An underwater photograph showing a sandy seabed with several sharks resting on it. There are patches of green coral and seagrass. Sunlight filters through the water, creating a shimmering effect on the sand and coral. The water is clear and blue-green.

# HOW TO ASSESS VISIBILITY BEFORE HEADING TO SNORKEL SITES IN PORT PHILLIP BAY / WESTERN PORT

By Simon Mustoe

# HOW TO ASSESS VISIBILITY BEFORE HEADING TO SNORKEL SITES



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Every site is different so this is only a guide and I encourage you to check site-specific information too (see last page). Port Phillip Bay is a 2,000 km<sup>2</sup> basin an average 13m deep and shallow around the edges. Your top considerations are wind and tides.

You can apply similar rules to Western Port and ocean side, though the ocean is far more extreme, and should be avoided in any dangerous south-westerly winds. Swell and surge can also be significant, even if low pressure systems are a long way south. Wave cut platforms can be very dangerous places to be even in slight swell, as there is a strong risk of freak waves.

Wind is your main consideration, followed by tides. Rainfall and other sediment-creating processes are less-regular factors. I have recommended tide and weather apps later.

## Summary

### Better visibility

After a day or two of light northerly winds anywhere.

After a day or two of light to moderate offshore winds (blowing from land to sea)

After a couple of days or so without heavy rain.

In winter (when winds are more northerly; there is less rainfall overall; and less marine algal growth)

On an incoming tide (when clearer water can be washed in from deeper areas)

### Worse visibility

After any heavy or sustained rainfall.

Up-current from river mouths, the Western Treatment Plant, marine dredging etc.

After any strong winds from the southerly quarter.

In the southern bay in places where the current is strong and at low tide.

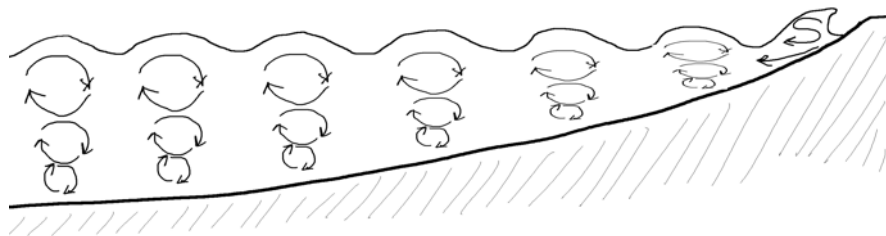
# WIND DIRECTION

Onshore winds (winds that blow from the sea onto the shore) generally create worse visibility, because waves propagate across the whole bay and have chance to build energy before reaching the coast. This applies to northerly winds in the southern bay or southerly winds in the northern bay.



Offshore winds are generally less of a problem because the land acts as a barrier, so snorkelling sites can be sheltered from the wind and wave energy increases further out into the bay.

Wave energy creates a circular motion which decreases with depth. As you get closer to the shore, this creates a back wash and stirs up sediment. The stronger the wind, the poorer the visibility.

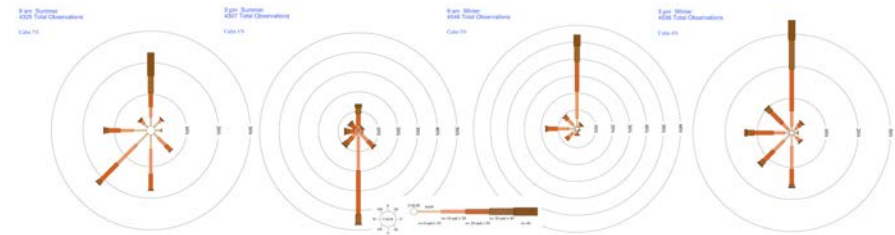


## Melbourne Seasonal Winds

Here is the average seasonal wind strength and direction for summer and winter. The length of the bars indicates the percentage of time at those directions and speeds. For example, in summer at 9am, it averages >30 kph from the north.

As you can see, winter has a far higher prevalence of northerly winds and therefore tends to have better visibility than summer and overall calmer conditions.

