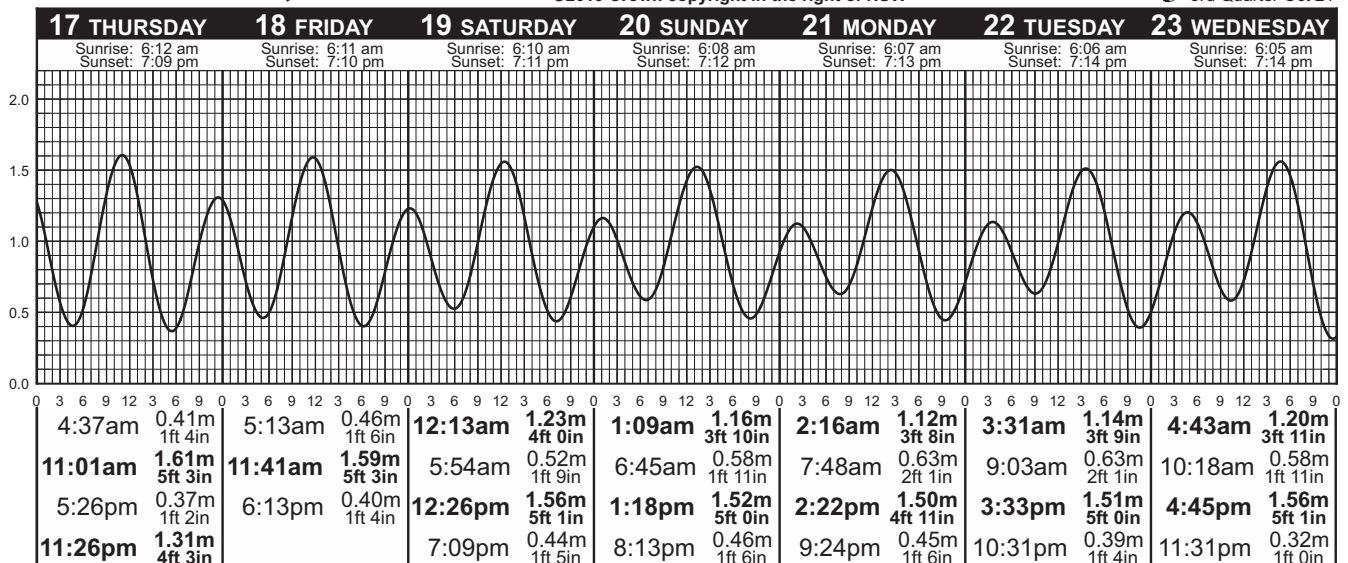
Full Moon Oct 14



# October 17-23, 2019

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3rd Quarter Oct 21

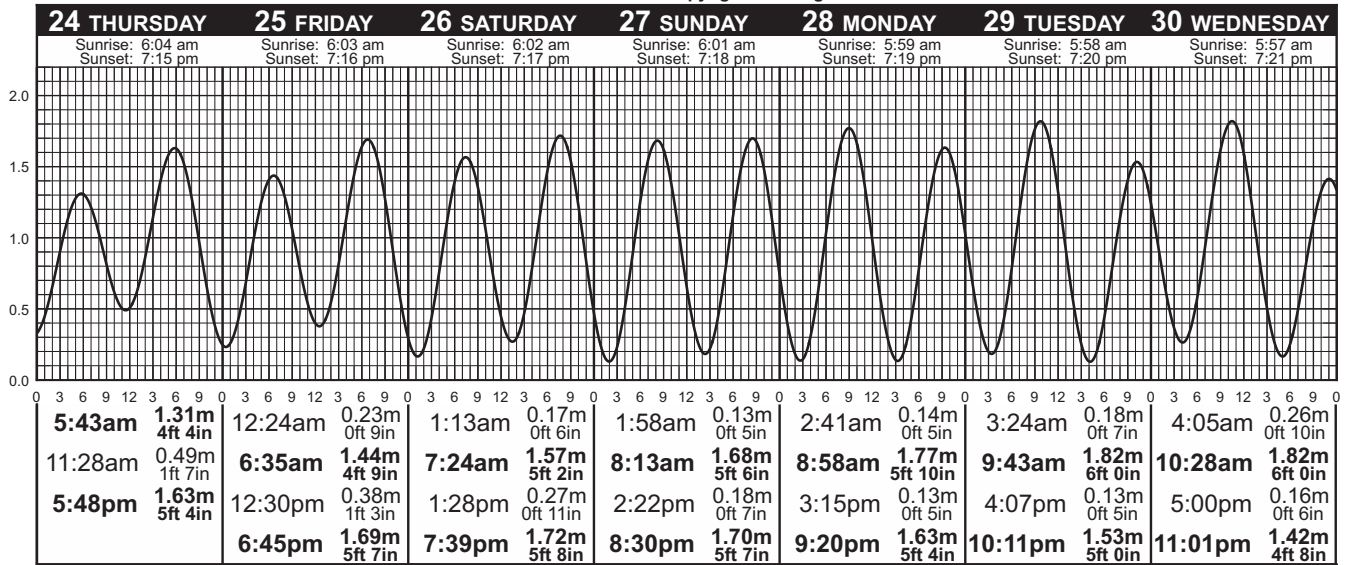


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# October 24-30, 2019

