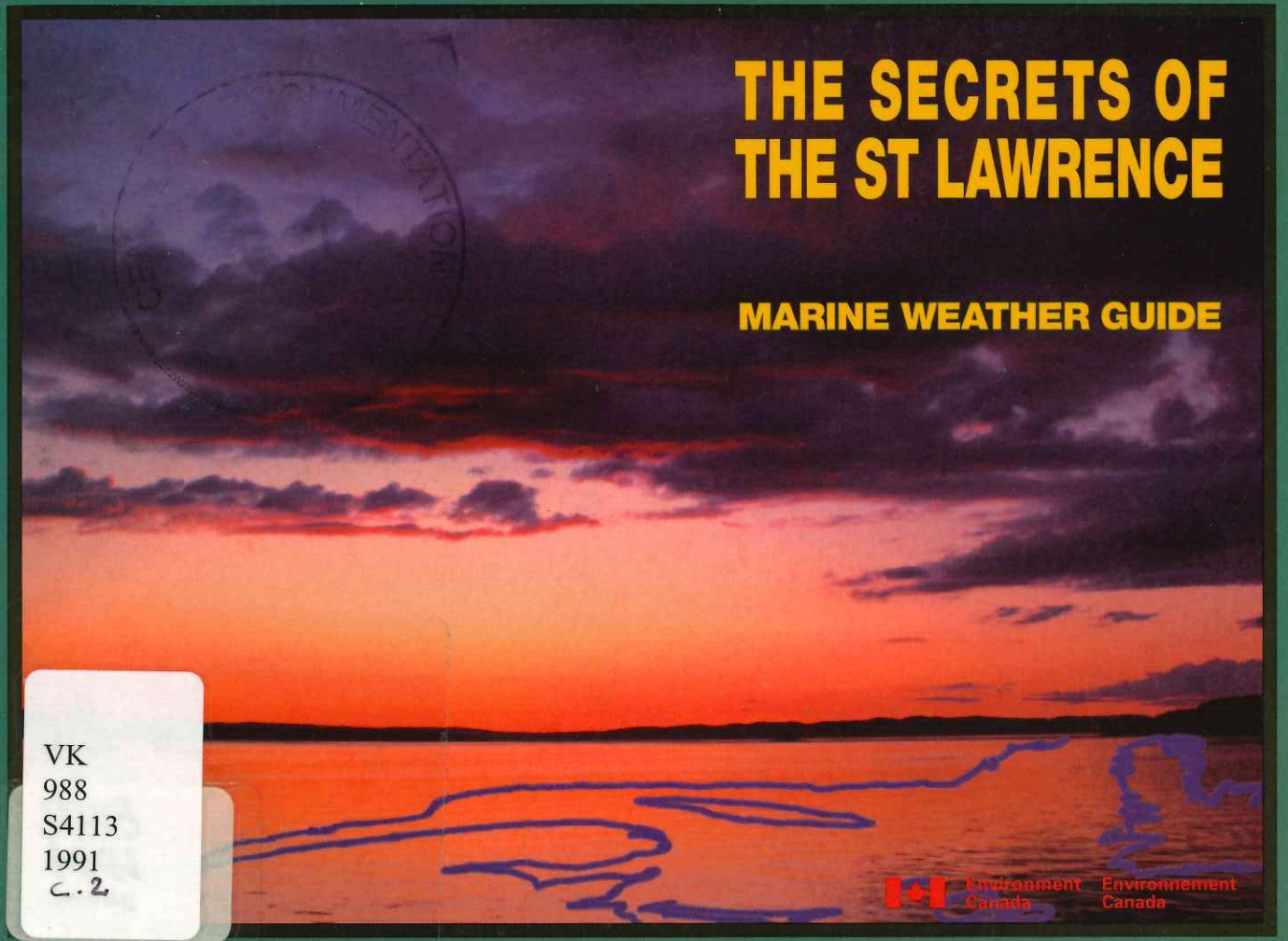
QUÉBEC ✦ POINTE-DES-MONTS ✦ CAP WHITTLE ✦ BLANC-SABLON ✦ GASP



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Symbols

Seastate

Confused or choppy sea *(rip)*

Cross sea

Reflection

Waves
- breaking
- shoaling
- short
- steep

Fog

Effects

Barrier

Channelling

Convergence

Corner

Funnelling

Winds

Katabatic wind

Turbulence

Wind opposing current

Symbols used in the local listings, pages 30 to 69

THE SECRETS OF THE ST LAWRENCE
Marine weather guide

Editor
Guy O'Bomsawin

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Denis Poupart

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Jacques Lavigne

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Printing
Imprimerie Richard Veilleux inc.

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Beacons

Fore to aft

Main cabin

Pierre Pelletier

“Le Solstice” - July 5 - 17:32

Tadoussac

- Éric, we're leaving for Rimouski.
With this wind, I'd like you to have a look at the Environment Canada **Marine Weather Guide**. Could you go and find it, please?

- I have it here, Captain!

- Turn to the Québec - Pointe-des-Monts section and find the Rimouski area for me. And could you tune in Weatheradio, please?

- Certainly, Captain.
Can you just imagine what Jacques Cartier would have thought if he'd been able to get weather bulletins on the radio for his first transatlantic crossing?

Can I get you a coffee, Captain?

A legacy

A rather odd introduction, you might say. But we couldn't think of a better way to lead into this guide, designed especially for mariners on the St Lawrence.

The guide was prepared by Environment Canada meteorologists in Québec, with the assistance of many seasoned mariners, fishermen and recreational sailors.

The guide contains:

- full details on wind and sea conditions
- a description of the geography of the St Lawrence
- a listing of some 150 locations in which wind and sea combine to create special, and sometimes dangerous, situations
- the main warning signs indicating a change in weather
- information on marine weather forecasts
- details on how to obtain forecasts directly and quickly.

The key

The index and maps are the key to this guide.

Much more than just a title, The Secrets of the St Lawrence are what make mariners' lives a daily challenge, and give recreational sailors the thrills they seek.

For anyone who doesn't know the St Lawrence, it is one of the most inviting and awe-inspiring rivers in the world. If you wish to conquer it, you must know its secrets.

Happy sailing!

Conversion

The measurements in this guide refer to distance, speed and depth as they are generally expressed for navigation purposes.

m	=	metre

Speed

km/h	=	kilometres per hour
kn	=	knot
mi/h	=	miles per hour
1 mi/h	=	1.609344 km/h
1 knot	=	1.852 km/h

Distance

km	=	kilometre
1 nautical mile	=	1.852 km

Depth

f	=	fathom
1 fathom	=	1.8288 m

Pressure

kPa	=	kilopascal
1000 millibars	=	10 kPa

The Secrets of the St Lawrence

The St Lawrence is one of the largest *airways* in the world. The large air masses that generally cross the continent from West to East also travel the St Lawrence.

If you consider that both water and air masses literally hug the ground and follow all its contours and surfaces, it's easy to understand just how much variety there can be in wind and sea conditions.

In both cases, you must understand how they will behave in different situations. But the water forms a screen that hides its secrets, and the air, well, it's simply invisible!

For mariners, the wind is all important. And that wind is the result of shifting air masses, rising warm air currents and incoming cold air currents, as they rush up against, around and down obstacles.

The 6 dimensions

Every mariner must be aware of what there is to the left, the right, behind, in front, under the water and in the sky. It's a 6-dimensional environment!

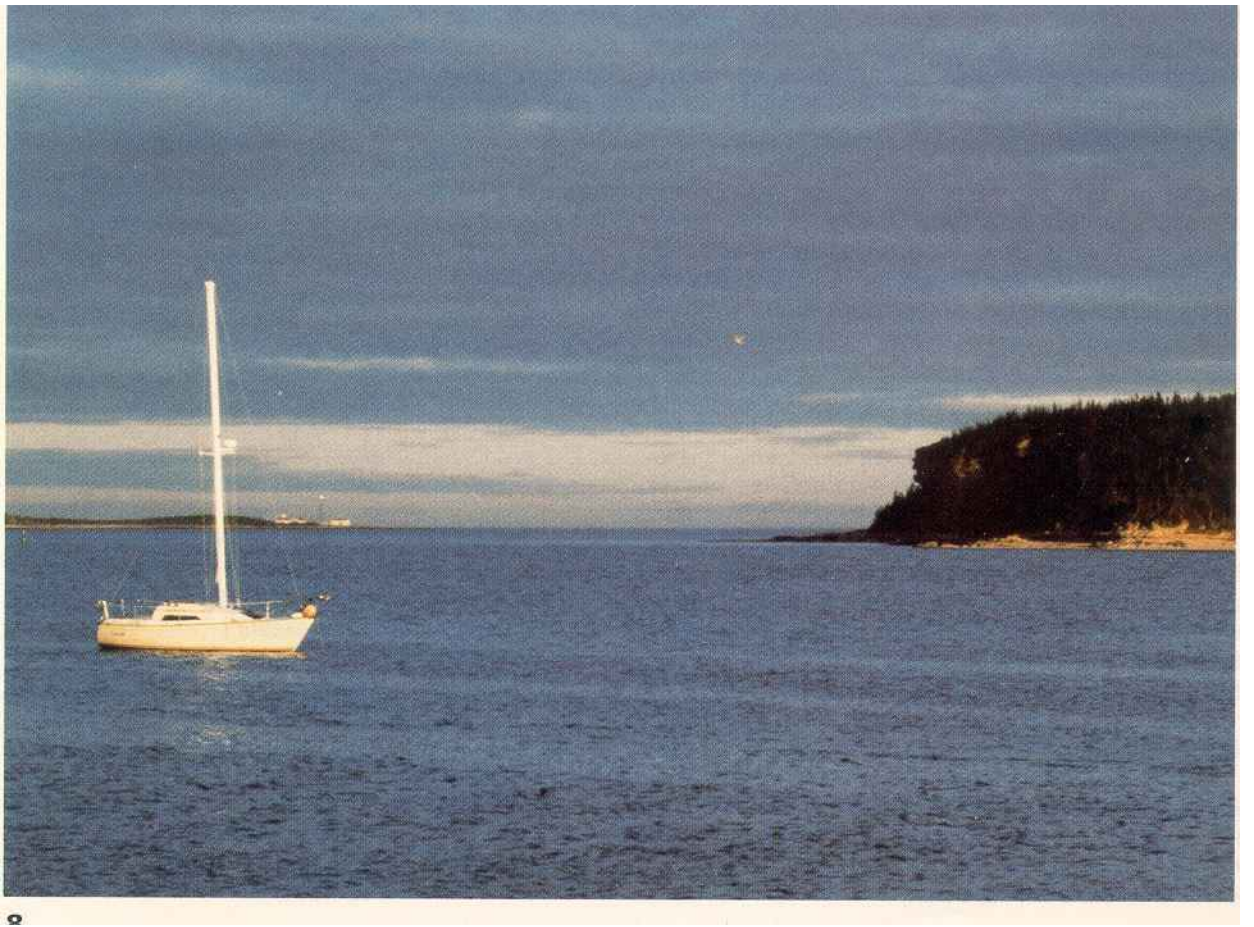
And like truckers, seasoned mariners can tell from the sea and sky where the weather conditions are generally better or worse.

They have learned some of the sea's secrets by penetrating the mysteries of its bays and capes.

The trio

For safe and pleasant sailing, you need:

- to know the wind and sea conditions
- to have the most up-to-date marine charts and sailing directions available
- to pay attention to the most recent weather forecasts



Pierre Pelletier

The wind in your sails

Hard a-port!

Fast or slow?

The wind's paths

Against the wall

Solar energy

Under the stars

Hard a-port!

Point ho!

- "With the wind at our backs like this, we're best to go to the left around the island. There's plenty of clearance over the shoals and we'll be able to go faster. The wind is amazing! There's no speed limit, but you can depend on it to follow its own rules."

Corner effect

Whenever the wind encounters an obstacle, it tends to shift to the left, and to strengthen.

This is true in the case of islands, capes and points.

When the wind is with you, it's always tempting to go along with it and sail around an island to the left. Just be careful to check your charts to make sure you won't find any unpleasant surprises in the form of shoals.

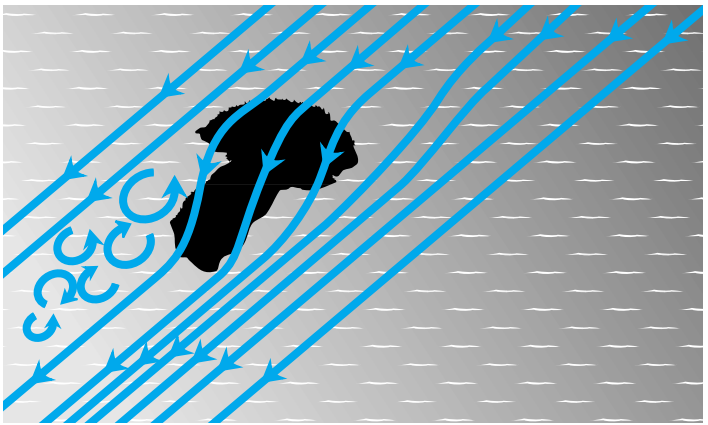
Slower to the right

Obviously, in such a case, there won't be much wind to the right of the obstacle. In the lee of the island, you may run into turbulence for quite a while, but you can avoid it by staying very close to the shore.

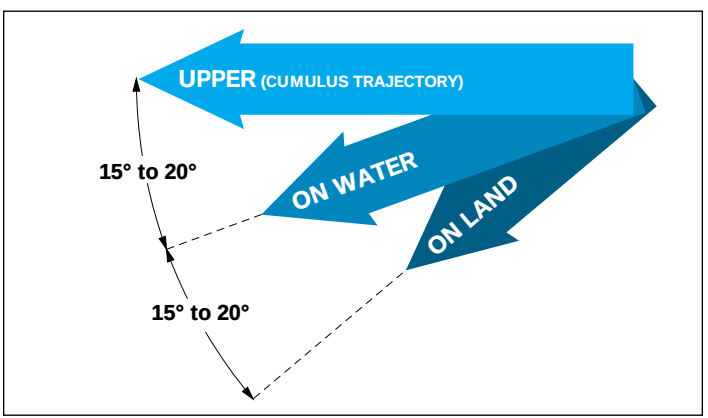
The rules

High above the earth's surface, the wind blows freely. Over the ocean, friction between the water and the wind slows it down slightly and deflects it to the left.