In summer, sea breezes from the south may make conditions worse in the afternoons. Sea breezes are caused by warming of the land, which sucks air off the ocean and creates strong onshore winds in the afternoons. This is why 3pm is windier from the south in summer. So, it's often better to go snorkelling in the mornings on very hot summer days.



## Summary

### Better visibility

Following sustained offshore winds for a day or so.  
Sustained light northerly winds (<10kph are ideal and visibility may be good almost everywhere).

### Worse visibility

South westerly winds are generally associated with storm fronts and stronger winds.  
Sustained onshore winds >10kph anywhere.

For a last check, I have the Bay Winds page bookmarked on my phone as this shows real time data from the weather stations. It also contains links to water temperature too (see resources page, below).

# RAINFALL, ALGAE & SEDIMENT

## Microbes and ill-health

After any significant rainfall, sediment from river mouths will tend to make things murkier. This can also carry toxins and unpleasant microbes that can hospitalise you.

Check the Beach Water Quality Reports!

<https://www.epa.vic.gov.au/for-community/summer-water-quality/beach-report>

(sorry, EPA only runs this during 'beach season' and only for Port Phillip Bay).

If in doubt, don't swim after heavy rainfall.

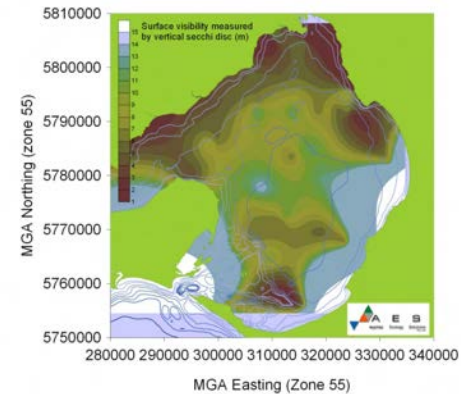
**!** Avoid swimming near stormwater or river outlets 24-48 hours after heavy rain.



## Algae

Algae are microscopic plants that occur naturally and grow faster during summer when it's warmer and sunnier. Also, nutrients run off the Western Treatment Plant and get caught in currents (see later). You get heaviest rainfall in spring, which drives sediment down the Yarra River and Kororoit Creek in the north, Patterson River in the east and Werribee and Little River in the northwest.

The diagram on the left is average surface visibility and shows the trend towards poorer visibility in shallower northern areas due to a combination of wind and sediment loads from river pollution.



## Summary

### Better visibility

After several days without heavy rain.

Away from stormwater, river outlets and the Western Treatment Plant coast.

In the winter (when cooler conditions and less sunlight mean less natural algal growth).

### Worse visibility

After heavy rainfall.

In the vicinity of stormwater and river outlets.

When there is nearby dredging.

# TIDES

Snorkelers tend to like low tide because you can get closer to the sea floor but this does increase the risk of sediment, especially if there is some wind and current. A rising tide will often bring cleaner water onto a site, so around low tide or just thereafter can be best.

Some sites are more prone to sedimentation when the water is shallower (particularly in the south and when it has been windy). Note, it can take a day or two for lighter sediment to completely settle out after storms. X`

## The rule of twelfths

The speed of currents and therefore visibility, is affected by the rate of water movements, which varies across the tides.

- In the first hour after low water, the tide rises one twelfth of its range.
- In the second hour after low water, the tide rises two twelfths of its range
- In the third hour after low water, the tide rises three twelfths of its range.
- In the third hour before high water, the tide rises three twelfths of its range.
- In the second hour before high water, the tide rises two twelfths of its range
- In the last hour before high water, the tide rises one twelfth of its range

What this means is that in the hour either side of high or low tide time, currents are weakest.

A tide table will look something like this (right) with the time of high and low tide shown as well as the relative heights. Mostly tides fluctuate by about 1m in the north of the bay and 2m in the south of the bay.

## Summary

### Better visibility

An hour or so either side of slack water, when currents aren't too strong.