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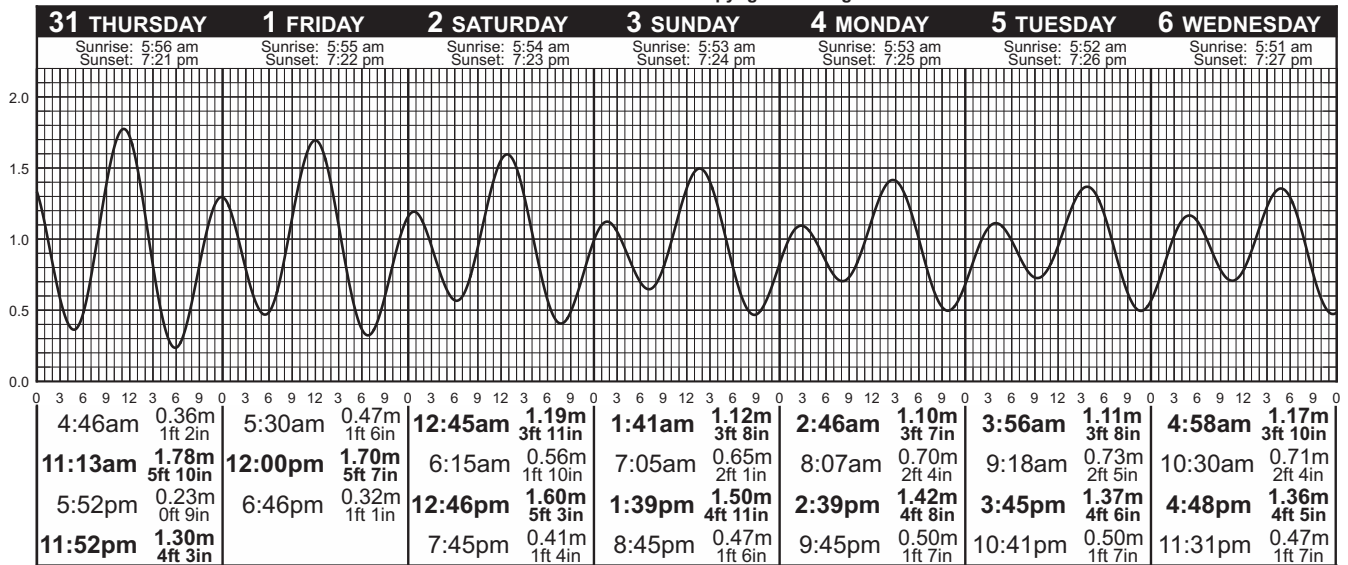
● New Moon Oct 28



# October 31 - November 6, 2019

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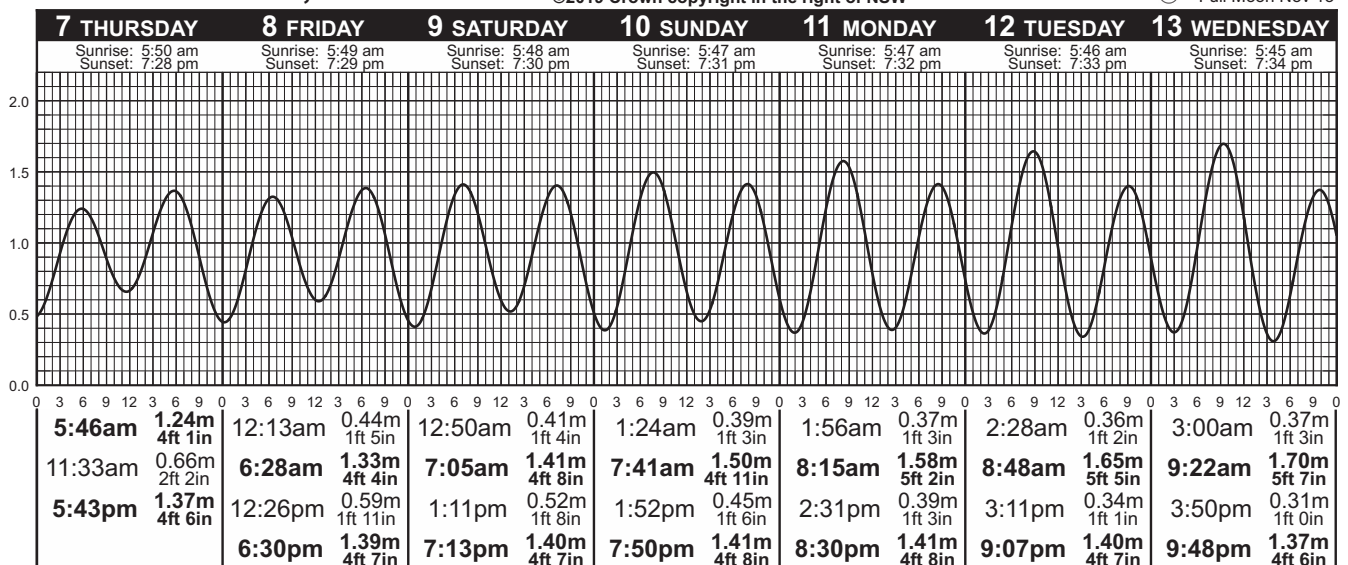
● 1st Quarter Nov 4