The braking and deflection effects are stronger over the land, since there is greater friction between the land and the wind.



Corner effect



Wind deflection

Fast or slow?

10 nautical miles off Matane - Destination: Grande-Vallée - Wind direction: Southwesterly; wind speed: 15 knots.

- “We're going to head for the shore. If my grandfather is right, the wind will pick up closer in.”

When the wind is blowing parallel to the shore, it creates a narrow band in which the wind picks up speed or drops off sharply, depending on whether the shore is on your right or your left with the wind at your back.

Convergence

When the shore is on your right and less than 3 nautical miles off, the convergence effect means that the wind will automatically be 25 % stronger.

The wind will shift slightly to the left because of the friction created by the shore and will join forces with the sea wind.

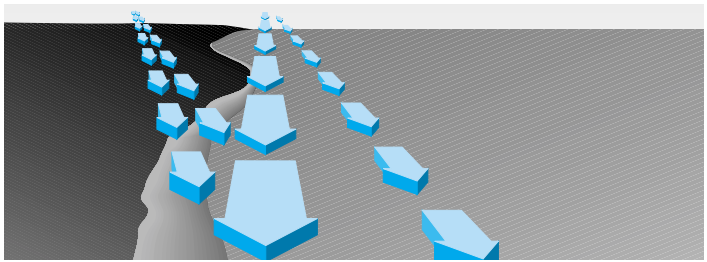
Divergence

The effect is the opposite when the shore is on your left.

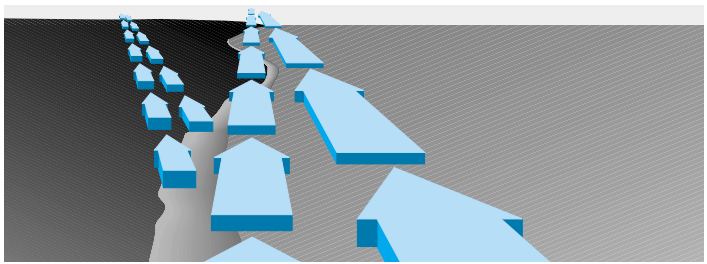
The airstream that diverges to the left because of friction on the shore will meet and slow down the sea wind.

Intersection

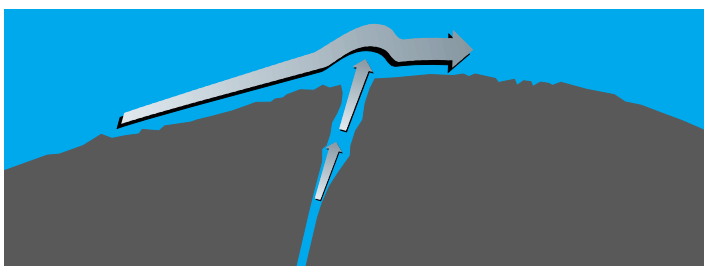
Watch out for drainage winds. Where there is convergence, the wind over the ground will flow down a valley and, when it meets the sea, may give a nasty shock to anyone caught hugging the shore too closely



Convergence



Divergence



Drainage wind

The wind's paths

La Malbaie

- “Be careful around Tadoussac. You think the Northwesterly wind is strong here? It's three times as strong at the mouth of the Saguenay. It's a regular cannon there.”

Channelling

The wind finds its own paths. They may sometimes be as wide as immense valleys, and other times merely a passage between two islands or two shores.

When the wind is blowing over a chain of mountains, it may come shooting out of a valley with great force. Mariners on the Saguenay actually call it *THE CANNON*.

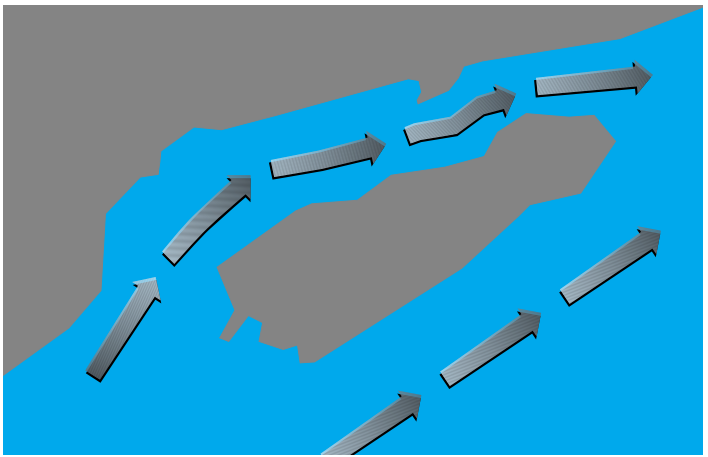
These natural channels may make it seem that the wind is coming out of nowhere, but that isn't really so. It is merely subject to local deviation.

Before navigating in an unfamiliar area, be sure to take a look at the topography.

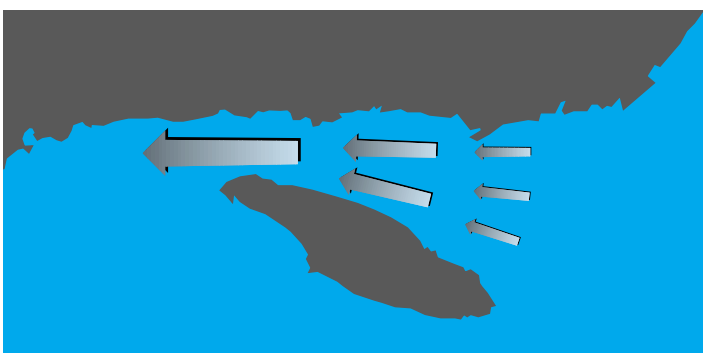
Funnelling

This effect corresponds to the size of the funnel created by the topography. The steeper and closer the banks or shores, the more the wind will be forced into a narrow passage and the more it will accelerate. It may even double in speed.

Gusts of wind, strong funnelling effects, steep shores and mountains all add up to very hazardous conditions



Channelling



Funnelling

Offshore

- "We're coming up to the Péninsule de la Gaspésie. With those mountains and high cliffs, this Northwesterly wind will have to turn Westerly. If we stay offshore a few nautical miles, we should get to Mont-Louis a lot faster. With this wind, it would be a lot harder if we hugged the Charlevoix shore."

Barrier

When the wind strikes a steep shore at an angle, it is deflected along the shoreline and strengthens. This increase in wind speed results as the air piles up.

The steeper the barrier, the stronger the wind and the more pronounced the effect. It may be felt as far as ten nautical miles off the Péninsule de la Gaspésie.

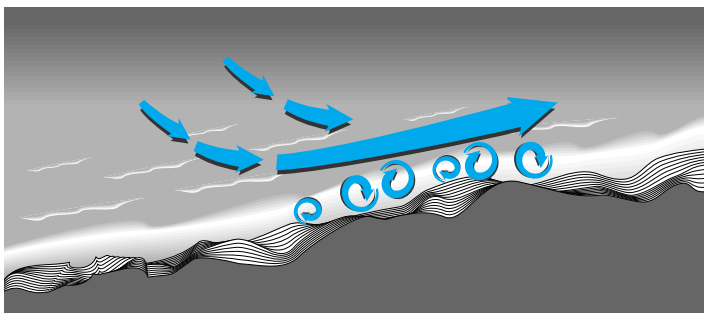
Close to the shore, the wind will be very turbulent because of this barrier effect.

Eddies

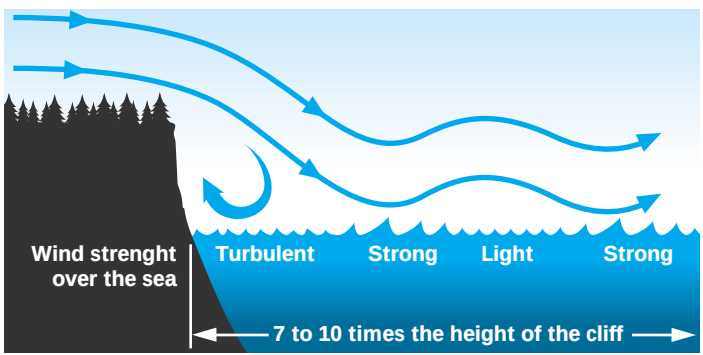
The situation is very different if the wind is blowing off the top of a cliff. The wind will blow toward the sea, but when it meets the sea it will eddy back toward the cliff just where you would have thought that you were sheltered from the wind.

Farther offshore, the wind will bounce along the water's surface for a distance of about 7 to 10 times the height of the cliff.

These eddy and bouncing effects create very turbulent winds



Barrier effect



Cliff effect

Solar energy

Côte-Nord

The sun is shining brightly. The air is calm. The smell of coffee lingers in the air. It looks like a beautiful morning.

Gradually, a cool breeze picks up over the water. It's time to hoist the sails if you want to enjoy a few hours of good sailing wind. The sea breeze is in your favour.

Sea breeze

The sea breeze is the result of the sun shining on the shore. As the land heats up, the air becomes lighter and rises. The cooler air from the sea moves in to take its place.

Initially, the breeze is perpendicular to the shore. Then, as it picks up speed, it gradually shifts to the right and ends up blowing against the shore at an angle.

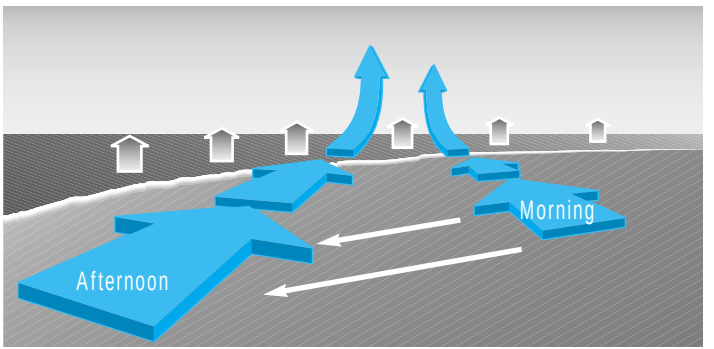
It disappears shortly before sunset.

On the Basse-Côte-Nord, it may be felt as far as 15 nautical miles offshore and may reach 25 knots.

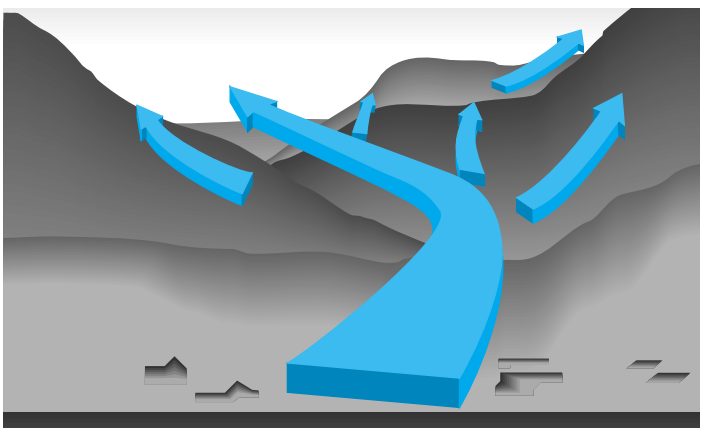
Anabatic wind

When the sea breeze hits the opening of a steep valley, it is strengthened by the anabatic wind. This is a wind that flows up the valley, as it is created by the warm air rising up the hillsides.

The anabatic wind is stronger when the mouth of the valley faces south.



Gradual shift in sea breeze


Anabatic wind

A bay at the mouth of a steep valley

22:00. It's time we were all in bed. New horizons await us tomorrow. 23:18. All hands are jolted awake.

The boat is straining at its anchor. It's shuddering in the wind. No one expected this on such a fine, clear night after such a beautiful, warm day. It's *katastrophic*!

Land breeze

The calm before the storm. A few hours after the sun sets, it's time for the air from the shore to flow out to sea, but this phenomenon is not as strong as the sea breeze.

On a clear night, the cooler air from the shore will replace the warmer air over the sea.

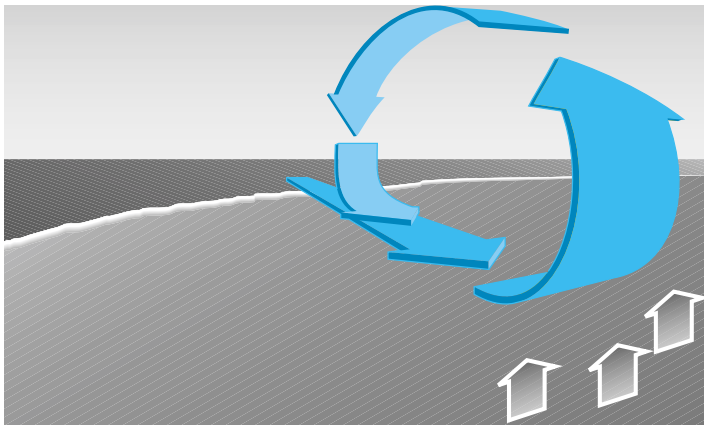
This is known as the land breeze. It blows until morning.

Katabatic wind

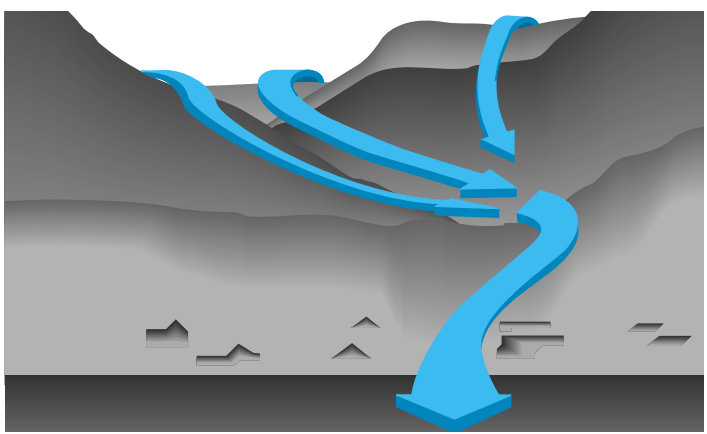
While the land breeze is rather gentle, not so the katabatic wind. It doesn't believe in sweet dreams.

After a warm, windless and cloud-free summer day, the katabatic wind will blow in strong gusts. The cooler air from above will flow down the deep valleys and rush out to sea.

This local wind, which tends to spoil the most pleasant nights, can easily reach 25 or even 30 knots. It blows from late evening until sunrise. *Kata means "downward"*



Land breeze



Katabatic wind

Pierre Pelletier

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.