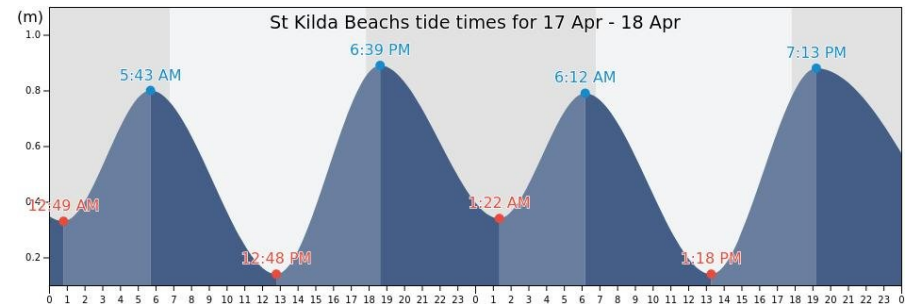
On the incoming side of the tide, when cleaner water from deeper is swept onto shallow reefs.

In the southern bay it's harder to predict but can also change very quickly.

### Worse visibility

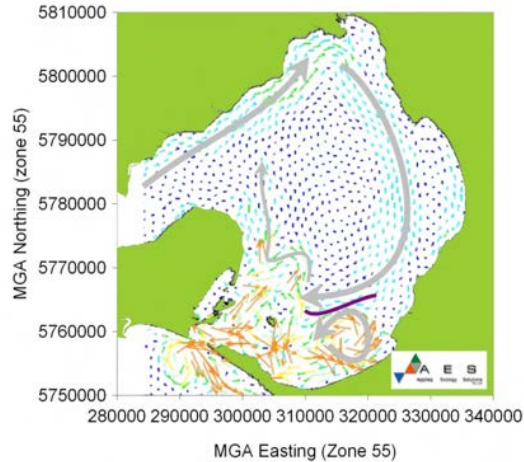
Mid-tide, when currents are rising or dropping faster and there is more friction with the seabed.

On an outgoing tide, when there tends to be more backwash of shallower substrate from the beach.

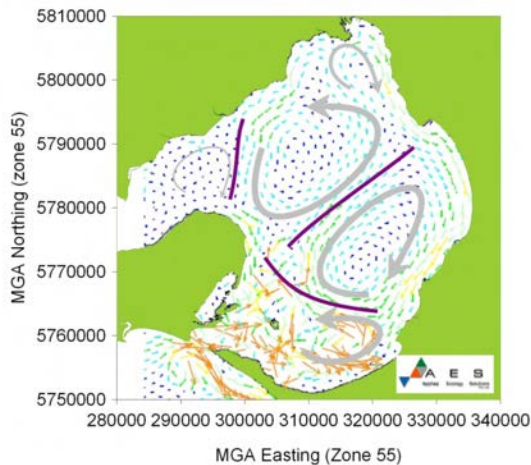


# PORT PHILLIP BAY CIRCULATION

In the summer (December to February, below left) there is a general clockwise rotation of currents in the Bay.



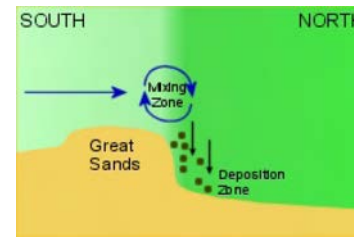
In winter (June to August, below right) there are two opposing eddies.



Knowing this can sometimes help determine conditions, especially if there has been a recent sediment-input into the bay. For example, in late spring after storms and heavy rain, sediment will flow out of the Yarra River in a clockwise direction.

## The Great Sands Divide

In the south of the bay are the Great Sands which run in a line between Portarlington and Dromana. To the south (see below) is clear water and strong currents from Bass Strait (see left). Water mixes and oxygenates over seagrass and benthic sands, delivering nutrients into the northern Bay that then get caught in currents.



North of the bay, material circulates for about a year and south, for only a day.

This means south of the Great Sands, the water is always a lot clearer in the open water but currents are also very strong, which means you can get significant sediment stirred up by friction between the seafloor and currents.