# November 7-13, 2019

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○ Full Moon Nov 13

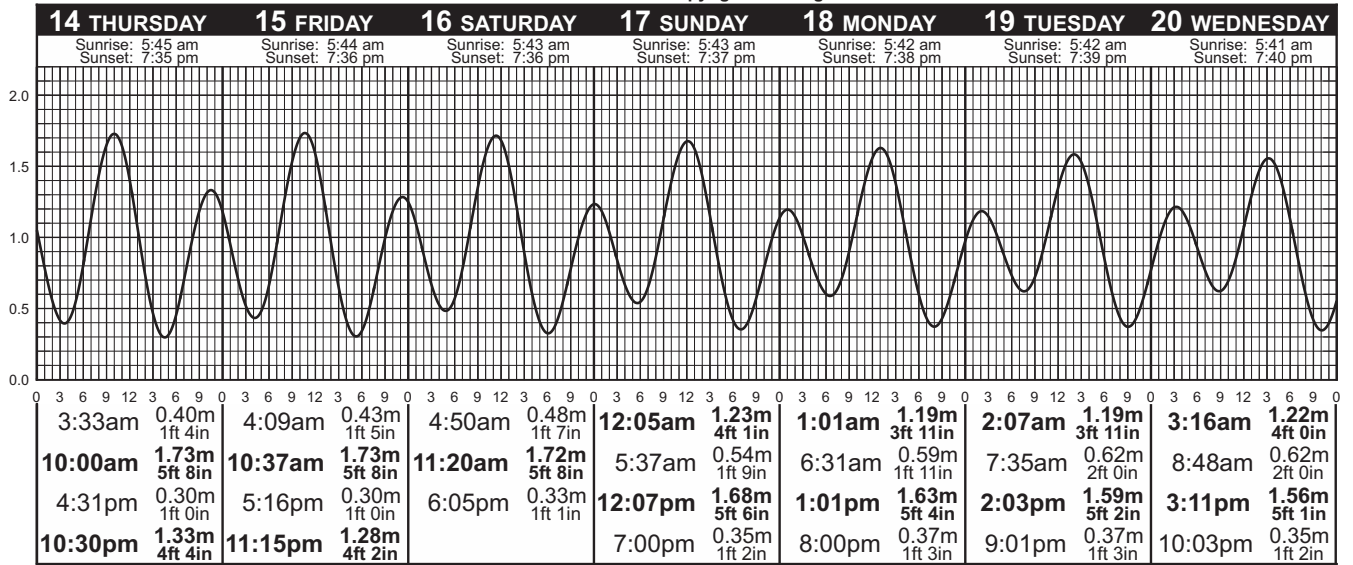


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# November 14-20, 2019

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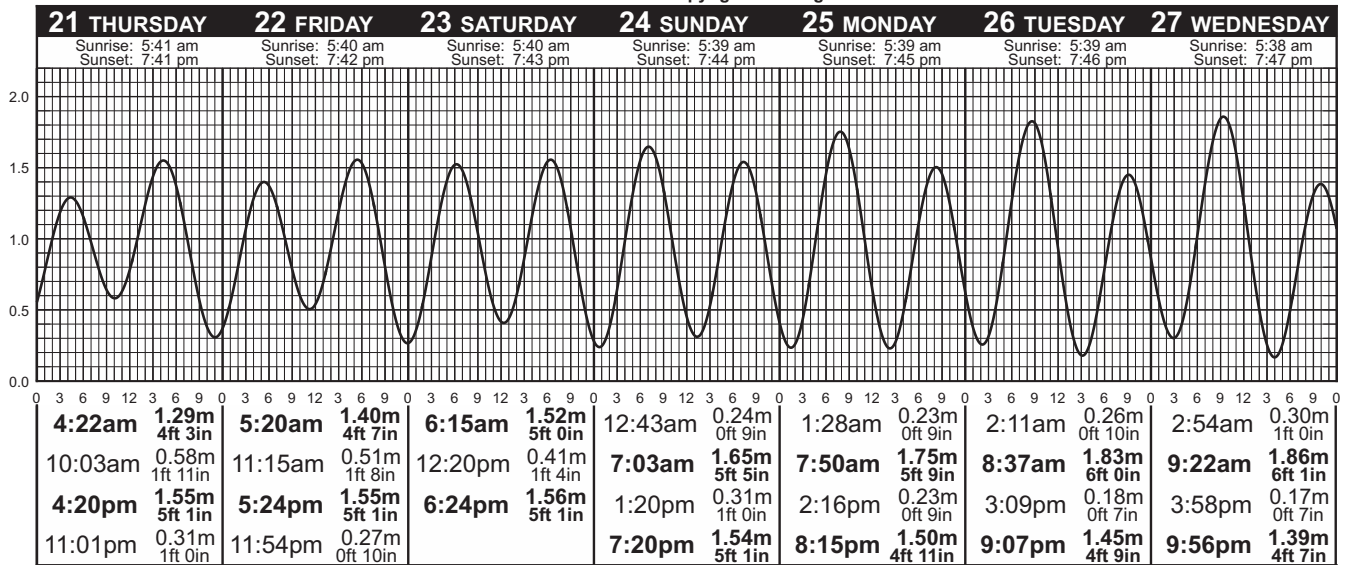
3rd Quarter Nov 20



