

The definition of tides from Wikipedia <http://en.wikipedia.org/wiki/Tide> Tides are the rise and fall of sea levels caused by the combined effects of the gravitational forces exerted by the moon, sun and the rotation of the earth.

One of the questions one must ask is: What are the key causes and why are there tide variations from day to day?

Generally there are four different tide changes for each 24 hour day of the month: High Tide, Low Tide, High Tide, Low Tide with each tide change being approximately six hours apart. This is the usual tide pattern for any given 24 period, however, for some locations there may only be one high and low tide each day.

The contributing factors for tide change are the centrifugal forces of the earth and moon rotation around each other and the gravitation forces of the moon and sun on the earth. Also the forces can be greater or lesser depending the distance of the earth from the sun and moon. For a much more detailed scientific analysis of tide actions go to the following website: Our Restless Tides <http://co-ops.nos.noaa.gov/restles1.html> *This site provides a brief explanation of the basic factors which produce tides.* There are five short chapters with diagrams and a explanation of the effects that time, distance, moon, sun and the earth's rotation has on coastal tides. Good site.

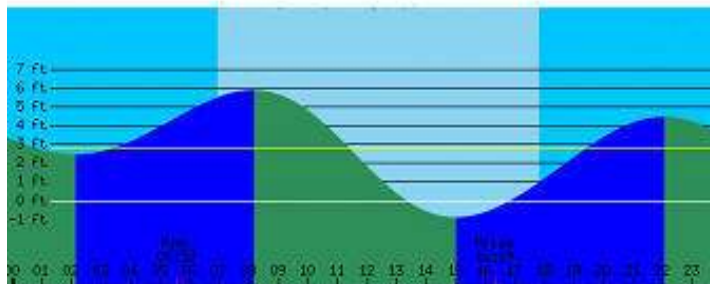
The best way for a detectorist to gain real time tide knowledge for their area is to acquire a set of tide tables for the salt water beach areas that are of interest. Most tide tables will provide the detectorist with all of the information required to having a greater chance of detecting valuable finds.

How to read tidal information?

Tide Chart

36.9667° N, 122.0167° W

2011-02-16	02:07 PST	2.44 feet	Low Tide
2011-02-16	05:32 PST		Moonset
2011-02-16	06:55 PST		Sunrise
2011-02-16	08:08 PST	5.87 feet	High Tide
2011-02-16	14:59 PST	-0.90 feet	Low Tide
2011-02-16	16:19 PST		Moonrise
2011-02-16	17:49 PST		Sunset
2011-02-16	22:02 PST	4.45 feet	High Tide



To the left is a typical tide table found on the web. Usually it will display the city name, in some cases a GPS co-ordinance, date, time (24 hour clock), time zone, the high and low tides for each 24 hour period with sunrise & sunset times.

The high and low tides are recorder in feet from relative mean sea level which is a zero level. A low tide may exhibit a negative number (i.e.: -0.9 feet) this will be the lowest point of the tide and will occur at a specific time (i.e.: 14.59 PST in the table) this tide is negative or minus relative to mean sea level. High tides are recorder in feet with a positive number so at 08:08 PST the tide is +5.87 feet above relative mean sea level.

The graph on the left represents the table data overlaid on a 24 hour clock period that is placed on the graphic bottom (x-axis) on the left side (y-axis) is the measurement in feet (ft). The graph displays the

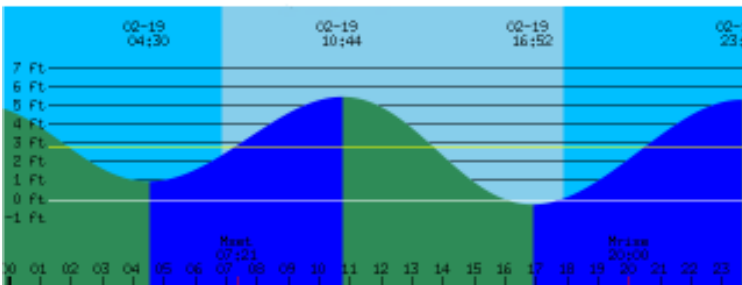
four tides during a 24 hour period for a beach. Generally the best metal detecting takes place at the 24 hour period lowest tide.