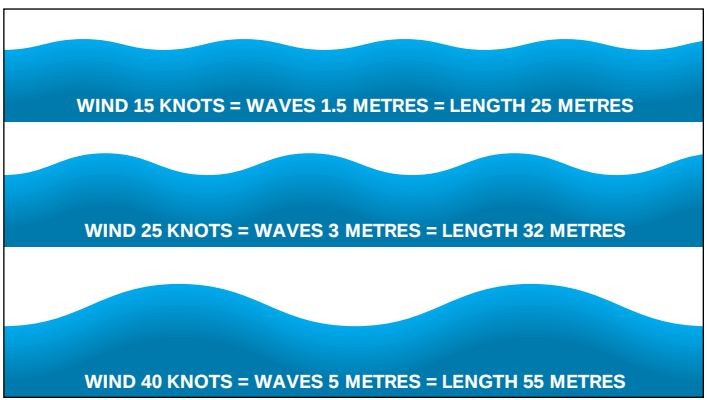
In July and August, the waves are rarely higher than 3 metres.

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.

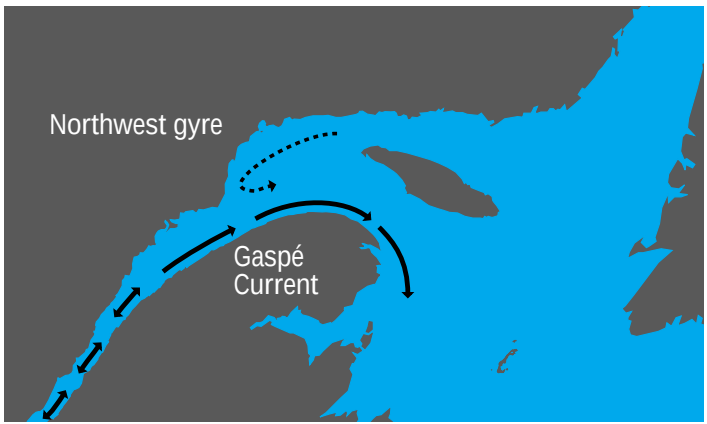
But the influence of the tidal and river currents is much stronger. And when the wind enters the picture, the waves can change the sea's behaviour, sometimes dangerously.

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.

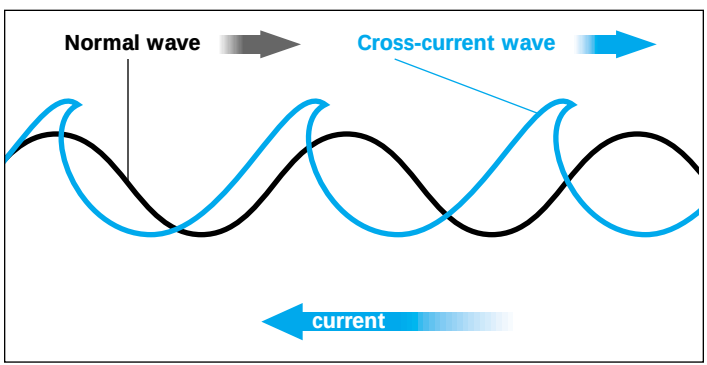
Chop

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

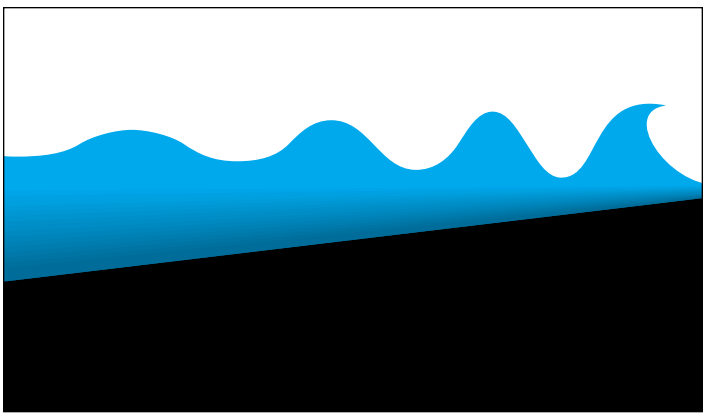
- “Now, listen to this. If the waves start getting steeper when you're close to shore, watch out. You're approaching shoals. Be particularly cautious of waves breaking at the mouth of a river.”

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.



Shoaling

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.

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.

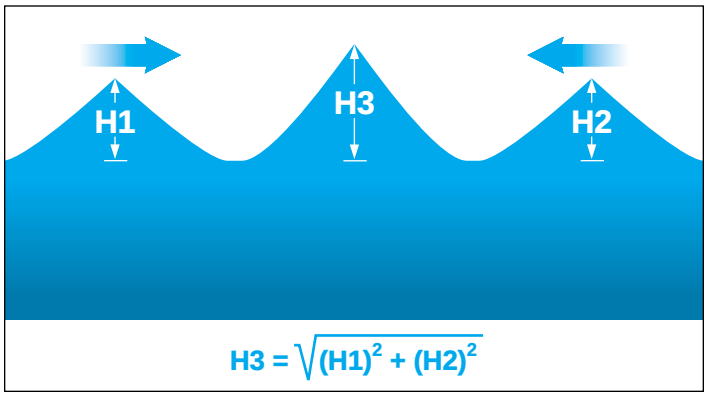
Refraction

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

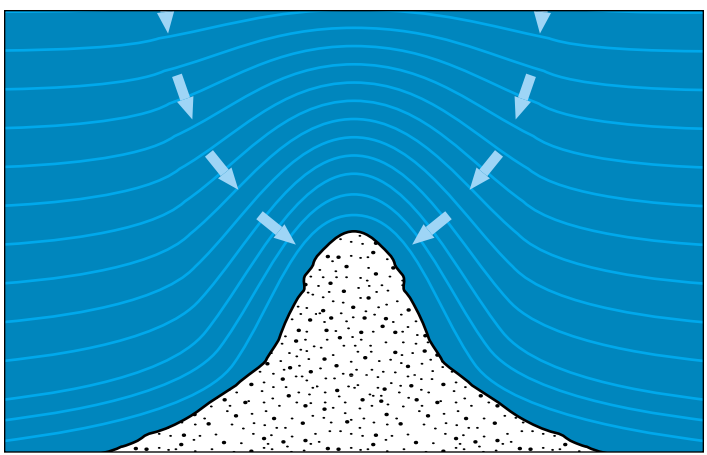
When waves approach shoals from an angle, they bend toward the shallows, increasing in height.

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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Environment Canada *

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Charlottetown	902 566-7060
Gander	709 256-6605
Jonquière	418 548-0980
Mirabel	514 476-3029
Moncton	506 851-6600
Montréal	514 636-3284
Québec	418 872-0061
Saint-Hubert	514 678-3161
Sept-Îles	418 962-8524
Sydney	902 564-7299
Trois-Rivières	819 371-5191

** Weather Offices*

During the pleasure boating season, weather forecasts are also available by taped telephone message. Contact your local weather office for details.

Canadian Coast Guard

Cap-aux-Meules	418 986-2740
Charlottetown	902 838-3722
Mont-Joli	418 775-5392
Montréal	514 928-4425
Québec	418 648-7282
Rivière-au-Renard	418 269-5686
St Anthony	709 454-3852
Sept-Îles	418 968-3118
Stephenville	709 643-5516

Transport Canada

Gaspé	418 368-5661
Sept-Îles	418 962-8229

Local AM and FM radio stations near the St Lawrence River and the Gulf also broadcast marine forecasts.

MARINE EMERGENCIES **Channel 16**
Search and Rescue 1 800 463-4393
1 418 648-3599

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Atmospheric Environment Service
100 Alexis-Nihon Blvd
3rd Floor
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(514) 496-2089

Canadian Coast Guard
Transport Canada
104 Dalhousie
Québec G1K 4B8
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Canadian Hydrographic Service
Fisheries and Oceans Canada
Maurice-Lamontagne Institute
850, route de la Mer, PO Box 1000
Mont-Joli G5H 3Z4
(418) 775-0502

The St Lawrence, from 1 to...

Legend

Calling all sailors

Hot spots

Local listings

Québec Pointe-des-Monts

Pointe-des-Monts Cap Whittle

Cap Whittle Blanc-Sablon

Gaspésie Baie des Chaleurs

Îles de la Madeleine

Legend

Capitalization
Since the compass points are one of the keys to this publication, we have identified them clearly by capitalizing them in all cases.
Example: North, South, East, West

Offshore
The term *offshore* refers to anything that is not right beside the shore.

Winds
The shaded portion indicates the wind direction, according to the 8 compass points. In the example below, the illustration indicates Northerly or Northwesterly winds.

Each illustration indicates all of the wind directions users should take into account to ensure pleasant, or at least safe sailing.

Chart numbers
The chart numbers highlighted in the margin refer to the marine charts that are regularly updated by the Canadian Hydrographic Service. These charts are essential for sailors.

Chart 4026

The maps are based on climatological charts of the St Lawrence, published by Environment Canada, Québec Region.

Seastate

Confused or choppy sea *(rip)*

Cross sea

Reflection

Waves
- breaking
- shoaling
- short
- steep

Fog

Effects

Barrier

Channelling

Convergence

Corner

Funnelling

Winds

Katabatic wind

Turbulence

Wind opposing current

Symbols used in the local listings, pages 30 to 69

The following pages describe the St Lawrence from Portneuf to Le Corps-Mort in terms of its shoreline, shoals, currents and waves.

This section contains maps and local listings describing the difficulties that mariners may encounter, depending on wind and sea conditions.

Markers

The effects referred to in the local listings are exactly the same as those described in the preceding pages:

- **topography,** on wind speed and direction
- **wind**, on sea height and behaviour
- **shoals and currents**, on waves

Guides

This listing should be used in conjunction with the following guides, which are essential to safe sailing:

- Sailing directions
- Marine charts
- Tide and current tables

By the way...

Vessels

- The comments regarding difficulties facing mariners refer to vessels under 14 metres.

Standardization

- Distances and depths are given in nautical miles, metres and fathoms, because these are the types of measurements appearing on the marine charts published by the Canadian Hydrographic Service.

Vive la différence!

Archipel	=	Archipelago
Baie	=	Bay
Banc	=	Banks
Battures	=	Flats
Brisants	=	Reefs
Chenal	=	Channel
De - du - d'	=	Of
Détroit	=	Strait
Haut(s)-fond(s)	=	Shoals
Île	=	Island
Îlets	=	Islets
Le - la - les - l'	=	The
Passage - Passe	=	Pass
Péninsule	=	Peninsula
Pointe	=	Point
Rivière	=	River
Rocher(s)	=	Rock(s)
Traverse	=	Crossing

Wind speed

In the following pages, the wind is assumed to be strong – 20 to 33 knots – except where otherwise indicated

Hot spots

The numbers below refer to the locations indicated on pages 30 to 69.

Hot spots

Québec Pointe-des-Monts

The St Lawrence is the Beethoven of rivers. It has nothing to do with music. We're referring to its temperament! The St Lawrence is anything but a *long and lazy river*. It leaves that role to others. From Québec, the strong tidal currents, the high cliffs, and the mountains lining the shore all make it an ideal starting point for transatlantic races.

The Québec – Pointe-des Monts section is an immense Southwest–Northeast corridor, basically walled in by the Laurentides and the Appalaches mountain chains. The wind has no choice but to follow that corridor.

Although the 2 shores are close together, they each have a different face: gentle to the South, and steep and dotted with valleys to the North, where the wind whips along the cliffs and valley openings.

Québec to Tadoussac

Mariners encounter the most trying conditions in this area. The tides are the highest and the currents, the strongest and most turbulent, in some places reaching up to 8 knots.

Moreover, islands and shoals abound, making some areas barely navigable in strong winds, given the gusts of wind and choppy seas they produce.

Downstream from Tadoussac

The majesty of the St Lawrence becomes apparent from Tadoussac to Pointe-des-Monts or, if you prefer, from Cacouna to Les Méchins. The river there is calmer, but even more awe-inspiring in its more ocean-like nature.

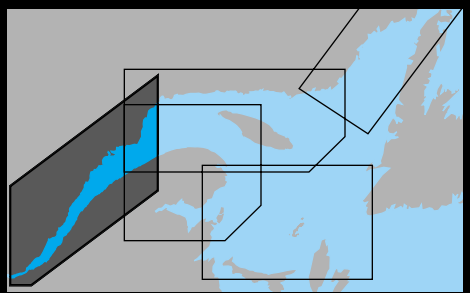
While the North shoreline doesn't reach the same heights as upriver, the bottom is deeper. An interesting phenomenon occurs near the mouth of the Saguenay: extremely cold water accumulated deep in the river over the winter months periodically rises to the surface.

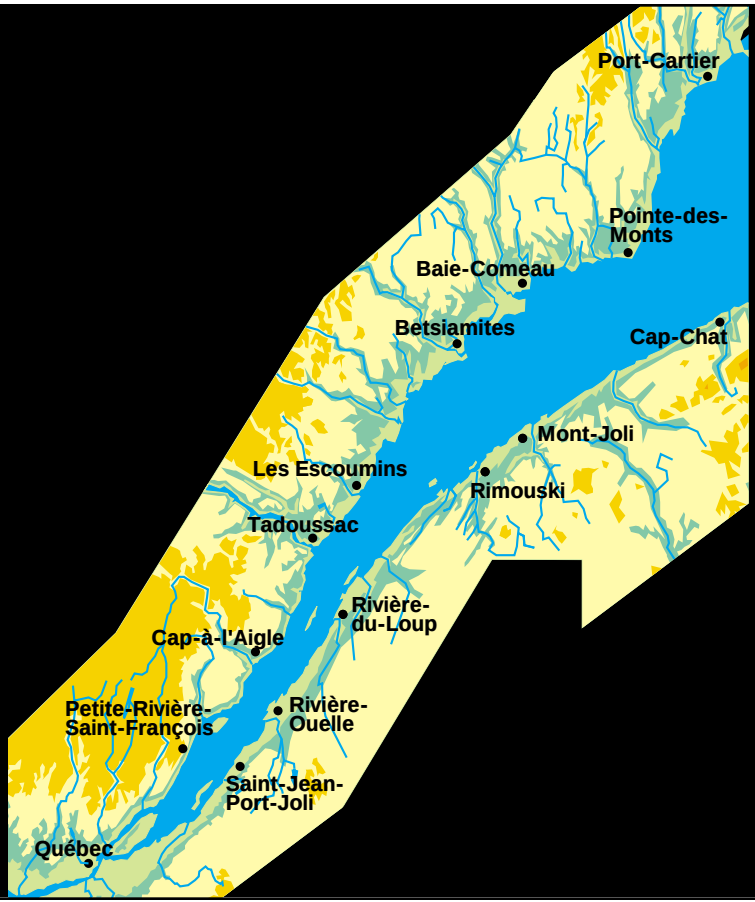
Even in mid-summer, this tidal phenomenon keeps the surface water temperature between 1 °C and 7 °C, and causes frequent fog.