# November 21-27, 2019

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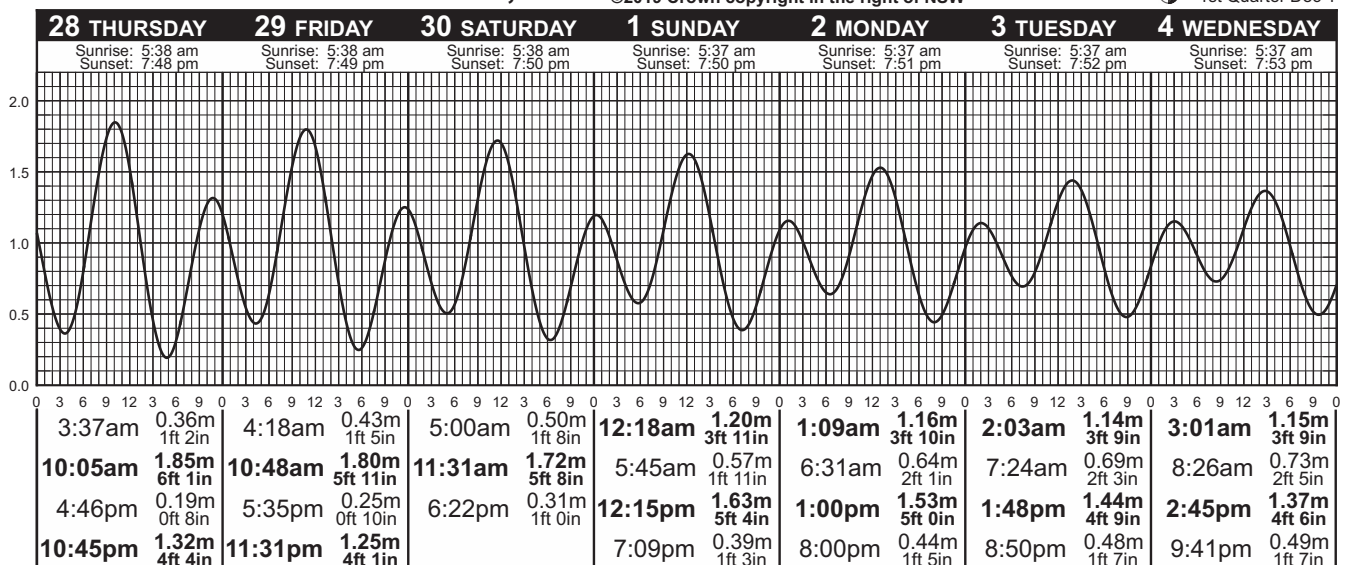
New Moon Nov 27



# November 28 - December 4, 2019

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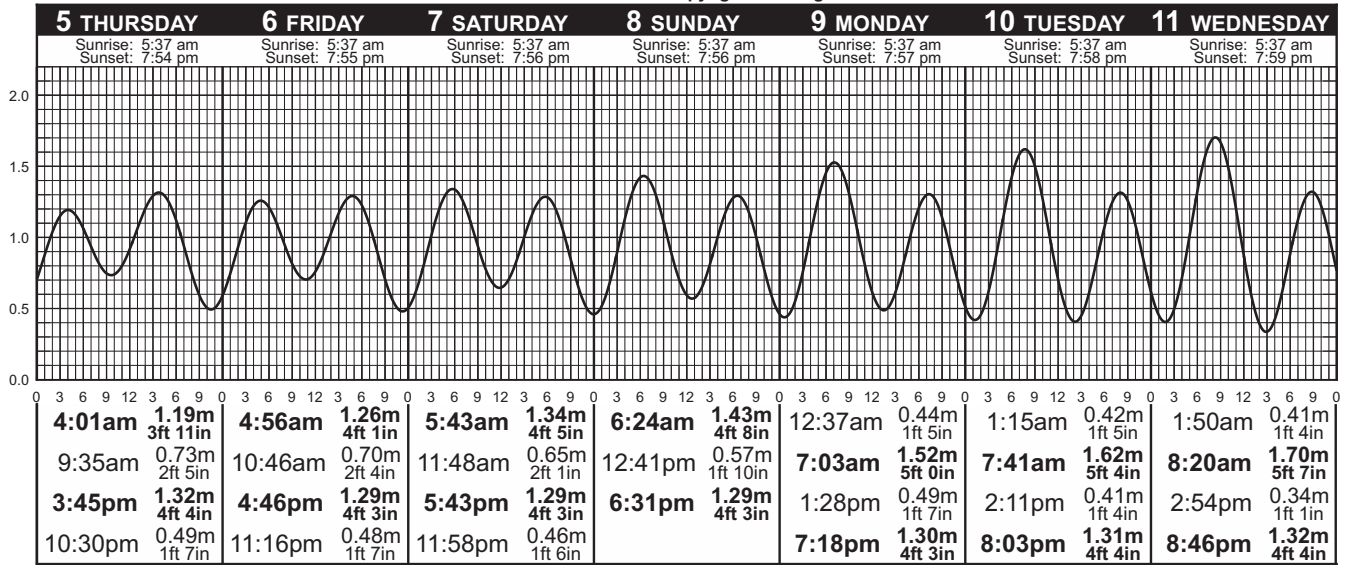
1st Quarter Dec 4



