



The 'Ins and Outs' of Tides

Tides are always changing so it is important that we understand and know about tides when we are playing or working alongside coastal waters.

What is a tide?

A tide is the cyclic rising and falling of the sea levels. This causes changes in water depth along coastlines and in river estuaries.

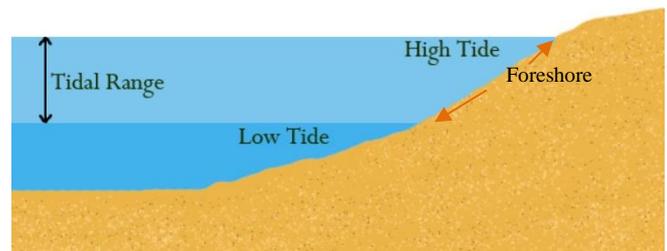
Tides explained

A **rising (incoming) tide** is one that over a period of a few hours (about 6hr 10 min in most places) advances up the beach. When the water has reached its highest point, this is known as **high tide**. This is the end of the advancement. The tide then reverses its direction - this is the **turning tide**. The sea level then will fall over several hours and this is called the **ebb tide**. When the sea has reached the lowest point, this is the **low tide** (water mark). One cycle takes just over a half day (12 hours and 25 mins).

We normally get two high tides and two low tides each day (24-hour period). However, sometimes there will only be three tides and the fourth one in the sequence will be very early the next day. There may be a different height in the two high tides each day. This daily inequity changes because of the changes in tide time and the position of the moon. Information on tide times, locations and heights can be found in tide charts, in newspapers, on weather websites and mobile phone apps. e.g. [MetService](#) or NZ tides app.

The **tidal range** is the vertical difference between high and low tides (see below).

The **foreshore** is the 'wet' zone of the beach or the horizontal distance between high and low tide. The depth of this zone varies with location as it depends on the height and incline of the beach or cliff.



The Bay of Fundy in Canada has the greatest tidal range in the world - 15.2 metres. A moored boat - pictures taken at high and low tide in the Bay of Fundy.

Photos: Samuel Wantman
Source: [Wikipedia](#) – Tide



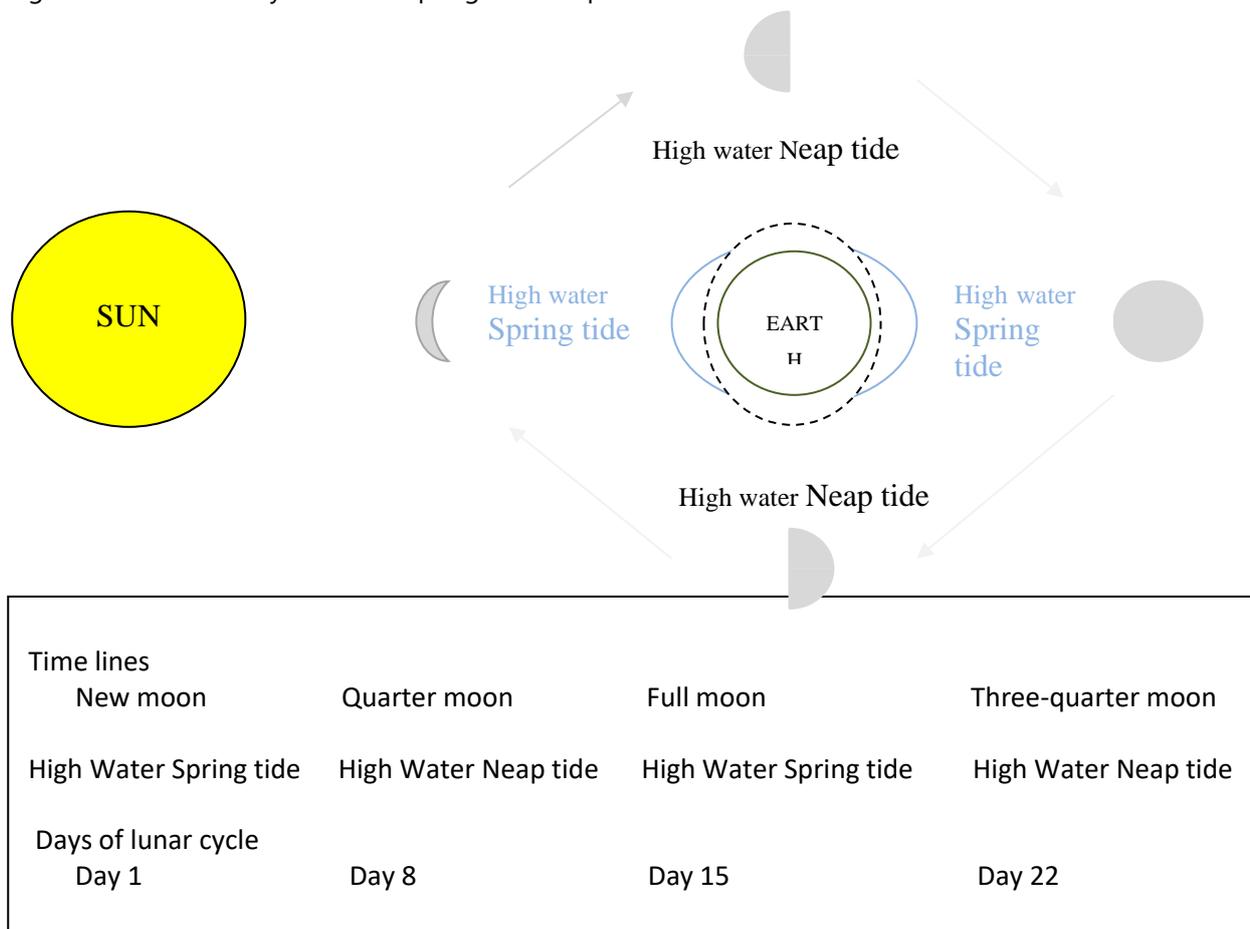
Diagram: To show the tidal range and foreshore.
Adapted from [Wikipedia](#) – *Tidal Range*

