



# SOS Fact Sheet

# WAVES

## How are waves formed?

The waves we see at our beaches have all been formed by the same thing: WIND. The size of the wave is controlled by how fast the wind blows, how long the wind blows for, and the distance across the ocean that the wind acts over. As all those factors increase, the bigger the waves get.

## Are all waves the same?

No. There can be all sorts of waves in the ocean at the same time coming from different directions. One way to tell the difference is to measure the time between two waves. This is called the wave period. Waves which are formed locally by wind, like the afternoon sea-breeze, are small, short, and choppy with periods of 1 to 7 seconds and are called WIND waves. Waves which have moved a long distance away from where they were formed are cleaner, longer, often bigger and are called SWELL waves and have periods of 8 to 20 seconds. On most days there is some sort of combination of wind and swell waves hitting on our beaches.



*Wind Waves on Sydney Harbour*



*Swell Waves*

## Why do waves break?

Waves break when the shape of the wave becomes too steep and this usually happens as waves travel from deep water to shallow water. This causes the waves to slow down, increase in height and become steeper until they break. So the shape of the coastline and the ocean bottom is really important!



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### Types of Breaking Waves

- **Plunging waves** have the classic tube or barrel shape and are often called dumping waves. They occur when waves travel from deep water to shallow water very quickly and have to slow down rapidly. That's why you get plunging waves on steep beaches (shore-dump!), on sandbars, and at the outside edge of rock and coral reefs. Be very respectful of plunging waves!



**Plunging Wave**



**Plunging Wave Shore Dump**

- **Spilling waves** are much gentler with the crest of the wave gently spilling down the front face of the wave as it breaks. They occur when waves travel from deep water to shallow water over a wide, gentle sloping bottom. These are the safest type of wave to swim in.



**Spilling Waves**

- **Surging waves** do not plunge or spill, but bulge up near the shoreline and then rush up the beach very quickly. The backrush is equally quick and is often mistaken as undertow. They occur on most beaches that have a moderate slope usually during smaller swell.



**Surging Waves**



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### Are Waves Dangerous?

- All types of waves are dangerous in very large surf conditions. Unless you are a very experienced swimmer or surfer, don't go in once waves are higher than 1.5 – 2 m. If it's bigger than you, it's time to go to the pool! *Plunging waves* are the most dangerous type of breaking wave as they can easily slam you into the bottom with a lot of force. Many spinal and head injuries are caused this way. Avoid bodysurfing these waves and always, always, always bodysurf with your arms held out in front. Surging waves can also be dangerous as they can easily knock both children and adults over as they rush up and back down the beach.

### How do you Measure the Height of a Wave?

- Scientists generally use the vertical distance between the top (crest) and bottom (trough) of the waves just before they break to describe the height of a wave. Surfers always underestimate the true height as they look at the back of the wave as it heads to shore and only see half the wave. So when a breaking wave is 2 m high, surfers often say it's only 3 ft (1 m)!

### Fast Facts about Waves

- Waves tend to travel in groups (or sets) of 5-6 larger waves.
- The typical wave in NSW has a height of 1.6 m and a period of 10 seconds.
- Best time to surf clean waves is in the morning before it gets windy.
- Tides and tsunamis are also waves, but are not formed by wind.

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