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# December 5-11, 2019

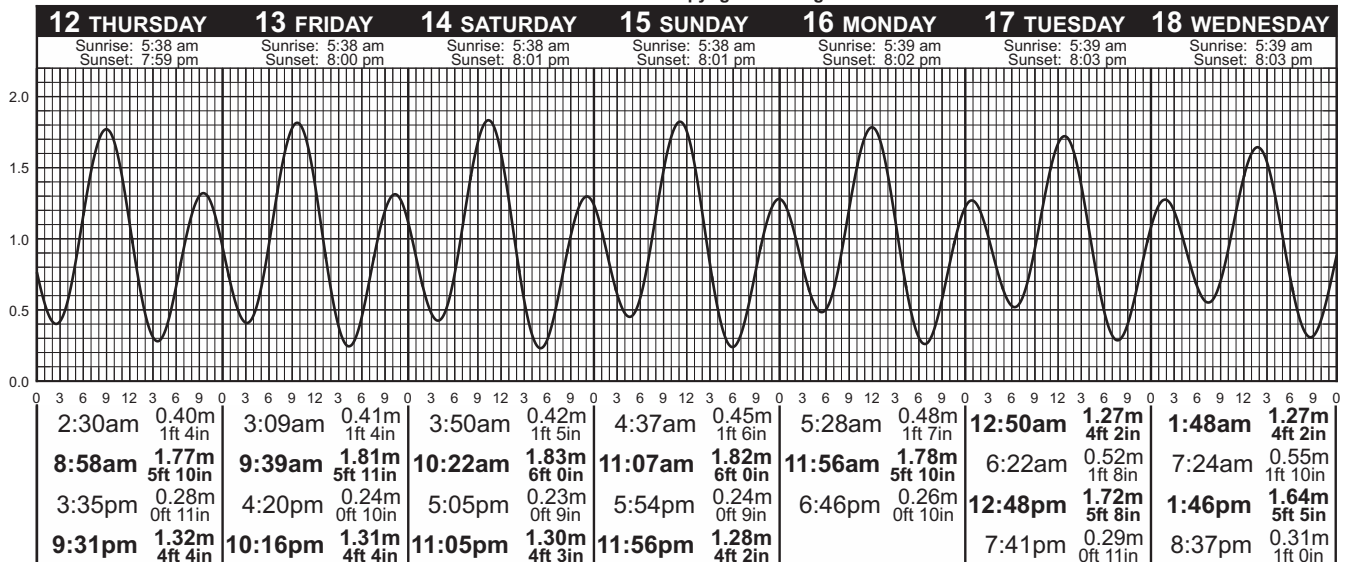
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# December 12-18, 2019

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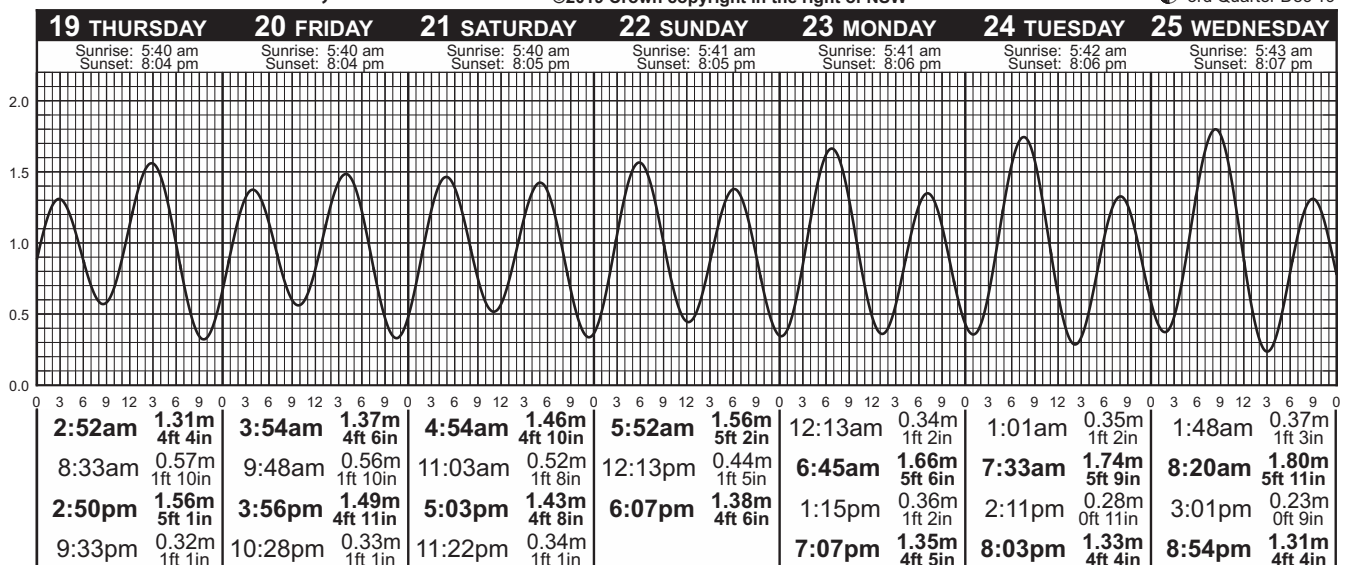
○ Full Moon Dec 12