Current speeds in some places can reach 9 knots and you don't ever want to get caught in those, or you could find yourself out in Bass Strait quite quickly.

## Summary

### Visibility

- Snorkelers in the north of the bay could make some assessment of the likely impact of sediment based on current circulation.
- The closer you get the Great Sands, the harder it becomes to predict visibility at low tide, as currents can be quite changeable. It also means conditions can improve or decline quite quickly.

## OTHER RESOURCES

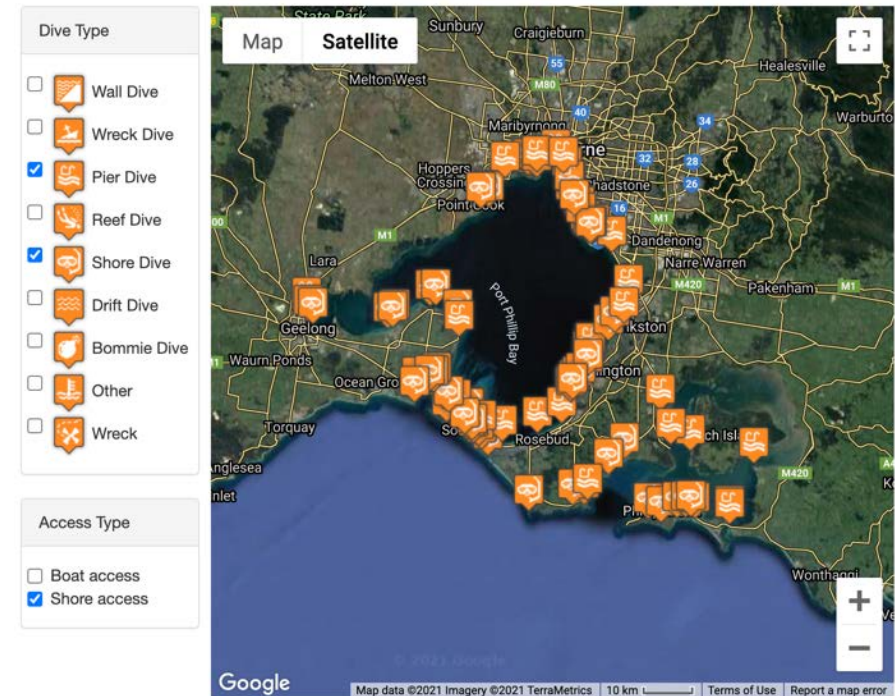
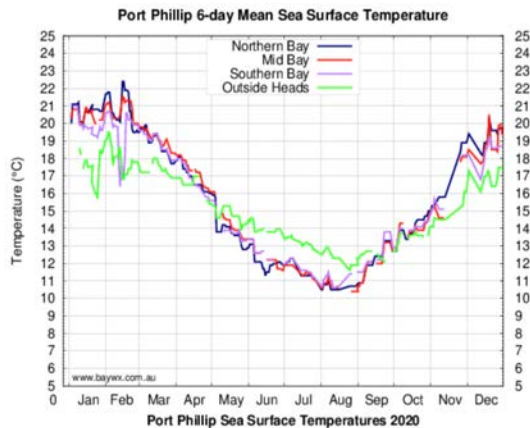
1. Port Phillip Bay winds <http://www.baywx.com.au/>
2. BOM bay forecast <http://www.bom.gov.au/vic/forecasts/portphillip.shtml>
3. Download the Willy Weather app for your phone.

Scuba Doctor has the most comprehensive maps of snorkelling sites in the bay.

Visit their sites map <https://www.scubadoctor.com.au/melbourne-dive-sites-map.htm> and filter by “shore dive”, “pier dive” and “shore access”.