In this part of the estuary, the largest islands are all located along the South shore, between the Rivière Saguenay and Rimouski, with the exception of Île Rouge.

Around Rimouski, the river current stabilizes at about 1 knot and is known as the Gaspé Current

Québec ✳ Pointe-des-Monts





Québec Pointe-des-Monts

Chart 1316

1. Portneuf to Québec

Winds Northeasterly or Southwesterly, against the current
Short, choppy seas.

Difficult.
Strong downstream current.

2. Québec bridges

Winds Southwesterly or Northeasterly, even at 15 knots, against the current
Short, choppy seas. Strong current.

Difficult.

Chart 1317

3. Québec to Île aux Coudres

Winds Northeasterly
Wind accelerates strongly, reaching maximum strength in the Île d'Orléans area. Funnelling effect.

4. Pointe Saint-Jean to Cap Tourmente

Haze or fog
Visibility often reduced because of colder water in the Chenal Nord.

5. Pointe Argentenay

Winds Southwesterly
Stronger winds to the North of and off the point, and cross seas. Corner effect around Île d'Orléans, accentuated by the barrier effect produced by Cap Tourmente.

6. Cap Tourmente to Saint-Siméon

Wind frequently turbulent close to shore.

Winds Westerly or Northwesterly
Wind follows passes and valleys and gusts out over the river.

Watch out for sudden gusts of wind.

7. Petite rivière Saint-François

Winds Northeasterly, against the current
Strong chop.

Winds Southwesterly, even at 15 knots, against the current.
Strong chop. Area should be avoided in strong winds.

Dangerous.

South side of channel is calmer.

Chart 1233

8. Baie Saint-Paul

Winds Northwesterly
Wind accelerates.
Channelling effect produced by the Rivière du Gouffre valley.

9. Passage de l'Île aux Coudres

Winds Easterly or Southwesterly, against the current
Strong chop. Strong tidal current.

Québec Pointe-des-Monts

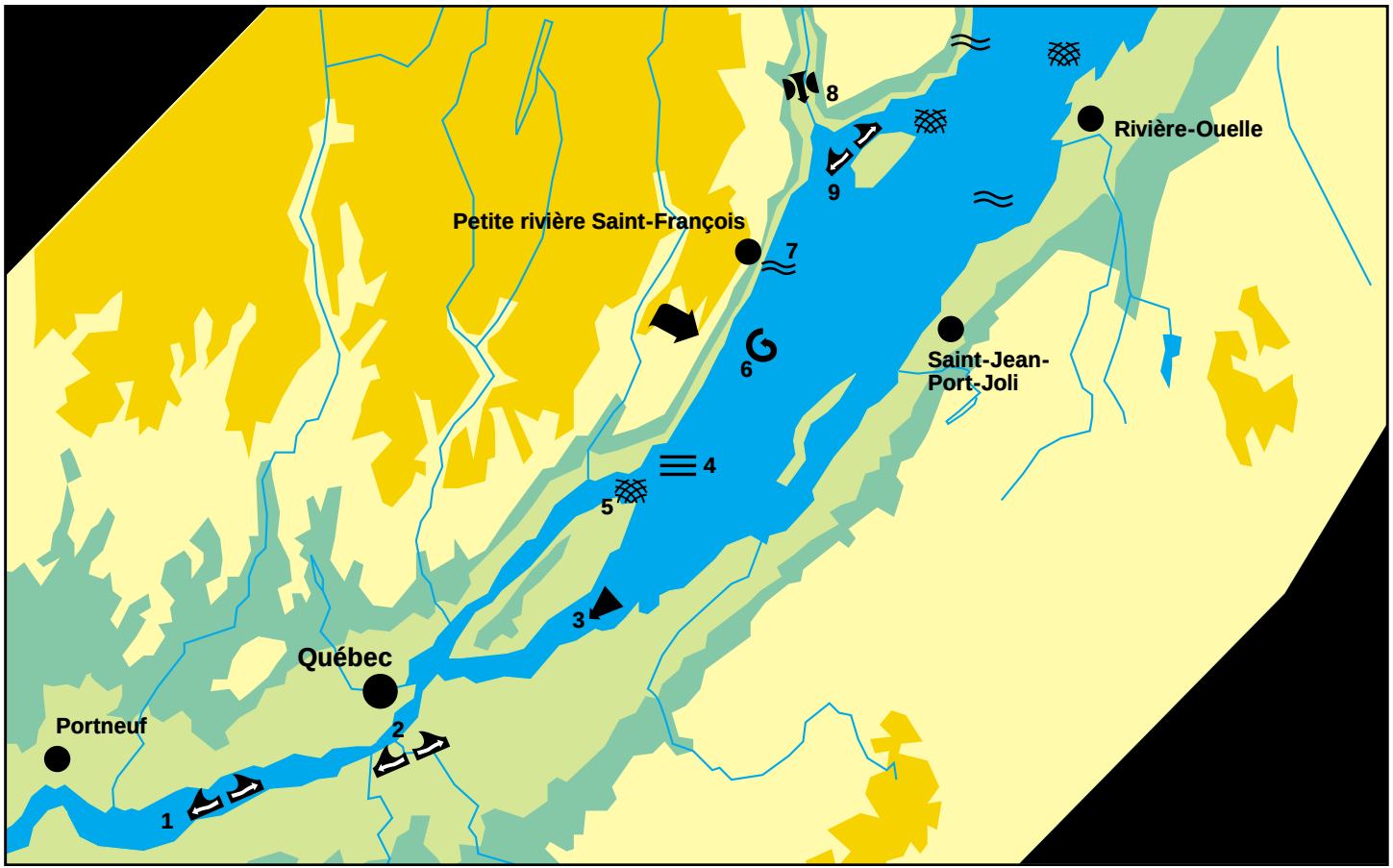


Chart 1233

10. Traverse de Saint-Roch

Winds Northeasterly or Southwesterly, against the current

High, steep waves. Chop. Very strong tidal currents. Shallow area.

Navigation very difficult.

11. Pointe du Bout d'en Bas (Île aux Coudres)

Winds Southwesterly

Cross seas from the Southwest and the West, offshore. At rising tide: breaking waves.

Dangerous.

Chart 1234

12. Banc des Anglais

Winds Northeasterly or Southwesterly

High, breaking waves.

13. Cap aux Oies to Pointe aux Orignaux

Significant chop, particularly at ebb tide.

Winds Northeasterly, even at 15 knots

Special case: close to Cap aux Oies, immediately after low tide, very strong chop. Tidal currents cross.

Very difficult conditions.

14. Haut-fond Morin

Winds Northeasterly

Breaking waves, refraction and cross seas to the South. Phenomenon accentuated by tidal currents.

15. Îles de Kamouraska

Winds Westerly or Northwesterly

High waves and breaking waves near the flats.

16. Gros Cap à l'Aigle and Cap au Saumon

Winds Northeasterly and Easterly

Near the points of the capes: cross seas. Wind deviates and accelerates as a result of corner and barrier effects.
Chop and eddies at certain points in the tide cycle.

17. Passe de l'Île aux Lièvres

Winds Easterly at ebb tide

Strong chop on top of swell waves.

18. Île Blanche

Winds Northeasterly against the current, on the Northeast side of the island

Navigation difficult.

Chart 1235

19. Pointe de la rivière du Loup

Winds Northerly or Northeasterly, at ebb tide

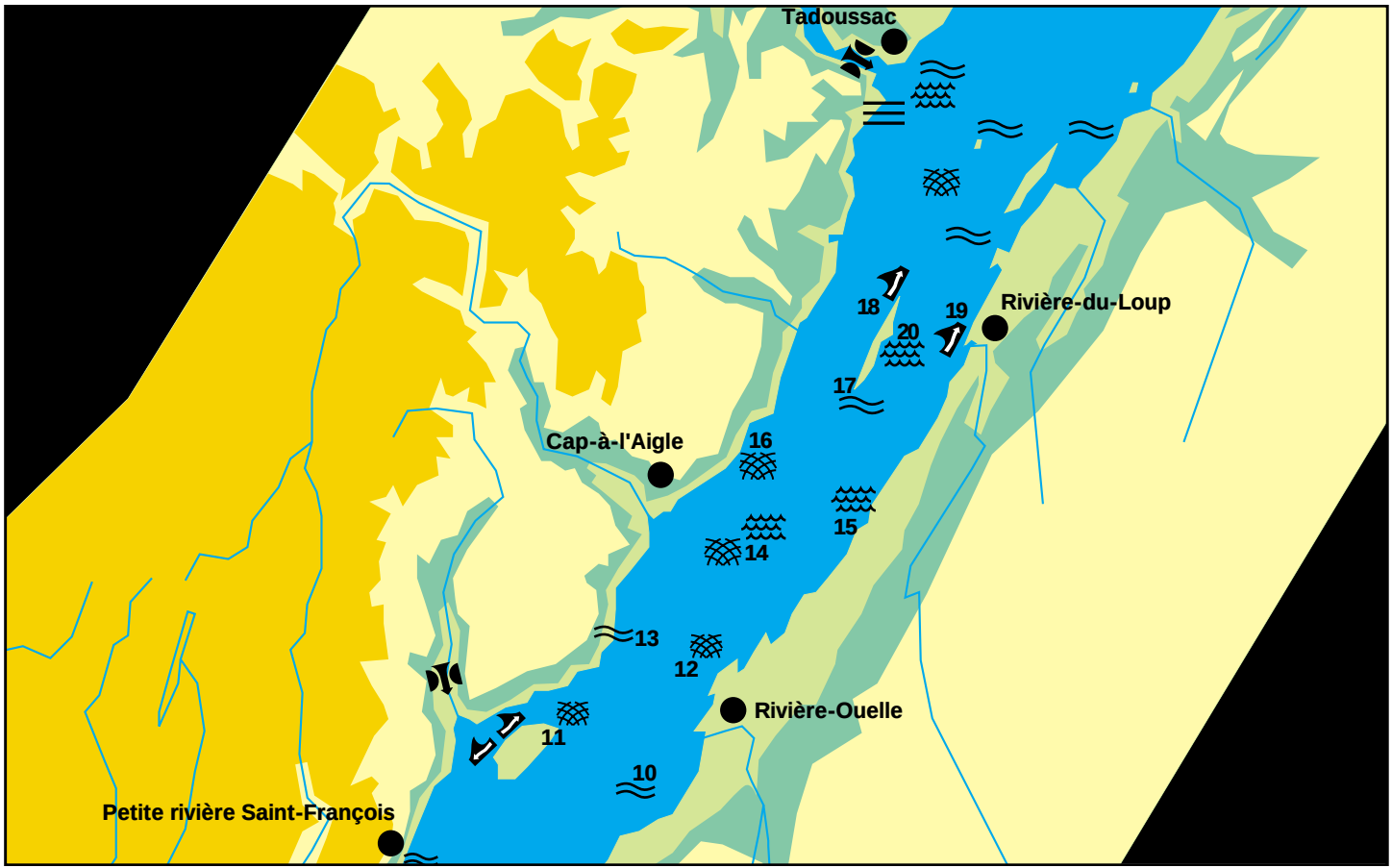
High waves near the wharf.

20. Brisants Barrett and Hauts-fonds du Milieu

Winds Northeasterly

Breaking waves, especially at ebb tide.

Québec Pointe-des-Monts



21. Rocher de Cacouna to the South tip of Île Verte

Winds against the current
Strong chop. Strong tidal eddies.

22. Mouth of the Saguenay

Charts 1203 and 1235

Winds Easterly, at ebb tide
Dangerous conditions. Avoid this area. Current 7 knots.

Winds Westerly or Northwesterly
Extremely strong gusts of wind reaching or exceeding 60 knots. Channelling and funnelling effects. Frequent fog, particularly in August, because of cold water.

At the mouth of the Saguenay, Northwesterly winds may be 10 to 15 knots stronger than those observed at the Île Rouge automatic reporting station.

23. Île Rouge

Winds Northeasterly
Cross seas Southwest of the island.

24. Bancs de l'île Rouge

Winds from any direction
Very confused seas. At all times: strong chop, particularly on the West side.

25. Île Verte to Île aux Basques

Chart 1235

Strong chop, particularly between Île Verte and the Bancs de l'Île Rouge.

Winds Southwesterly at rising tide
Short, steep waves near Île Verte. Convergence effect.

26. Cap de Bon-Désir

Winds Northeasterly
Wind accelerates and deviates, cross seas offshore from the point. Barrier and corner effects.

Difficult to make way.

27. 48° 21' - 69° 20' - Point 6A

Winds Northeasterly or Southwesterly and when gale force
High waves.

Difficult seas.

28. 48° 21' - 69° 07'

Winds Northeasterly or Southwesterly and when gale force
High waves. Underwater mountain.

29. Île du Bic - 5 nautical miles to the West

Chart 1236

Winds Northeasterly or Southwesterly and when gale force
High waves produced by underwater mountain.