# December 19-25, 2019

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● 3rd Quarter Dec 19

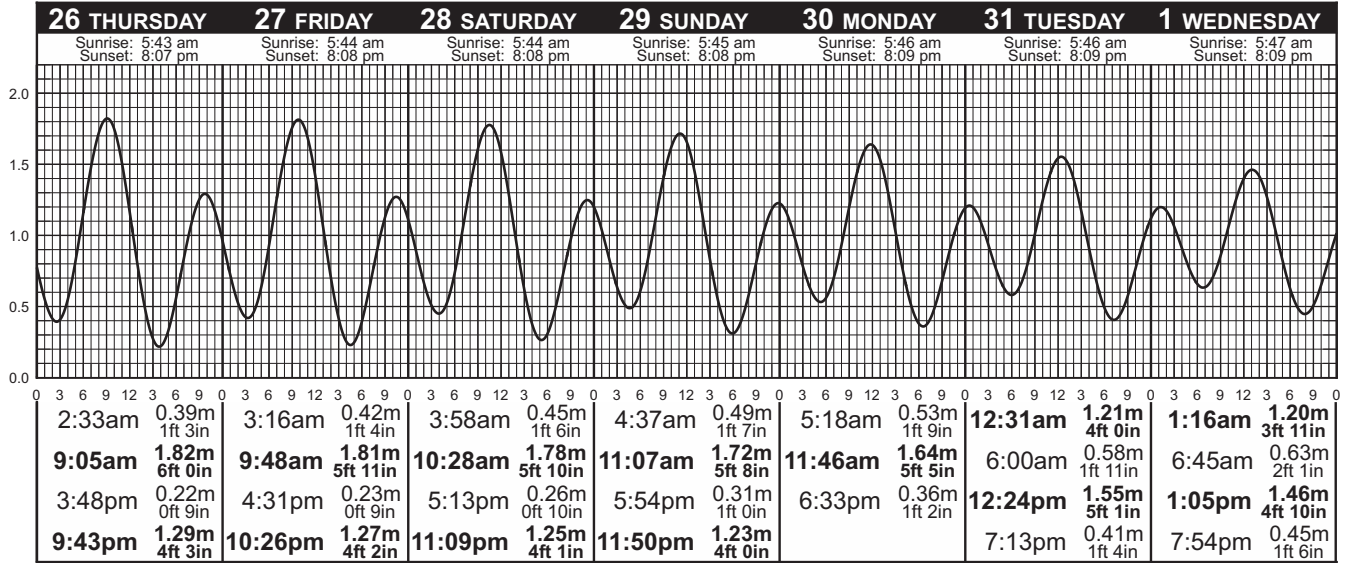


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# December 26 - January 1, 2020

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New Moon Dec 26



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# TIME DIFFERENCES FOR SECONDARY LOCATIONS

(\* Indicates secondary ocean location).

Secondary Locations have been grouped according to river basins or ocean locations listed from north to south down the New South Wales coastline – from the Tweed River Basin to the Far South Coast Region.

Add or subtract the appropriate hours and/or minutes listed here to adjust for the time difference between when high or low tide occurs at Middle Head, Sydney Harbour, and when the corresponding tide will occur at the secondary location. Lows will generally be later than highs.