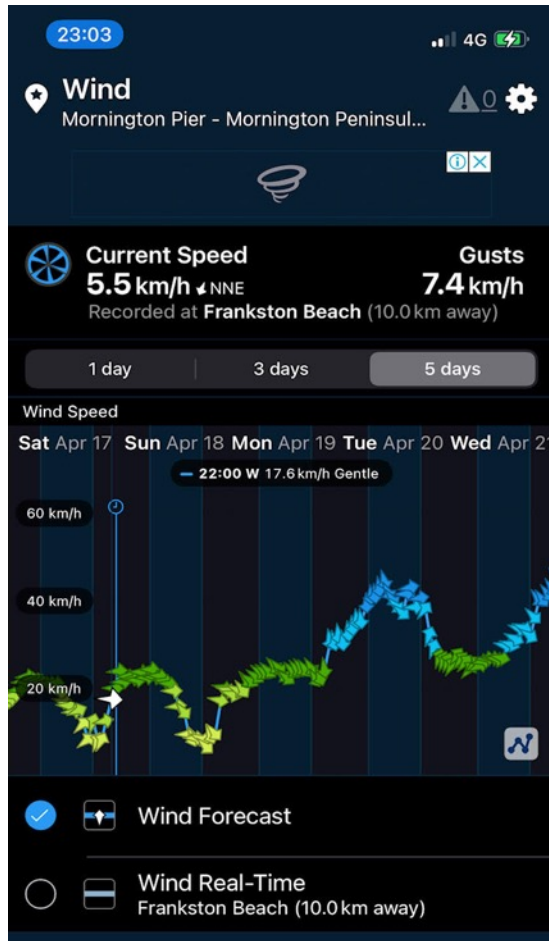
## BAY TEMPERATURE

While it should not matter, you can also check 6-day mean water temperatures at <http://www.baywx.com.au/>.



Each snorkelling site is described in more detail here too <https://www.scubadoctor.com.au/melbourne-snorkelling-sites.htm>

# WORKED EXAMPLE

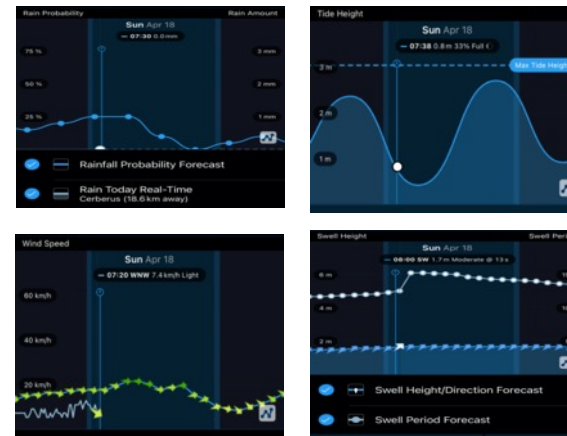


This is a screen grab from Willy Weather (left) which also has swell, tides and rainfall.

If I was considering a snorkel on the east side of the bay around Mornington or Mt Martha on Sunday (left), I may hesitate.

Overnight winds are rising to over 20kph and blowing directly onshore. Willy Weather also estimates swell to be about quite significant so it could be uncomfortable trying to swim up against any reef.

The westerly wind means the swell across the bay has a lot of time to build and the wave heights at the beach will probably stir up a lot of sediment.



But moderate westerly winds might indicate good conditions at Flinders Pier (below) as there, the westerly wind is offshore and the pier is protected by sea cliffs.

At Flinders (left), there is no rain forecast, the tide will be rising by about 1am, so water is likely to be clearer then.

This is what the Scuba Doctor pages say:

<https://www.scubadoctor.com.au/divesite.htm?site=Flinders-Pier>: “All winds other than strong E or NE winds. If the ocean is rough, there most likely will be surge and poor viz. High tide is better for scuba diving as the tide movement is typically 1.5 metres and high tide means clearer ocean waters. Some snorkellers prefer a low tide as it puts them closer to the critters when they are on the surface. Best dived at slack water, or on an incoming Western Port tide. The viz will be best when there has been no recent rain”

A final check of the Bay Winds page and I can see right now there is a 4 knot (~7kph) northwesterly wind at Flinders.

There is never any guarantee ... but this is a good bet for these conditions.

You may not get this right every time but practice makes perfect and you'll learn to understand the conditions at specific sites the more you go to them.