Québec Pointe-des-Monts

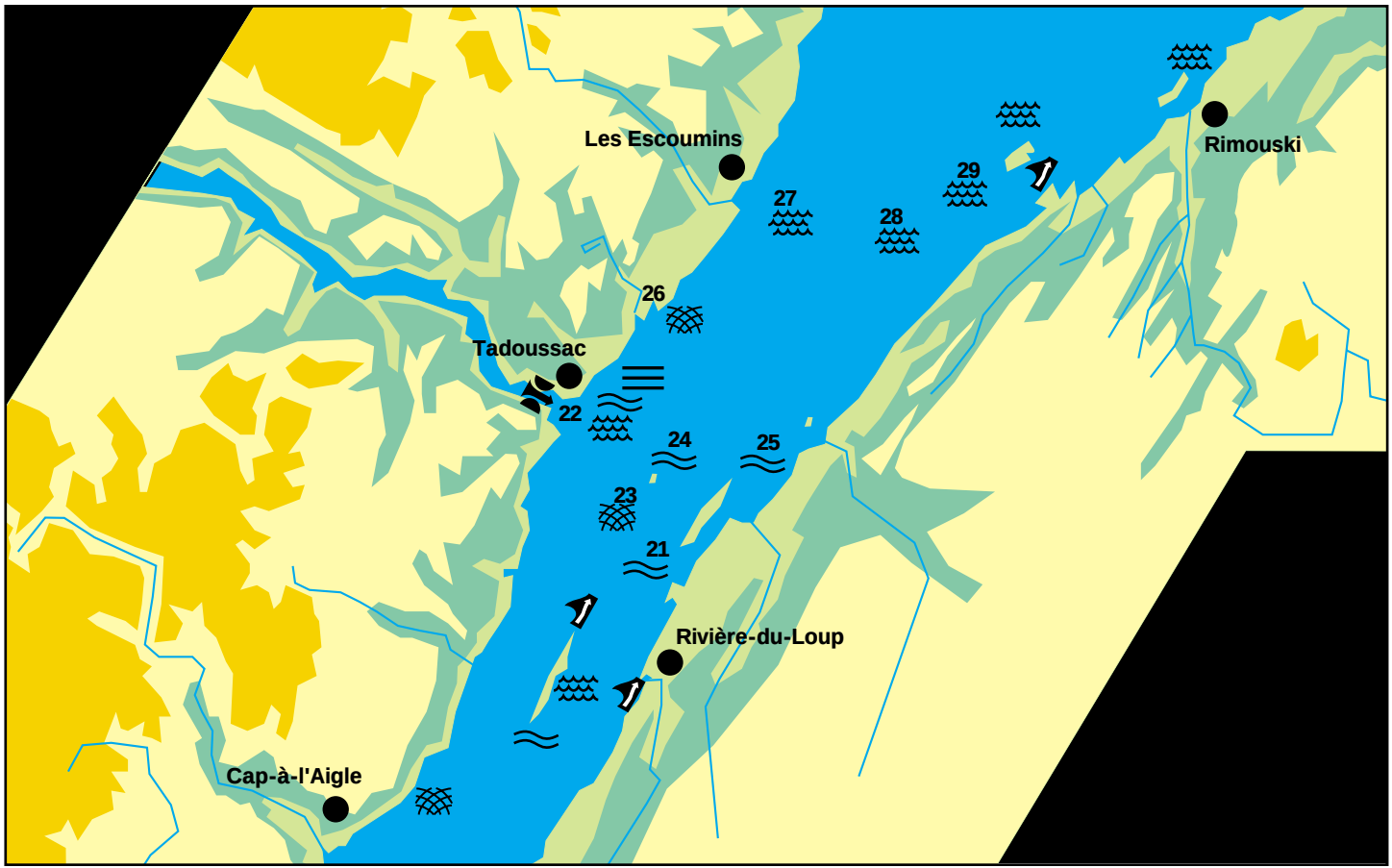


Chart 1236

30. Île du Bic

Winds Northeasterly and at ebb tide
High waves in the channel between the island and the shore, caused by the wind blowing against the currents.

31. Île du Bic - Northern part and close to Île Bicquette lighthouse

Winds Northeasterly
High waves.

Difficult conditions.

32. Rimouski (harbour)

Winds Northeasterly
High waves over shoals, up to about 3 nautical miles offshore.

33. Pointe à Michel

Winds Southwesterly
Strong seas offshore.
Shallow waters.

Winds Easterly at ebb tide
Strongly breaking seas. Wind opposing current at mouth of Rivière Bersimis.

Difficult.

34. Battures de Manicouagan (flats)

Winds Easterly, Northeasterly, Southeasterly or Southwesterly, against tide
Short waves, accentuated by shoals.

Navigation difficult.

35. Baie-Comeau

Winds Easterly and Southeasterly
Impressive swell flowing into Baie des Anglais.

Navigate with caution.

36. Anse Saint-Pancrace

Winds Southeasterly and Southerly
Impressive swell flowing into bay.

Navigate with caution.
Watch for katabatic winds.

37. Matane

Winds Northerly or Northeasterly
Steep waves and very strong swell at entrance to pleasure boat harbour. Caused by channelling of waves between two wharfs and outflow from Rivière Matane.

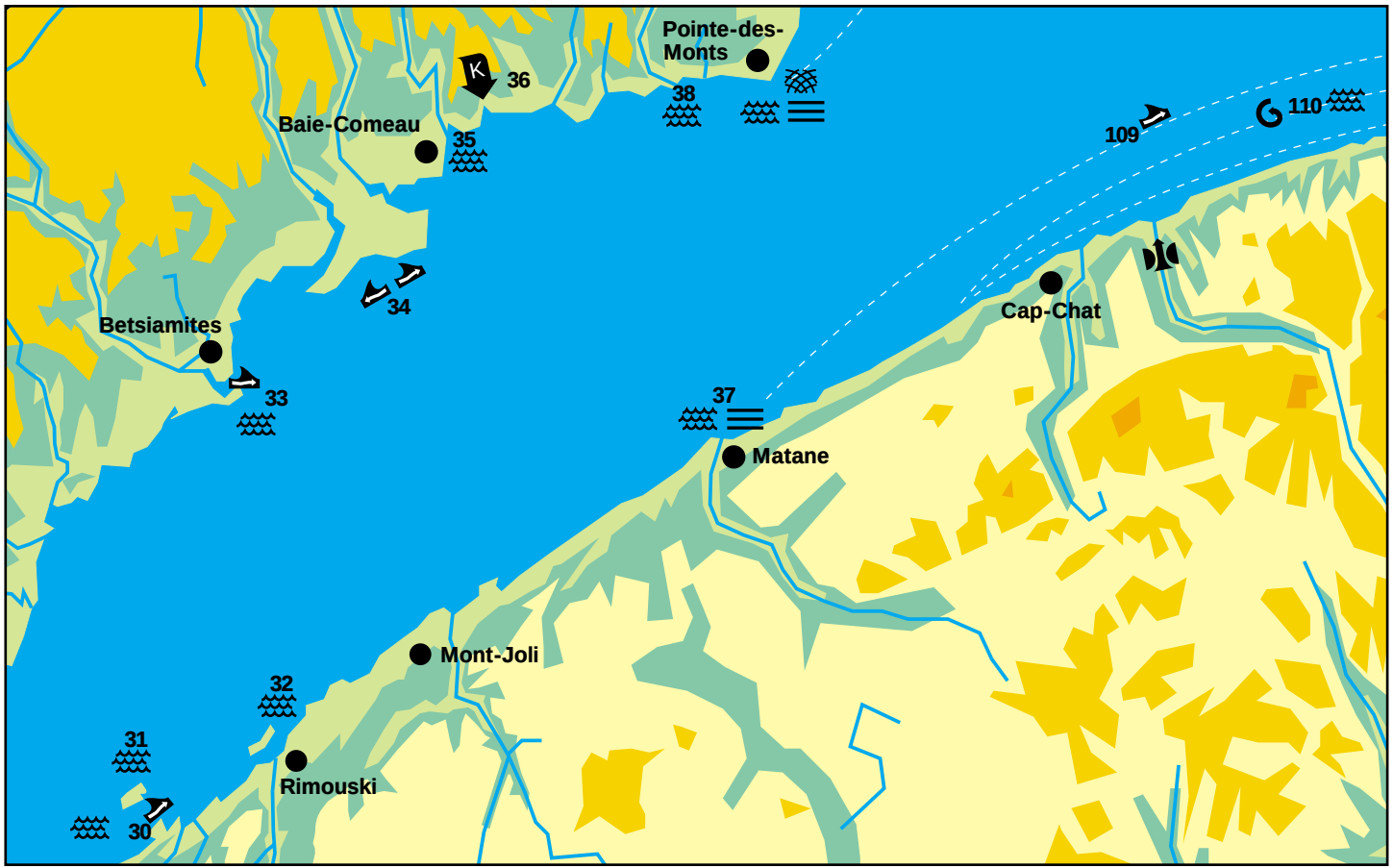
Frequent fog.

Conditions may become dangerous.

38. Godbout

Winds Easterly or Southeasterly
Impressive swell flowing into bay.

Québec Pointe-des-Monts



Pointe-des-Monts Cap Whittle

This is the gateway to that veritable inland sea known as the Gulf of St Lawrence. It is also the door through which the Easterly wind surges into the estuary, forced into the funnel formed by the North and South shores.

Northeast of Pointe-des-Monts, the sharp relief of the Archipel des Sept Îles creates gusty winds.

In the Archipel de Mingan, the combination of uneven seabed and strong tidal currents sometimes makes navigation dangerous, as is often the case among the islands on the mid and lower Côte-Nord.

As one moves East, however, the tide becomes weaker. Mariners will find that the strength of the tidal currents does not necessarily correspond to the height of the tides.

The Easterly wind is particularly strong in the Détroit de Jacques-Cartier, where Anticosti and the North shore form a huge funnel. This wind produces an impressive swell on the Bancs de Mingan.

Along the Basse-Côte-Nord - the lower North shore - only from Baie Johan-Beetz to Kegaska will mariners find a smooth shoreline and deep water.

Be careful near the river mouths on the North shore. At ebb tide, the strong currents from these rivers create very difficult, if not dangerous, seas.

Anticosti

The great island of Anticosti has 2 faces. On the North, it has steep cliffs and numerous capes, near which mariners will encounter cross seas. The water is quite deep.

On the South, the land slopes gently away to the sea. But don't be deceived by appearances. Its shoals and reefs are the graveyard of over 400 ships. *Watch out for gusts of wind.*

There is frequent fog in the Pointe-des-Monts and Havre-Saint-Pierre areas as a result of cold water rising from the river bottom

Pointe-des-Monts ✝ Cap Whittle

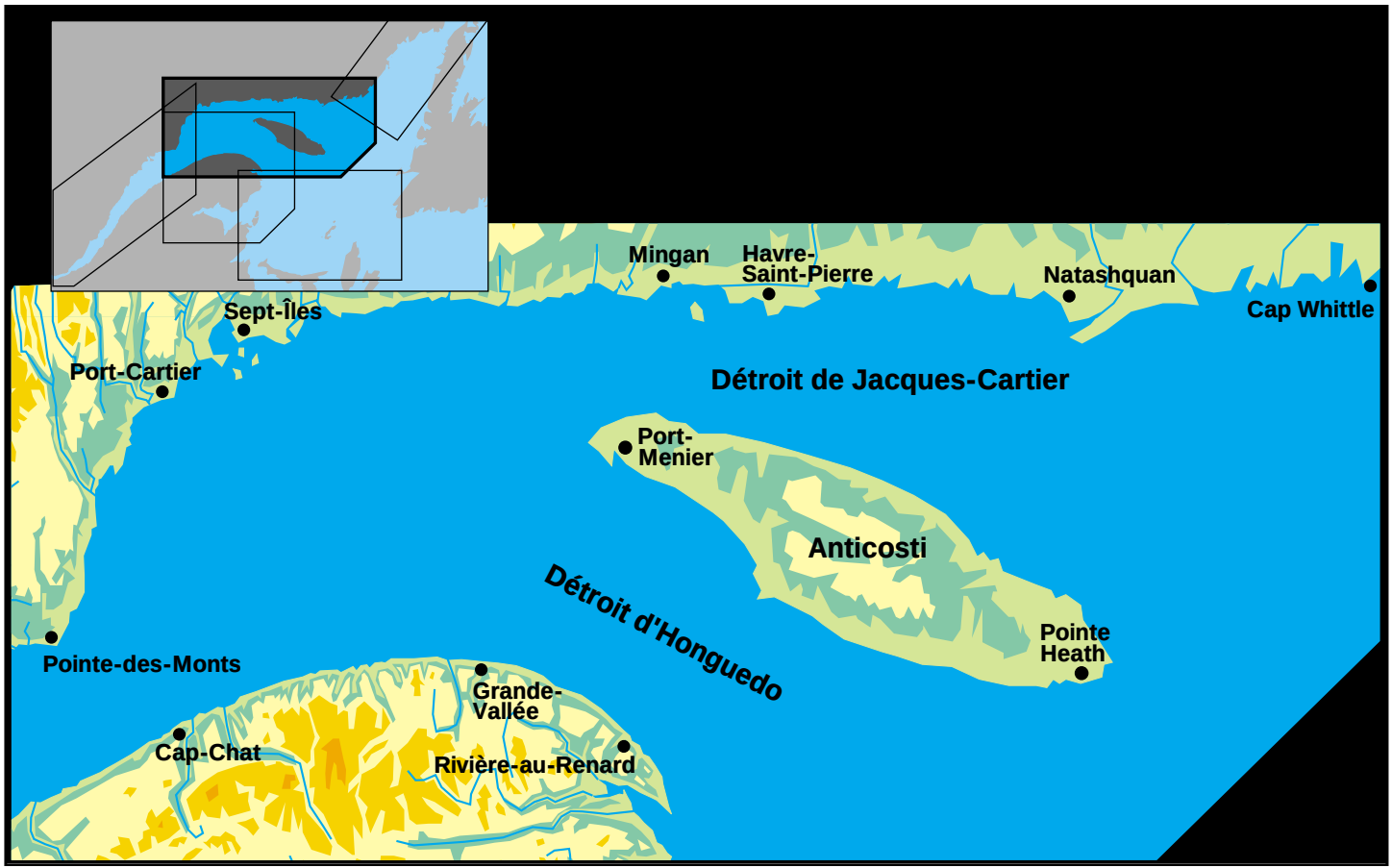


Chart 4026

39. Pointe-des-Monts

Winds Easterly
Cross seas. Wind deviates and accelerates as a result of barrier and corner effects. Conditions may become very difficult.

Dangerous seas within 3 or 4 nautical miles of the point.

Winds gale force from the Southwest
High, short, sharply breaking waves. Southeast of the point, bottom rises from 180 to 40 fathoms. Frequent fog caused by cold water rising to the surface.

40. Pointe-des-Monts to Pointe aux Jambons

Winds gale force from the East
High waves 3 to 5 nautical miles offshore. Bottom rises rapidly.

41. Île aux Oeufs

Winds Easterly or Northeasterly at ebb tide
Breaking waves.

Avoid passing between the island and the shore.

42. Île du Grand Caouis

Winds Easterly or Northeasterly at ebb tide
Breaking waves.

Avoid passing between the island and the shore.