Also note that one low tide is +2.44 ft and the other low tide is -0.9 ft and the high tides are also not equal with the highest tide at +5.87 ft and the other high tide at +4.45 ft. This is the result of the gravitational forces and the distances of the moon from the earth in the 24 hour period plus other factors.

Tide Chart

2011-02-19 04:30 PST 0.94 feet Low Tide
 2011-02-19 06:52 PST Sunrise
 2011-02-19 07:21 PST Moonset
 2011-02-19 10:44 PST 5.45 feet High Tide
 2011-02-19 16:52 PST -0.29 feet Low Tide
 2011-02-19 17:52 PST Sunset
 2011-02-19 20:00 PST Moonrise
 2011-02-19 23:36 PST 5.30 feet High Tide

Take a few minutes to compare the two tide charts in this article. The first item to note is that they appear slightly different during the 24 hour period. The dates on the charts are three days apart and the 02-16 first low tide is at 02:07 am, in the second chart on 02-19 the first low tide to 04:30 am. The low tide has moved in time 2 1/2 hours in three days. Plus the second low tide on 02-19 a -.29 ft low tide. So time is a critical element in reading tidal information.



There are also changes to the other tides from the 02-19 chart as compared to the 02-16 chart. This is why it is necessary to acquire a tide chart booklet or tide tables before doing any salt water beach

detecting. Tidal changes take place each day of the month and at certain times of the month there are extreme low tides which contribute to greater beach sand exposure and shallower shore line waters.

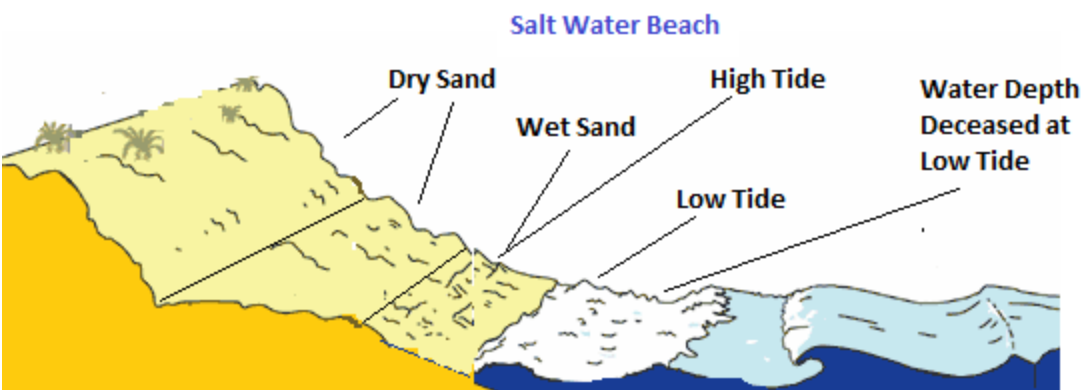
Where to get tide information? You can usually purchase annual tide booklets in or near the area that you plan to metal detect or you can go online and select one of the web site URLs below and get tidal information for most of the coastal regions in the U.S.

NOAA Tide Predictions http://tidesandcurrents.noaa.gov/tide_predictions.shtml

Regions with Tide Predictions <http://www.saltwatertides.com/pickpred.html>

WWW Tide and Current Predictor <http://tbone.biol.sc.edu/tide/>

Why is it necessary to consider tidal information for salt water beach metal detecting?



Another effect on tide change is the distance your beach area is from the equator. The greater the distance from the equator the greater the tide change between high and low tide.

Tide Change Examples.

Alaska +13 ft to -1.5 ft
North CA +6 ft to -1.6 ft
Florida +3.5 ft to -.4 ft
Mass. +11 ft to -1.8 ft

Finally there are only a few good days in the month to metal detect low tides so it is essential to keep reviewing tide tables to find the best days for each month. The understanding and knowledge of tide times, tide heights and tide lows can be very important to any salt water beach detectorist. This knowledge can contribute to a greater chance of detecting interesting and valuable finds while at the beach.

