

The wind and the waves

The windway

Wave wars

Graveyards

Conflicting seas

The windway

Sept-Îles

- "We have to cross to Anticosti today, or we'll have trouble tomorrow. They're calling for 30 knot winds tomorrow and the sea will be too high for my liking. Sailing is a lot of fun, but you need strong nerves."

Fetch

If there were never any wind, the St Lawrence would be a gigantic mirror, rising and falling with the tides. But that is not the case at all.

The St Lawrence is a vast surface that can be whipped up into violent seas depending on the direction, duration and speed of the wind.

Fetch is the distance over which the wind has been blowing from the same direction. The longer the fetch, the higher and longer the waves. After 12 hours at the same speed, though, the wind has almost no effect on the waves, except that it may cause them to lengthen, distance permitting.

Since the fetch is limited on the St Lawrence, the waves cannot lengthen as much as they do out in the open ocean, so they often become very steep.

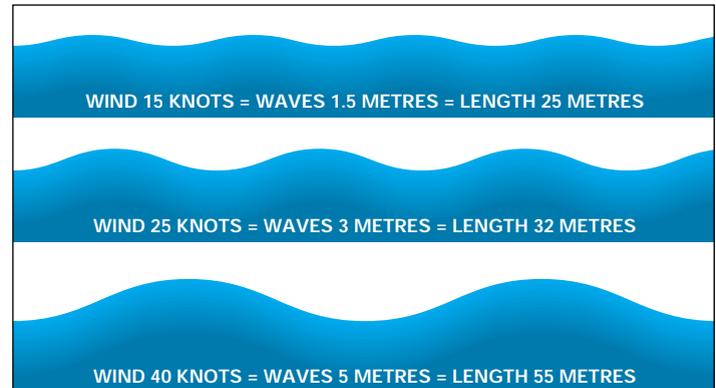
In July and August, the waves are rarely higher than 3 metres.

Swell and wind waves

Waves that have been formed elsewhere or before the wind changed direction are called *swell*. The swell can be an indication of approaching winds.

If the waves are flowing in the same direction as the wind, however, you are looking at *wind waves*. If the wind should shift, you will encounter *cross seas**

Fetch: 50 nautical miles
Duration: 6 hours



Petite rivière Saint-François

- "I don't know. With this Southwesterly wind, who'd be bold enough to head out into the rising tide. It's absolute hell in the Chenal Nord!"

Wind opposing current

There are 3 types of currents in the St Lawrence and the Gulf: ocean currents, tidal currents and river currents.

Of the ocean currents, the Gaspé Current has the largest effect on waves.

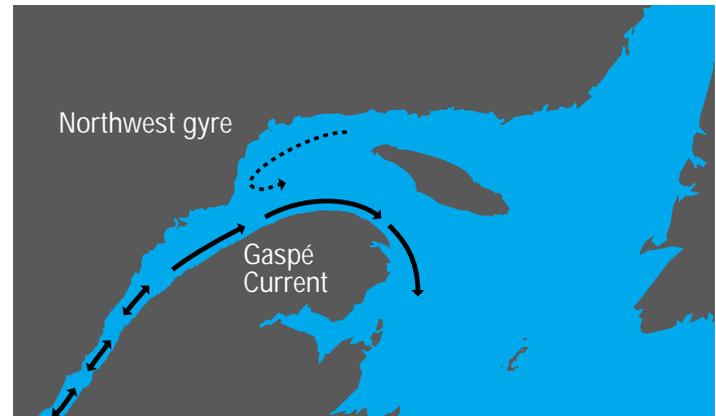
But the influence of the tidal and river currents is much stronger. And when the wind enters the picture, the waves can change the sea's behaviour, sometimes dangerously.

If the current and the wind are moving in different directions, waves will build and shorten. Very quickly, the water may become a dangerous place to be.

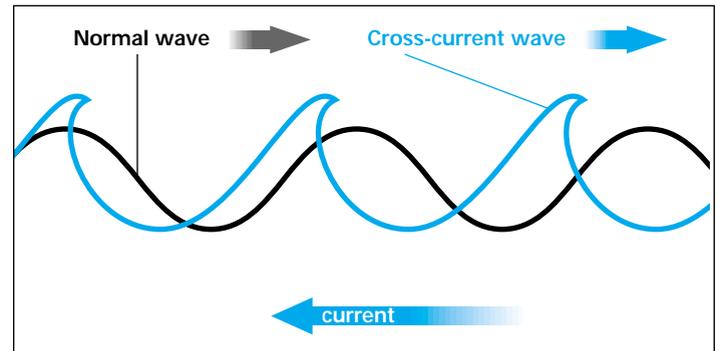
Chop

When 2 currents meet or cross, even when the water is calm, they will cause the surface of the water to literally boil. This turbulence is called rip. It looks as though the water is breaking over rocks or the Loch Ness Monster is about to surface. An impressive sight, but not a dangerous one.

But as soon as the wind begins to blow against the current, the situation will quickly deteriorate. The waves will be confused, steep and breaking. The resulting chop creates absolute chaos!