43. Port-Cartier

Winds Easterly or Southeasterly
High waves near the Cascades (Rayonnier) wharf. Convergence or barrier effects.

44. Pointe aux Jambons

Winds Easterly
High waves. Underwater cliff. Corner effect near the point, which accentuates the phenomenon.

Stay several nautical miles off the point.

45. Rivière Sainte-Marguerite

Winds Southeasterly
Cross seas and breaking waves against the currents and over sandy shoals. Accentuated by acceleration of the wind along the Northeast side of the bay. Corner effect.

Winds Northerly or Northwesterly
Short, steep waves that break easily at rising tide. Wind accelerates. Channelling effect.

Dangerous conditions at the mouth of the river.

Pointe-des-Monts ✳ Cap Whittle

Charts 1220 and 4026

46. Chenal de l'Ouest

Winds Southwesterly or Southerly
High waves. Amplified by the funnelling effect created by the Îlets Dequen and Pointe à la Chasse.

47. Pointe à la Chasse

Winds Southerly or Southwesterly
Strong swell between the point and Île du Corossol.

Winds Southeasterly
Wind accelerates along the West side of the point, toward Rivière Sainte-Marguerite.

48. Baie des Sept Îles

Winds Southerly or Southwesterly
Impressive swell flowing into the Chenal du Milieu and high, steep waves up to 2 nautical miles offshore from the Iron Ore wharfs.
Reflection effect.
When there is a Southerly swell: surf, even when winds light.

49. Île du Corossol

Winds Easterly
Confused seas and wind accelerates around Southern tip. Corner effect.

50. Ile La Petite Boule

Winds Easterly
Strong swell on Eastern side.

51. Ile La Grosse Boule

Winds Easterly
Confused seas and strong swell.
Wind accelerates around Southern tip.
Corner effect.

52. Sept-Îles to Rivière-Saint-Jean

Chart 4026

Winds gale force out of the South, Southwest or Southeast
Strong swell. Produced by shallow and irregular seabed along the shore, up to 20 nautical miles offshore.

53. Rivière Moisie

Winds Southerly, Southwesterly and particularly Southeasterly
High, very short waves breaking at the mouth of the river, caused by the river current.

Very dangerous. Risk of capsizing. Particularly at ebb tide.
Stay several nautical miles offshore in these conditions. Enter the river only at high tide.

Pointe-des-Monts ✳ Cap Whittle

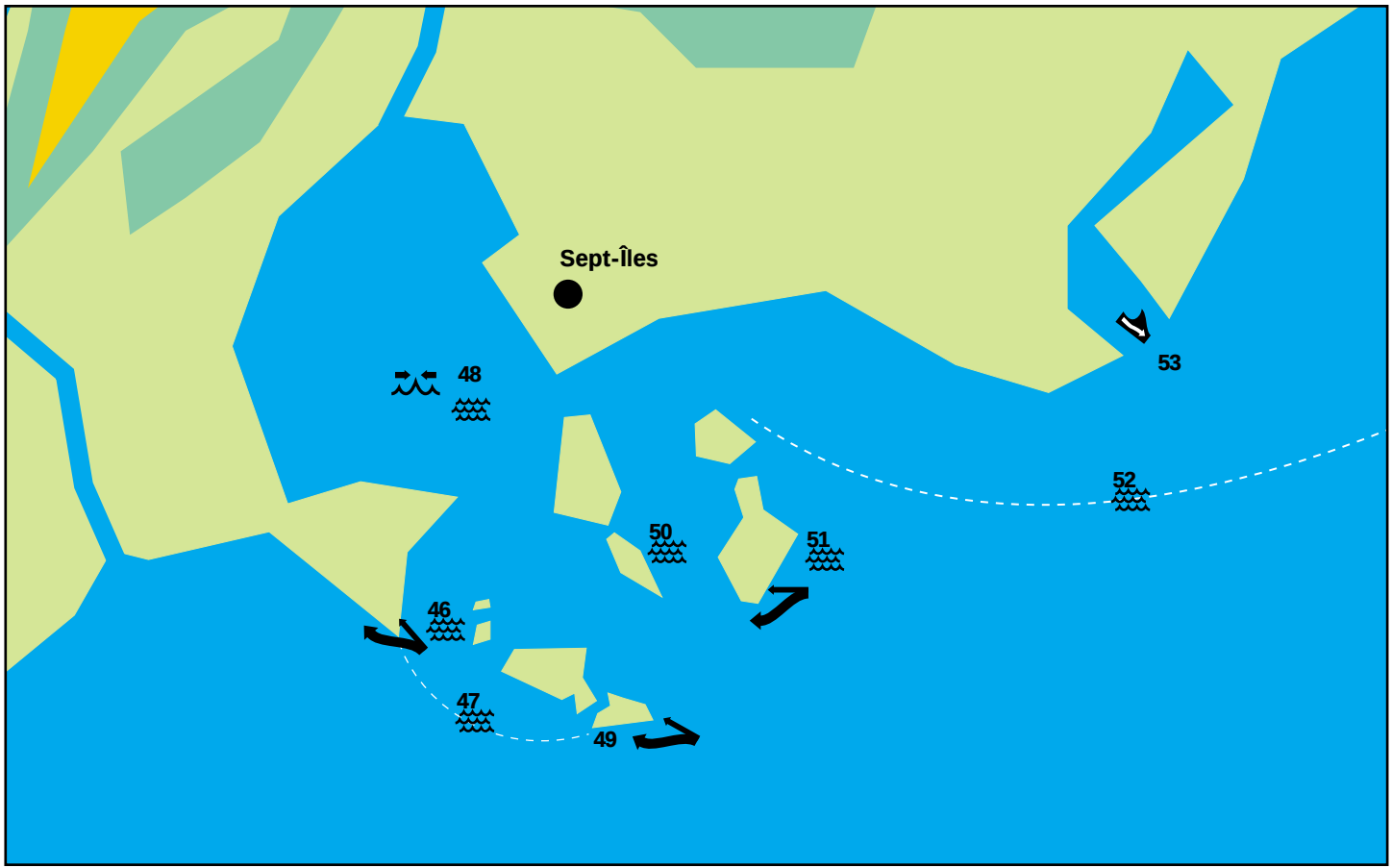


Chart 4026

54. Banc Blaskowit

Winds gale force out of the East
Strong refraction effect and breaking waves near the bank. Underwater point.

55. Rivière Sheldrake

Winds Southerly, Southeasterly or Southwesterly
High breaking waves forming a bar 20 metres or so off the shore. Wait for rising tide before entering the river.

56. Rivière-au-Tonnerre

Winds Southwesterly at ebb tide
High, breaking waves at the entrance to the harbour.

Hazardous.
Avoid Banc Rouge, 20 nautical miles to the East-Southeast. Breaking waves and shoals.

57. Banc Parent

Winds gale force out of the Southeast
Cross seas produced by channelling effect from East in Détroit de Jacques-Cartier and by shoals.

Dangerous conditions.

Charts 4025 and 4026

58. Pointe de l'Ouest

Winds gale force out of the Southeast
Heavy, cross seas offshore, produced by Easterly winds channelled to the North of Anticosti by Détroit de Jacques-Cartier.

59. Port-Menier

Winds Southerly and particularly Southeasterly
Strong, breaking waves. Sea bottom rises.

Very difficult access to wharf.

60. Rivière Jupiter

Winds Southerly, Southwesterly or Westerly
Breaking waves creating a bar.
Numerous sand banks.

Dangerous river mouth.

61. Pointe Carleton

Winds Westerly
Cross seas up to a few nautical miles offshore.

62. Cap de la Table

Winds Westerly
Cross seas up to a few nautical miles offshore.

63. Pointe Heath

Winds Easterly
Swell accentuated offshore by submerged segment of point.

Winds Westerly
Heavy, cross seas offshore, created by refraction.

Difficult to very difficult conditions.

Pointe-des-Monts ✳ Cap Whittle

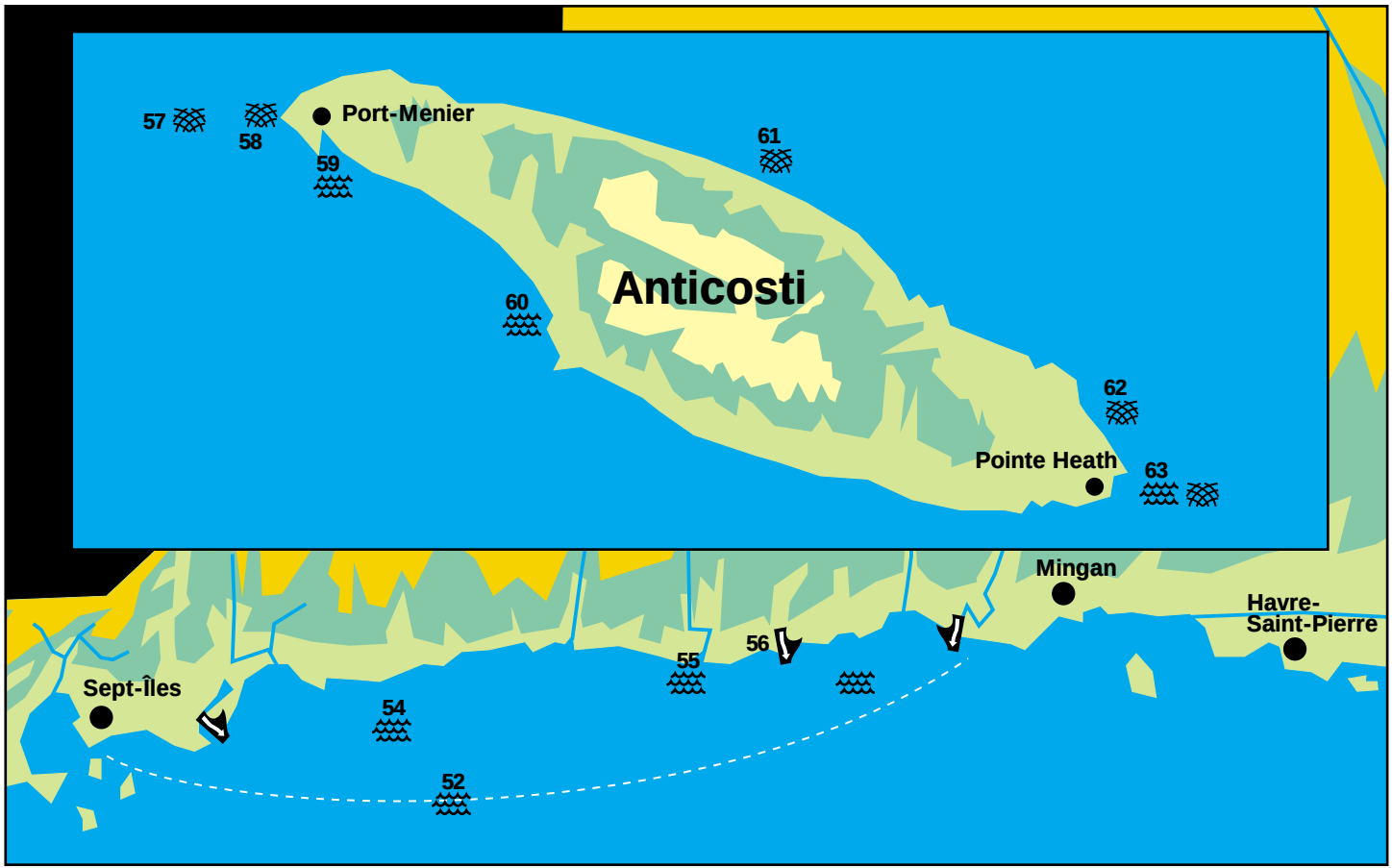


Chart 4026

64. Rivière Saint-Jean

Winds Westerly or Southwesterly at ebb tide
Breaking waves forming a bar.
Produced by sandy shoals.

Dangerous river mouth.

65. Île aux Perroquets and Île Nue de Mingan

Chart 4432

Winds Westerly or Southwesterly
Cross seas in the lee of the islands.
Produced by refraction.

Sometimes very difficult.

66. Banc de Mingan

Winds Southerly, Southeasterly, Southwesterly or Easterly
Impressive swell produced by shoals.

67. La Longue Pointe to Île Nue de Mingan

Winds Westerly at rising tide
High, breaking waves in channel.

68. La Longue Pointe to Mingan

Winds Southerly
Strong, breaking waves close to shore.

Strongly advisable to avoid this area.

69. Île du Havre de Mingan

Winds Westerly or Southwesterly at rising tide
Heavy seas between the shore and the island, at the Western entrance to the channel.
Funnelling effect and shoals.

70. Chenal de Mingan

Winds Westerly at rising tide
High, breaking waves. Particularly between Île du Havre de Mingan and La Grande Île.

Winds Southerly or Southwesterly
Cross seas accentuated by tidal currents.

May become dangerous.

71. Île aux Bouleaux to Petite Île aux Bouleaux

Winds Westerly or Southwesterly
Heavy seas at Western entrance to islands, particularly at rising tide. Funnelling effect and shoals.

72. La Grande Île

Winds Westerly, Southwesterly, Southerly, Southeasterly or Easterly
High waves South of the island. Shoals.

Navigation difficult.

73. Chenal à la Proie - South entrance

Winds Northerly or Southerly, against current
Very confused seas.