LOCATION	HOUR:MIN
<b>Tweed River Basin</b>	
Tweed Heads, River Entrance	+0:04*
Greenbank Island	+0:40
Cave Point	+0:50
Barneys Point	+1:25
Tumbulgum	+2:35
Murwillumbah	+2:40
Caddys Island, Terranora Creek	+1:40
Cobaki Broadwater	+2:10
Birds Bay, Terranora Broadwater	+2:20
Kynnumboon, Rous Creek	+3:15
Kingscliff, Cudgen Creek Mouth	+0:17
<b>Brunswick River Basin</b>	
Brunswick Heads, River Entrance	+0:06*
Billinudgel, Marshalls Creek	+3:55
Mullumbimby	+1:10
<b>Richmond River Basin</b>	
Ballina, River Entrance	+0:07*
Byrnes Point Ferry	+0:30
Woodburn	+2:30
Highway Bridge, Tucombil Canal	+2:30
Floodgate, Evans River	+2:25
Coraki	+4:05
Lismore Airfield, Wilsons River	+5:10
Woodlawn College, Wilsons River	+6:05
Tuncester, Leycester Creek	+6:05
<b>Clarence River Basin</b>	
Yamba, River Entrance	0:00*
Palmer's Island, Palmer's Channel	+2:40
Macleay	+2:00
Brushgrove	+3:45
Grafton	+4:15
Wooli River Entrance	+0:12
Wooli Caravan Park	+1:40
<b>Coffs Harbour Region</b>	
Coffs Harbour Jetty	-0:07*
Highway Bridge, Coffs Creek	+1:50
Newports Creek Junction	+1:50
Boambee, Boambee Creek	+1:50
<b>Bellingen River Basin</b>	
Repton Railway Bridge	+1:30
East Bellingen	+2:10
Urunga Bridge, Kalang River	+1:45
West Newry Island, Kalang River	+2:05
<b>Nambucca River Basin</b>	
Stuarts Island	+1:10
Macksville	+2:00
Utungun	+2:40
<b>Macleay River Basin</b>	
South West Rocks (Kemps Corner)	+0:23
Smithtown	+2:10
Kempsey	+3:25
West Euroka	+4:05
<b>Hastings River Basin</b>	
Port Macquarie, River Entrance	+0:19*
Settlement Point	+0:50
Dennis Bridge	+1:25
Wauchope Railway Bridge	+1:55
Telegraph Point, Wilson River	+3:05
Green Valley, Maria River	+3:45

LOCATION	HOUR:MIN
<b>Camden Haven Basin</b>	
North Haven	+0:18
Laurieton	+0:45
West Haven, Stingray Creek	+1:00
<b>Manning River Basin</b>	
Crowdy Head, Harbour Marina	-0:02
Harrington	+0:11
Croki	+2:05
Taree	+2:25
Wingham	+3:45
Farquhar Inlet, South Channel	+1:50
<b>Wallis Lake</b>	
Forster, Harbour Entrance	+0:01*
Wallamba Island, North Tuncurry	+2:05
Tiona	+3:25
<b>Hunter River Basin</b>	
Tomaree, Port Stephens	+0:05*
Nelson Bay, Port Stephens	+0:30
Stockton Bridge	+0:20
Hexham Bridge	+1:10
Tea Gardens, Port Stephens	+1:30
Raymond Terrace	+1:55
Green Rocks	+2:20
Hinton Bridge, Paterson River	+3:25
Morpeth	+3:30
McKimms Corner	+3:40
Dunmore, Paterson River	+3:55
Maitland, Wallis Creek	+4:10
Paterson, Paterson River	+4:30
Maitland, Belmore Bridge	+4:50
Swansea, Lake Mouth	0:00*
Belmont, Lake Macquarie	+3:10
<b>Brisbane Water/Broken Bay</b>	
Ettalong	+0:40
Woy Woy Bridge	+2:15
East Gosford	+2:20
Little Patonga (Juno Point)	+0:09
Patonga	+0:10*
Newport Wharf, Pittwater	+0:08
Berowra Waters Ferry	+1:00
<b>Hawkesbury River</b>	
Gentlemans Halt	+1:00
Spencer	+1:10
Gunderman	+1:45
Wisemans Ferry	+2:25
Lower Portland	+3:10
Sackville	+3:55
Ebenezer	+4:50
Windsor	+5:40
Freemans Reach	+7:30
<b>Sydney Harbour</b>	
Roseville Bridge Marina	+0:03
Gladesville Bridge	+0:05
Ryde Railway Bridge	+0:12
Silverwater Bridge	+0:14
Homebush Bay	+0:23
<b>Georges River Basin</b>	
Canterbury Bridge, Cooks River	+0:40
Picnic Point	+1:10
Milperra	+2:15
Lansdowne Bridge, Prospect Creek	+2:25
Lansvale	+2:35
Irelands Bridge, Cabramatta Creek	+2:35
Warwick Farm	+2:45
Cabbage Tree Point, Port Hacking	+0:03*

LOCATION	HOUR:MIN
<b>Lake Illawarra Basin</b>	
Port Kembla	-0:01*
Lake Illawarra Entrance (Windang Caravan Park)	+0:16
Lake Illawarra, Koonawarra Bay	+3:16
<b>Shoalhaven River Basin</b>	
South Shoalhaven Heads	+0:55
Shoalhaven Heads Inlet	+1:05
Nowra Bridge	+2:00
Crookhaven River Entrance	+0:16
Greenwell Point, Crookhaven River	+0:40
<b>Jervis Bay</b>	
Huskisson	+0:08*
Captains Point	+0:01*
<b>St Georges Basin</b>	
Lumeah	+0:18
Sussex Inlet Coastal Patrol Jetty	+0:35
Talofa Caravan Park	+1:15
Island Point	+3:40
Lake Conjola Entrance	+1:35
Narrawallee Inlet	+0:45
Burrill Lake, Highway Bridge	+0:55