The beach. There are basically three sections to any beach: dry sand, wet sand and sand under the water. This article will not address the dry sand portion of the beach since the article is primarily focused on the tidal area of the beach. The tides have the greatest effect on the wet sand and beach sand under the water. Tide changes either increase the water level depth at the shore line or reduce the water level depth at the shore line. Tide changes can also expose more beach sand.

High tides. There are some benefits to detectorist from high tides. Probably the most important benefit is that if the high tide takes place during the recreational daytime, people are swimming, playing water tag, etc.,. This puts beach goers that are in the water closer to the shore line because of the additional water depth. This is important to note since at low tide the beach area that was under water at high tide may now be wet sand at the extreme low tide (minus tide). Thus detecting the wet sand can be very productive for valuable finds that may have been lost during high tide water activities. Also high tides can erode sand from the beach crest and blanket area. This erosion can pull lost coins, jewelry and other items from the beach crest sand and place the lost items on the wet sand slope of the beach which now can be recovered by the detectorist at low tide without going into the water.

Low tides. The low tide area has many positive attributes for the detectorist. The detectorist should always be looking for the extreme low tides which are usually a minus tide (-1.5 ft or greater) if you are in the northern portion of the U.S.

- 1) The low tide exposes sand that was previously under water at the high tide. This is important in a couple ways. The detectorist does not have to be water detectorist to get at item lost in the water since the low tide exposes much of the high tides water portion of the beach now as wet sand. If you are a water detectorist the low tide makes its much easier to detect further out into the salt water beach area since the water depth has decreased.
- 2) The low tide sand area is where most of the beach activity takes place. So this is where you will probably find most of the lost jewelry. Also the low tide will expose the following beach characteristics: more of the beach slope, cuts created by a high tide, scallops on the slope, troughs, ripple cuts, flat spots, rock, pebble and shell areas, etc.

Another interesting beach characteristic is the wet line mark on the beach slope at low tide. This wet line mark is usually the result of the high tide. This mark represents where the high tide hit the beach and broke apart. It can be beneficial to metal detect this area. This wet line mark will run parallel to the beach crest and shore line.

Each of these beach characteristics can provide different age factor finds. How to detect each of these different beach characteristics is a discussion for another article.

You will also find a lot of information on beach characteristics in: [Overview of Metal Detecting Saltwater Beaches](http://www.mdhtalk.org/tutorials/md-beaches.htm) on the MDHTALK website - <http://www.mdhtalk.org/tutorials/md-beaches.htm>

3) Low tides allow the water detectorist to go further out into the salt water beach area. Many people swim and play water activities in very deep water. Low tides reduce water depth thus providing the opportunity to detect this area with simpler water detecting gear.

So when should a detectorist hit the beach to maximize finds?

Low tide. The suggestion is to start detecting a low tide if it is either a zero (+ - 0 ft) or minus tide two hour before and after the low tide mark for a total of three - four hours. This is detecting the tide as it moves down the beach slope and detecting the tide as it moves backup the beach slope towards the high tide mark.

High tide. The suggest for a detecting a high tide is to detect the area below the high tide crest two - three hours before the crest of the high tide. The area to detect is the wet sand on the beach slope just below the high tide mark. This can be productive if the previous high tide did any erosion of the beach crest.

Other actions that can influence tides.

Storm surges caused by hurricanes and other major storms can cause high tides to be much greater in strength and therefore cause a good deal of beach erosion providing that these surges occur in conjunction with the high tide.

High on shore winds can also contribute to greater high tide crest resulting in beach erosion.

Remember to.

- 1) Read the beach for the best place to start your detecting experience.
- 2) Always dig all targets at the beach.
- 3) Listen for those faint target sounds.
- 4) Slow down and keep your coil level and on the sand.
- 5) Respect other beach goers.
- 6) Keep you distance from beach goers that are enjoying the beach sand.
- 7) Remove all trash dug.
- 8) Fill all holes dug.
- 9) Have fun.