Pointe-des-Monts ✳ Cap Whittle

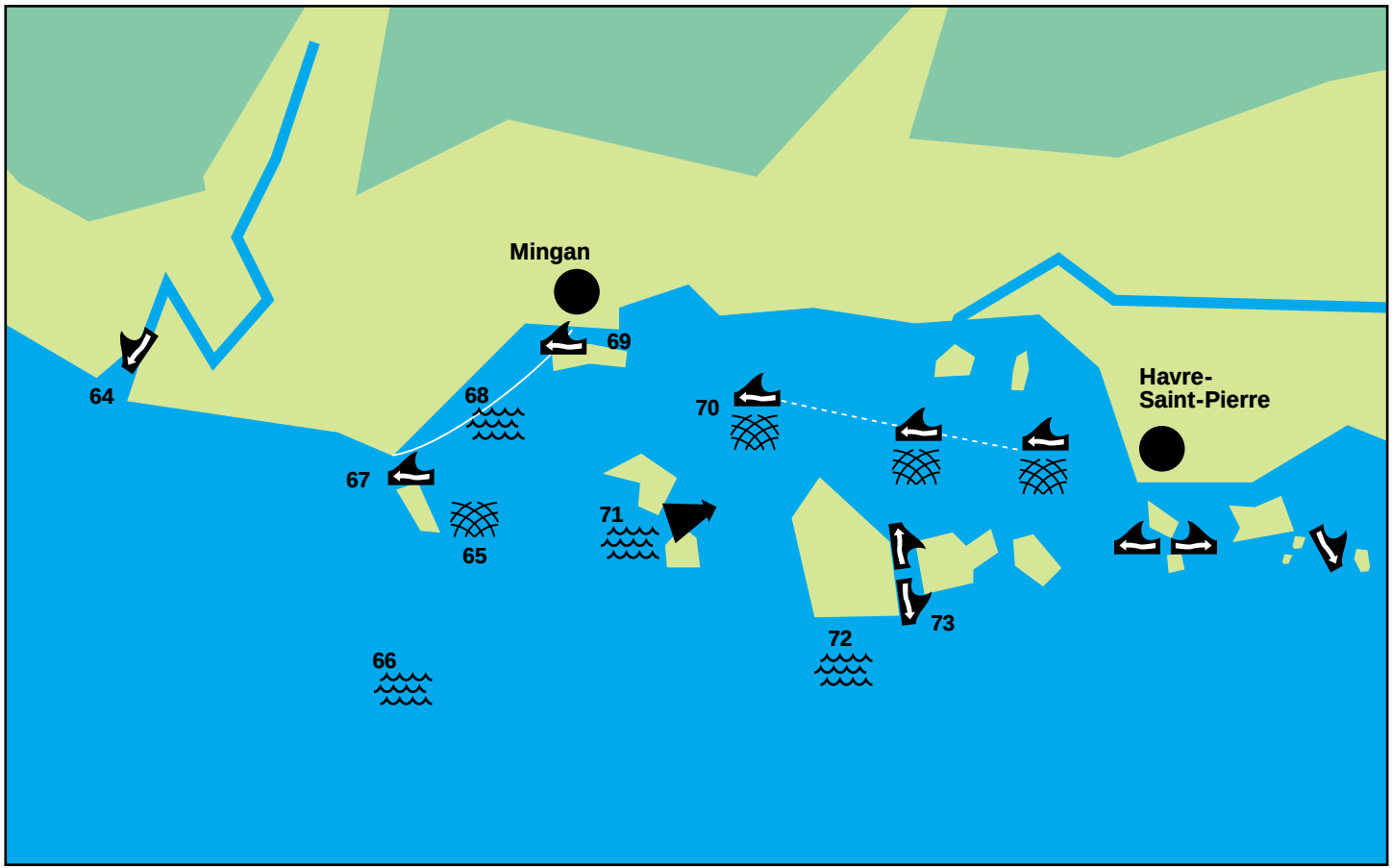


Chart 4432

74. Chenal du Fantôme

Winds against current
Very confused seas.

75. Chenal de la Petite Île au Marteau (Chenal Walrus)

Winds Southerly at ebb tide

Difficult.

Chart 4456

76. Haut-fond à l'Eau Claire

Winds Westerly, Easterly, Southwesterly, Southerly or Southeasterly
Strong swell and breaking waves.

Difficult area.

77. La Grande Pointe à l'Eau Claire

Winds Easterly
Cross seas.
Stay more than 3 nautical miles offshore.
Corner effect strengthens wind at the tip and causes it to shift to Northeast.

78. Baie des Trilobites

Winds Southerly or Southwesterly
Strong swell at entrance to bay.

79. Île Saint-Charles

Winds Southerly or Southwesterly
Zone of standing waves extending several nautical miles offshore.
Pronounced reflection effect West of island.

80. Île à la Chasse - Northwest tip

Particularly when wind Southwesterly against current
Strongly breaking seas.
Exceptionally strong chop.

81. Rocher de la Garde

Winds Easterly, Southeasterly, Southerly or Southwesterly
High, breaking waves.

Stay more than 3 nautical miles offshore.

82. Haut-fond Collins

Winds gale force out of the East, Southwest, South or Southeast
High, breaking waves.

Stay more than 3 nautical miles offshore.

83. Chenal des Saints

Winds Southeasterly
Strong swell. Funnelling effect.

84. Île Sainte-Geneviève

Winds Easterly
High, breaking waves over La Cormoraillère Sainte-Geneviève (Rochers Les Saints) and Rochers Bowen.

85. Pointe Nord-Est

Winds Easterly
Strong swell. Funnelling effect.

Pointe-des-Monts Cap Whittle

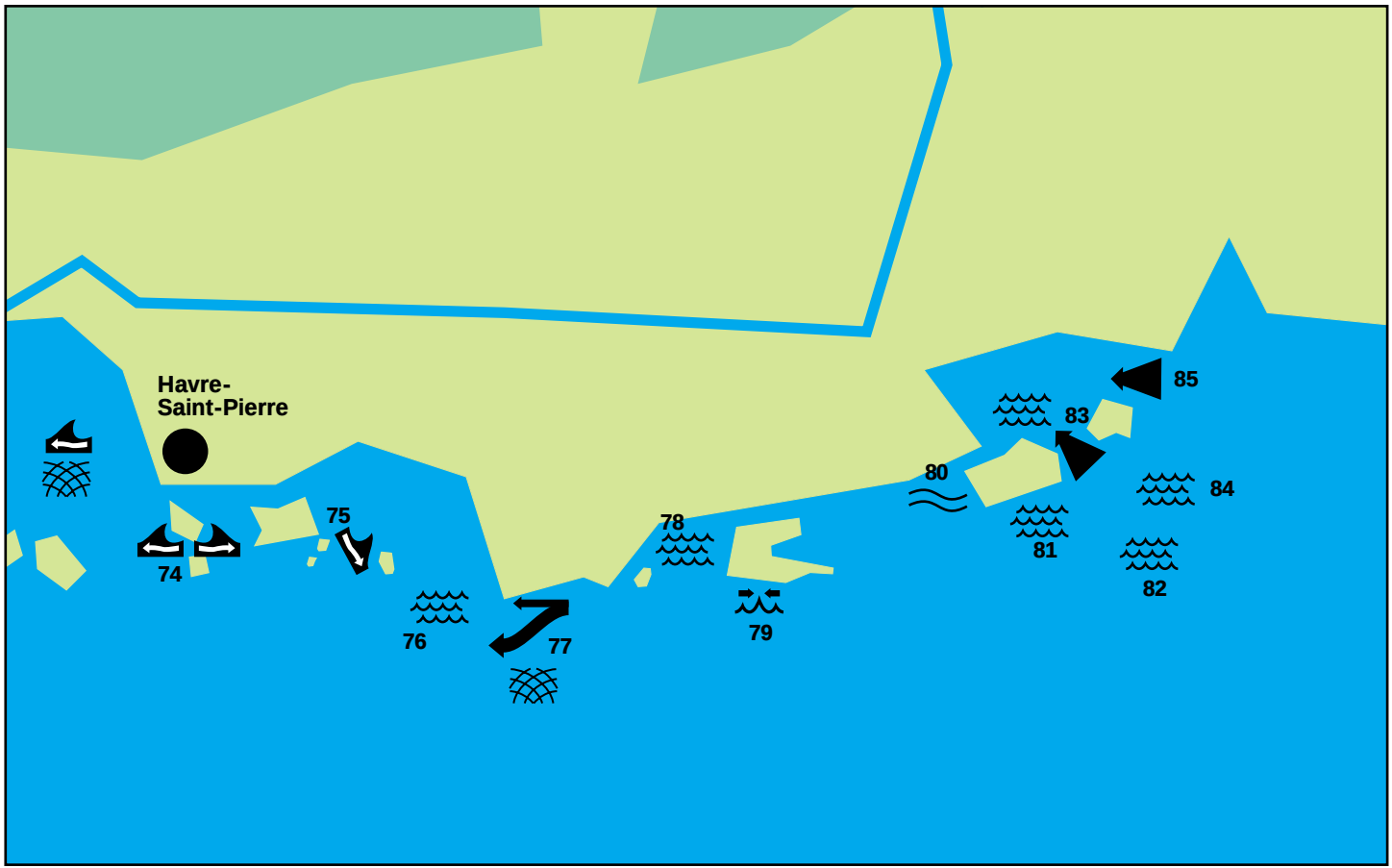


Chart 4456

86. Baie Johan-Beetz

Winds Southerly or Southwesterly
Strong swell. Funnelling effect.
Outflow from Rivière Piashti.

Difficult access to harbour.

Avoid at ebb tide. Strongly breaking seas.

Charts 4455 and 4454

87. Baie Johan-Beetz to Natashquan

Winds gale force out of South, Southeast or Southwest
High waves.

Stay more than 3 nautical miles offshore.

Chart 4454

88. Rivière Natashquan

Winds Westerly, Southwesterly or Southerly, at ebb tide

Dangerous. Strong river current.

Winds Southerly
Wharf exposed to swell.

Very difficult to come alongside.

89. Pointe de Natashquan

Winds Southerly, Southeasterly or Southwesterly

Difficult.

Winds Southwesterly
Shorter, breaking waves at rising tide.

More difficult.

Winds Southeasterly
Strong swell at ebb tide.

Winds gale force, offshore
High waves. Uneven sea bottom.

90. Haut-fond Court

Winds Southerly, Southeasterly or Southwesterly
Breaking seas.

91. Kegaska

Winds Southerly, Southeasterly or Easterly
Very difficult access.

92. La Romaine

Charts 4453 and 4440

Winds Southerly, Southeasterly or Southwesterly
Waves flowing directly into harbour.

Very difficult. Manoeuvring dangerous. Not advisable not to attempt to come alongside.

93. La Romaine to Îles Sainte-Marie

Winds Southerly, Southeasterly, Southwesterly and particularly Easterly
Breaking seas up to 10 nautical miles offshore.

94. Rivière Olomane

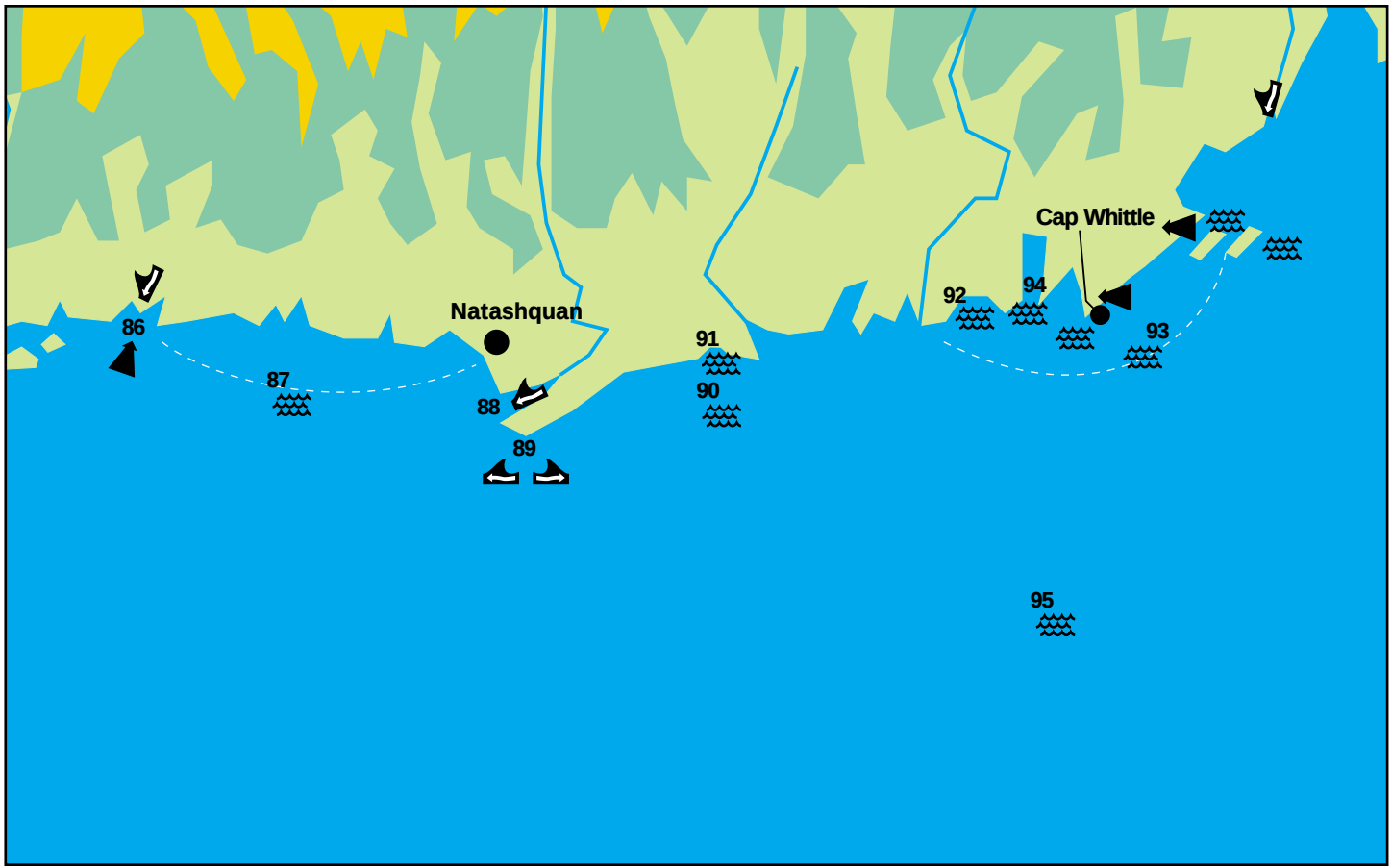
Winds Southerly or Southwesterly
Breaking waves at river mouth.

95. Banc Beaugé

Chart 4021

Winds gale force out of East, West or South
Seas always stronger over bank.

Pointe-des-Monts ✳ Cap Whittle



Cap Whittle Blanc-Sablon

This section marks the Eastern boundary of both Québec and the St Lawrence. It leads directly to the Strait of Belle Isle.

Its shoreline is jagged and fairly low, dotted over most of its length with a string of islands and islets. Local effects are marked here, including channelling and katabatic winds in some of the valleys.

The tides are weak, but the narrow passages between the islands create strong currents.

Up to 20 to 25 nautical miles offshore, high seas are accentuated by the shallow bottom, less than 35 metres deep.

In addition to creating high seas, the Southwesterly wind is strengthened by the funnel effect produced between Québec and Newfoundland shores.