LOCATION	HOUR:MIN
<b>Batemans Bay</b>	
Snapper Island	+0:03*
Princes Highway Bridge	+0:20
Nelligen, Clyde River	+0:45
<b>Moruya River</b>	
Tuross River, West Tuross Head	+1:40
Moruya Quarry Wharf	+0:35
Moruya Hospital	+0:55
<b>Wagonga Inlet (Narooma)</b>	
MSB Boatshed/Jetty	+0:15
Narooma Old Municipal Wharf	+0:40
Apex Park Boat Ramp	+0:55
Princes Highway Bridge	+1:15
Barlows Bay	+2:00
<b>Far South Coast Region</b>	
Bermagui, Boat Harbour	+0:08*
Merimbula Wharf	+0:40
Bonnie Doon, Merimbula Lake	+2:40
Wallaga Lake Entrance	+1:40
Wallaga Lake, Regatta Point	+2:50
Tea Tree Point, Pambula Lake	+1:10
Eden, Fishing Co-operative Jetty	+0:08*

# LEADERS IN WATER, COASTAL AND ENVIRONMENTAL SOLUTIONS

Manly Hydraulics Laboratory is a business unit within the Government and Corporate Services Division of the Department of Finance, Services and Innovation.

MHL provides specialist services in the areas of water, sewer, stormwater, irrigation, coastal and environmental solutions including physical and numerical modelling investigations and delivery of extensive data collection programs.

## **Environmental Data Capture**

weather, tides, waves  
water levels, flows, water quality  
oceanographic monitoring

## **Investigations**

beach erosion and foreshore protection  
ports, harbours and breakwaters  
offshore and coastal structures  
rivers, floodplains, dams and fishways  
bridges and river training works  
water supply and wastewater systems  
water quality, effluent management and stormwater  
pumps, flows in pipes and open channels  
NATA and NMI accredited meter testing (AS17025)

## **Environmental and water quality engineering**

## **Development of specialised instruments and logging systems**




**Manly  
Hydraulics  
Laboratory**

110B King Street  
Manly Vale NSW 2093  
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**Today's Conditions** 


**Ocean Wave** 


**Sea Temperature** 

**Ocean Tide** 

**Water Level** 

**Rainfall** 

**Water Quality** 

**Barometric** 

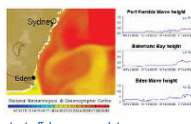
**Capabilities / Services**

### NSW Ocean Wave Data Collection Program

The wave data presented online by MHL has been collected under the NSW Coastal Data Network Program managed by the Office of Environment and Heritage (OEH). For more information on coasts, estuaries and floods visit: [environment.nsw.gov.au](http://environment.nsw.gov.au).

MHL collects offshore wave data at seven continuously recording sites off the NSW coast. The ocean wave monitoring sites are based on the Waverider buoy system developed by the Dutch company, Datawell. Waverider buoys are located off Byron Bay, Coffs Harbour, Crowdy Head, Sydney, Port Kembla, Batemans Bay and Eden. To provide deepwater wave data, the buoys are typically moored in water depths between 70 and 100 metres, between 6 and 12 kilometres from the shoreline.

#### Ocean Wave Links




Latest offshore wave data »»

#### Station Data Pages

- »» Byron Bay
- »» Coffs Harbour
- »» Crowdy Head
- »» Sydney
- »» Port Kembla
- »» Batemans Bay
- »» Eden

[www.mhl.nsw.gov.au](http://www.mhl.nsw.gov.au)






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Coasts and floodplains


- Coastal zone management 
- Coastal erosion management
- Coastal management reforms 
- Coastal management documents

**Estuaries of NSW** 

**Summary of physical characteristics**

Coastal protection regulation

Floodplains 

Coastal, estuary and floodplain management grants 

NSW Coastal Panel

Marine estate reforms

Home > Coasts and floodplains > Coastal zone management > Estuaries of NSW > Summary of physical characteristics

## Estuaries of NSW: Physical characteristics, tidal surveys and hydrographic surveys

A range of physical characteristics for each estuary listed, including their location and size is provided. Many estuaries have also been subject to tidal surveys and/or hydrographic surveys that may cover part or all of an estuary. The link will provide a listing of available tidal survey reports and a map detailing the most comprehensive survey. Hydrographic survey map sheets and data are also provided.

Estuary (north to south)	Physical characteristics	Hydrographic survey	Tidal prism measurements and tidal survey reports
Tweed River	✓	✓	✓
Cudgera Creek	✓	✓	✓
Cudgera Creek	✓	✓	✓

[www.environment.nsw.gov.au/estuaries/list.htm](http://www.environment.nsw.gov.au/estuaries/list.htm)