Legally the foreshore starts at an imaginary line drawn from the mean of high spring tides. This includes the air space, water space above land as well as the soil, subsoil and bed rocks.

The tidal range changes in a two-week cycle. Around the new and full moon time the sun, moon and earth are in line. So, the tidal force of the moon is enhanced by the extra pull of the sun. The tidal range then is at its maximum and this is called a **spring tide** (not from the season but from the Old English verb to spring up). The high tide is higher than average, and the low tide is lower than average.

When the moon is at the first quarter and third quarter stage, the moon, earth and sun are at an angle of 90 degrees to each other. At these points in the lunar cycle the tide range is minimal. This is called a **neap tide** and the tide range is less. (Neap is an acronym for Near Even As Possible). There is approximately a seven-day interval between spring and neap tides. Refer diagram 2.

Diagram 2: Shows the dynamics of Spring and Neap tides



King tides

These happen because the earth's annual orbit around the sun is elliptical. The earth-sun distance is at a minimum in January and maximum in July. Thus, if this January date coincided with a full or new moon, the sun's gravitational pull on the water would be exaggerated. Further away from that date the effect would not be as great. The king tide of 4.67m January 24th 2011 in Onehunga was the highest on record. The tide damaged roads, beaches and flooded homes in Bucklands Beach and some stores in downtown Auckland. The previous record was 3.99m in 1936¹. Sea levels have risen 12cm since 1936.

Why are tide times different around the country?

The tidal bulge of high tides travels anticlockwise around New Zealand. This takes about 13 hours to complete the circuit of the country so there is always one high tide point and one low tide point somewhere in the country at the same time. This explains why the tides on the Waitemata and Manukau Harbours are different. The tide travels from Auckland, north around Northland to the Manukau. This takes about 3.1/2 hours. Therefore, the tides in the two harbours are never the same despite their close proximity.

The Tides in Cook Strait

Tides in the Cook Strait are interesting. When it is high tide on one side of this body of water it is near low tide on the other side. This can create strong currents as the Pacific Ocean and Tasman Sea squeeze through the narrow 22km wide strait.

Strong winds in this area frequently make the crossing dangerous. There have been several shipping disasters in this water. Perhaps the most famous is the capsizing of the ferry Wahine on Barrett Reef in Wellington Harbour entrance in April 1968 when 51 people lost their lives.

¹ Freakish Swells A Sign Of Things To Come by Isaac Davison New Zealand Herald. Friday March 18th 2011