Ocean currents



Wind opposing current

Graveyards

Basse-Côte-Nord

- "Now, listen to this. If the waves start getting steeper when you're close to shore, watch out. You're approaching shoals. Be particularly cautious of waves breaking at the mouth of a river."

Shoaling

The numerous shoals along the shore and near islands can often be traps. When the waves reach the shallow water, they slow and begin to tumble and break.

There are 2 types of situations: in the first, the bottom rises gradually and so do the waves; in the other, the bottom rises abruptly, as is often the case at the mouth of a river.

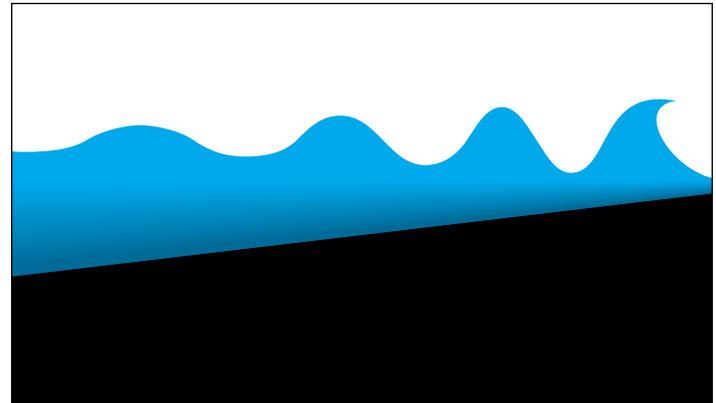
In the second case, the waves will break suddenly and form a line of surf. Mariners need to watch out for the underlying bar of alluvial deposits built up over the centuries. Underwater cliffs produce the same effect.

Depth

If the depth of the bottom is at least half the wavelength, the waves will be able to flow smoothly over such shoals.

If the depth of the bottom is less than that, the waves will become steeper and may tumble into breakers.

Out in the open sea, mariners need to watch out for banks. They will cause the sea to behave the same way^{sk}



Shoaling

Conflicting seas

Baie des Sept Îles

- "Just look at those waves. And I thought we'd find calmer seas here. Let's get out of here right away."

Reflection

Live and learn! When waves strike a vertical barrier such as a cliff or a wharf, they are reflected and rebound.

But as they flow back out and meet incoming waves, their crests cross and build quickly, producing a choppy, confused sea up to a few nautical miles offshore. It's not very comfortable for anyone on board.

If you are mathematically inclined, you can use the formula opposite to draw up a chart showing how high the waves will build, depending on the fetch in Baie des Sept Îles.

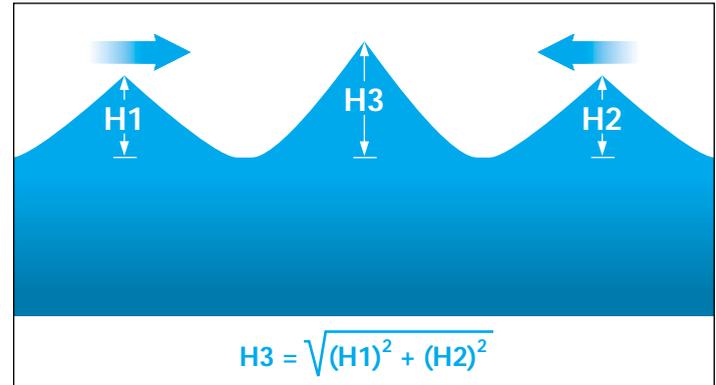
Refraction

In such a confused sea, it wouldn't be wise to try to seek shelter near a cape or a point.

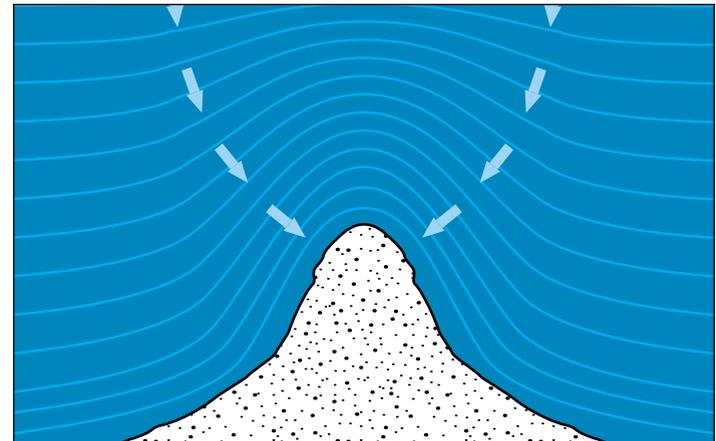
When waves approach shoals from an angle, they bend toward the shallows, increasing in height.

In the lee of an island, this refraction effect produces a cross sea. These confused and choppy conditions can make navigation very difficult and even dangerous, depending on the wind speed.

The same cross-sea effect can be produced by refraction when the shoal is an underwater mountain or point 🗺️



Reflection



Refraction