Finally, this section's *trademark* is surely its famous persistent fog. The closer one gets to the Strait, the greater the risk of encountering such fog

Cap Whittle Blanc-Sablon

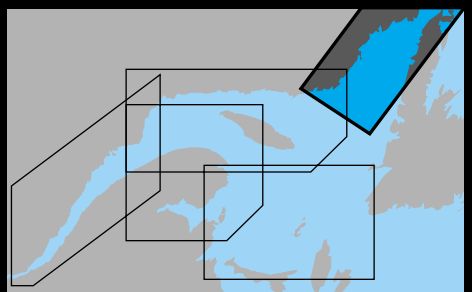


Chart 4440

96. Cap Whittle

Winds Easterly
Steep waves created by channelling and funnelling effects, between Île du Lac and Cap Whittle lighthouse.

Chart 4468

97. Île Galibois

Winds Easterly
Strong swell accentuated by ebb tide, between Île Galibois and Îles Sainte-Marie. Channelling and funnelling effects.

Advisable to avoid this area.

98. Îles Sainte-Marie

Winds gale force out of Southwest, Southeast, South and particularly East
Violent, breaking seas up to 20 nautical miles offshore. Area scattered with reefs and shoals.

99. Chevery — Rivière Nétagamiou

Winds Southerly or Southwesterly, at ebb tide
Sharply breaking, short waves.

Dangerous.

100. Cap Mackinnon (Île du Petit Mécatina)

Winds Easterly
Breaking seas offshore. Corner effect. Shoals.

Advisable to avoid this area. Stay more than 3 nautical miles offshore.

Chart 4021

101. Baie des Moutons

Winds Southwesterly, close to point
Strong, breaking waves, sometimes impassable. Sea bottom rises abruptly.

Dangerous area.

Winds gale force from any direction, except Northwest
Uneven bottoms up to 10 or 20 nautical miles offshore.

Very difficult seas.

102. Île du Gros Mécatina

Winds Easterly
Strongly breaking seas between Île du Gros Mécatina and Île Plate. Channelling effect.

103. Île aux Trois Collines

Winds Easterly
Heavy seas. Pronounced corner effect.

Cap Whittle Blanc-Sablon

Chart 4021

104. Baie de Jacques-Cartier to Baie du Vieux Fort

Winds Northerly
Strong wind channelled by shore up to several nautical miles offshore. Particularly strong at the heads of Mistanoque, Napetipi and des Homards bays.

105. Baie de Brador

Winds Southwesterly

High waves. Access difficult. In poor weather, avoid passing between Île du Bassin and shore.

106. Banc Perroquet to Île Greenly

Winds Southwesterly at rising tide
Very strong chop.

107. Baie de Blanc-Sablon

Winds Westerly or Southwesterly, at rising tide
Heavy, confused seas in channel between bay and Île au Bois.

108. Strait of Belle Isle

Winds Southwesterly
Very strong swell at Western entrance, more pronounced when against current. During summer: risk of enormous fog banks in strait.

Persistent fog close to Labrador coast.

Winds Easterly
Fog in entire strait. Newfoundland coast normally clears first.

Winds Southwesterly or Northeasterly, against current
Heavy seas.

Cap Whittle Blanc-Sablon

Gaspésie Baie des Chaleurs

Where the mountains of the North shore bow out those on the South shore step in.

With its steep cliffs and the Appalaches mountains, the Péninsule de la Gaspésie forms a barrier, causing the winds to shift and accelerate. This phenomenon is particularly marked in late summer, when the Northwesterly wind blows more frequently and more strongly.

All along the St Lawrence, the deep valleys of the Péninsule de la Gaspésie form corridors for the wind to rush into and strengthen and, when it is from the South, to gust out over the river.

At sea, the Gaspé Current follows the coast up to 20 nautical miles offshore. Close to shore, it can reach 2 knots. When the wind is against the current, it produces waves that tumble and may even break.

Then there is the Baie de Gaspé which channels the Northwesterly and Southeasterly winds. Mariners have to take care.

Offshore, 2 banks, the Banc des Américains and the Banc de l'Orphelin, are known for their choppy seas.

Baie des Chaleurs

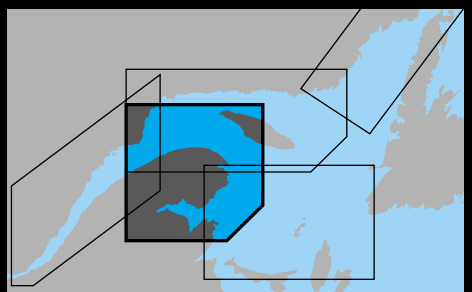
The entrance to Baie des Chaleurs is guarded to the North by the Haut-fond Leander and, to the South, by the Miscou shoals.

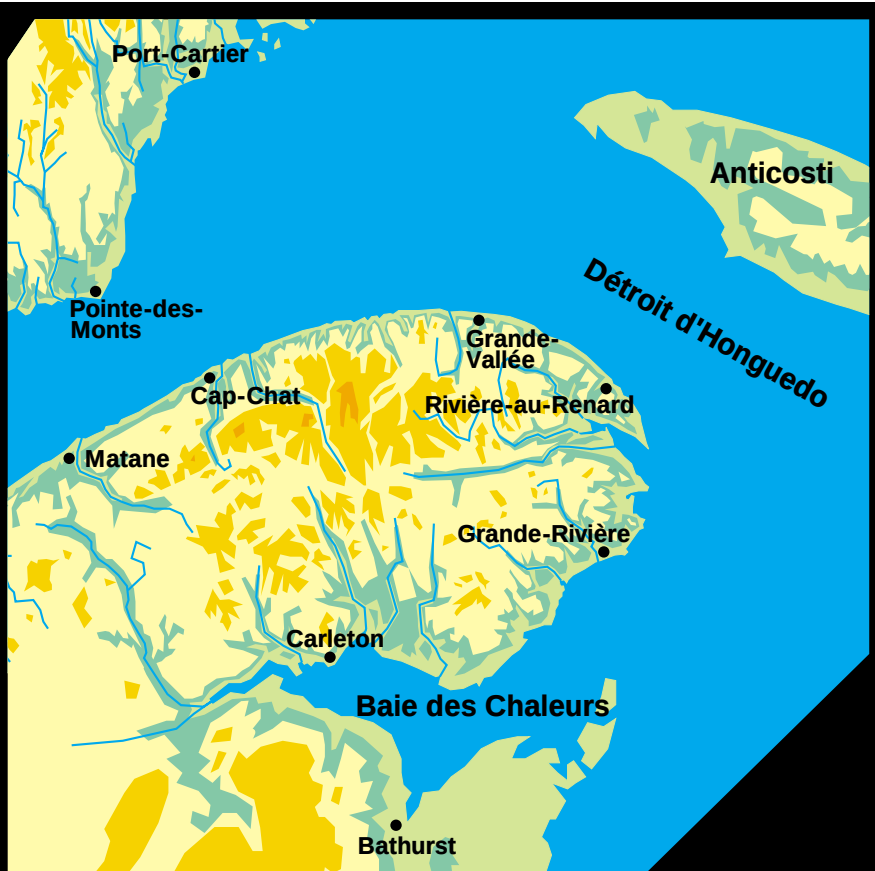
Its configuration tends to channel the wind for 2 reasons: the steep cliffs on its North side, and its V shape.

This means that in the middle of this section, off Nepisiguit Bay, there is a zone that is particularly windy and subject to high seas if the wind is from the Northwest or the Northeast.

Tidal currents in this section rarely reach one knot, except at the mouths of some rivers and some channels

Gaspésie Baie des Chaleurs





Gaspésie Baie des Chaleurs

Charts 1236 and 4026

109. Matane to Cap-des-Rosiers

Winds Easterly
High waves against the Gaspé Current.

110. Les Méchins to Grande-Vallée

Winds violent out of South, from fall to spring
Strongly breaking seas and turbulence close to shore.
Wind off Appalaches may occasionally reach storm force.

111. Les Méchins to Rivière-la-Madeleine

Winds Northwesterly
Cross seas all along shoreline.
Created by wind shifting to Westerly along coast and accelerated by barrier effect.

Difficult conditions.

112. Mont-Louis - L'Anse-Pleureuse - Rivière-la-Madeleine - Grande-Vallée

Winds Southerly
Steep valleys. Channelling effect.
Watch for katabatic wind. Gusts may exceed 40 knots: problems with anchoring at night.

Dangerous river mouths.

113. Petite-Vallée to Cap Gaspé

Winds gale force out of North, Northeast or Northwest
Heavy to very heavy seas close to shore.

Winds Northwesterly
Wind accelerated by convergence effect.

Sea bottom rises rapidly.

114. Rivière-au-Renard

Winds Northerly, Northeasterly or Northwesterly
Breaking waves up to harbour entrance.

Difficult.

Winds Northeasterly
Risk of surging sea in harbour. May cause moorage problems.

115. Cap Gaspé

Chart 4024

Winds Westerly or Northwesterly
Cross seas offshore. Refraction on both sides of the Presqu'île de Forillon.

Winds Southerly
Waves breaking on shoals Northwest of cape. Refraction.
Chop Southeast of cape at certain times during the tide cycle. Shallow.

Gaspésie Baie des Chaleurs

Gaspésie Baie des Chaleurs

Chart 4024

116. Baie de Gaspé

Winds Westerly or Northwesterly
Strong wind from mountains. Acceleration not very noticeable on Gaspé side, but marked on Forillon side. Channelling effect.

Winds Southeasterly
Channelling effect in bay.

Sea breeze, easily reaching 20 knots.

Winds gale force out of East or Southeast
Very strong swell.

NB: Gaspé weather is reported from the airport and may not correspond to conditions in the bay.

117. Douglastown

Winds Southeasterly
Strong swell.

118. Banc des Américains

Winds gale force from any direction, except West or Northwest
High, breaking waves.

119. Baie de Malbaie

Winds gale force out of Southeast
Heavy seas often preceded by fog.

120. Île Bonaventure

Winds Southerly or Northeasterly
Strong swell between the island and the shore. Shoals and channelling effect.

Navigation difficult.

Winds gale force out of East
Cross seas up to 10 nautical miles offshore, created by reflection.

121. Banc de l'Orphelin

Winds gale force from any direction
High, breaking waves.

122. Haut-fond Leander

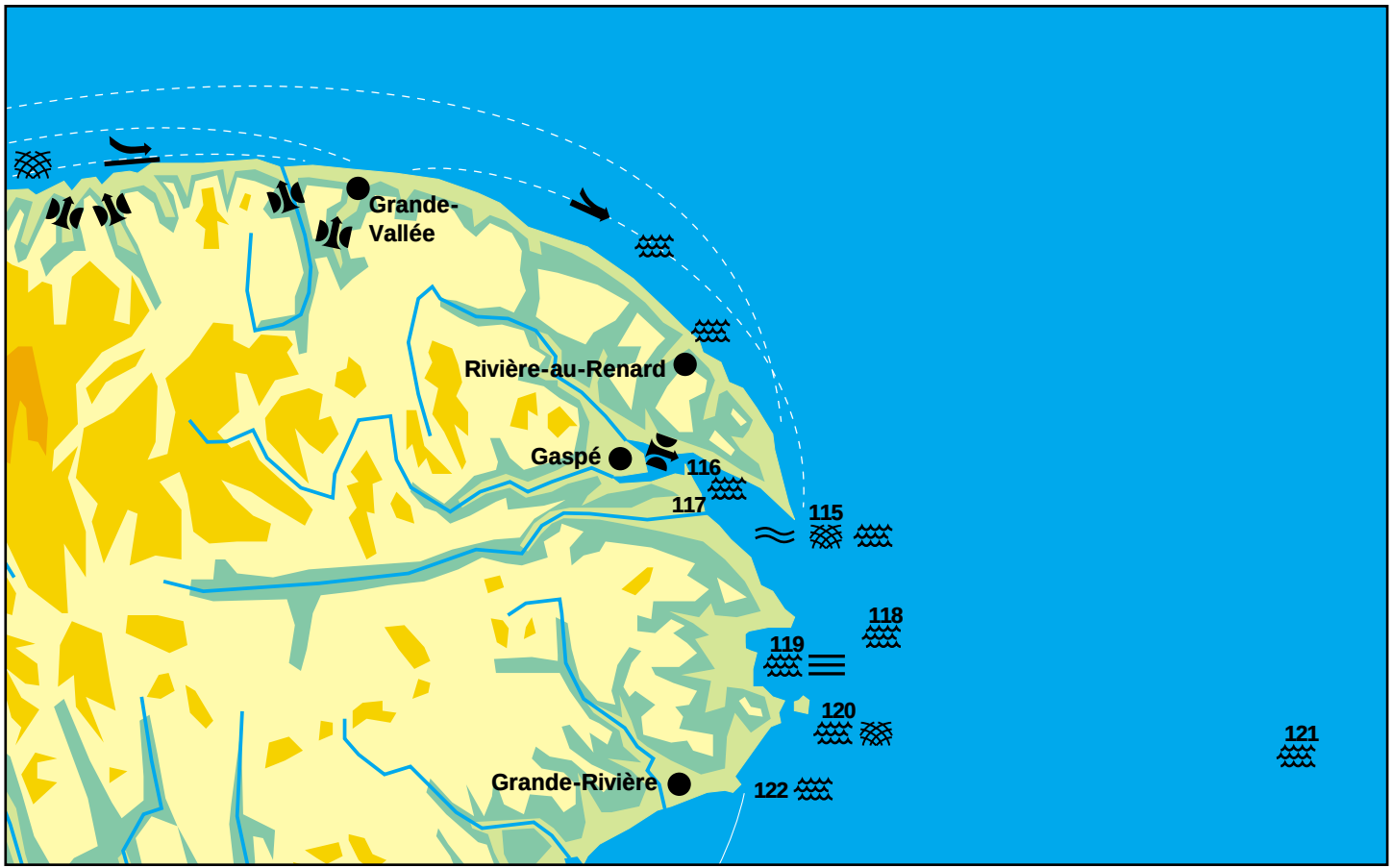
Chart 4486

Winds Easterly or Southeasterly
High, breaking waves. Cap d'Espoir extends underwater.

Very difficult zone.

One of the most difficult areas in Baie des Chaleurs.

Gaspésie Baie des Chaleurs



Gaspésie Baie des Chaleurs

Chart 4486

123. Cap d'Espoir to Pointe Bonaventure

Winds Easterly or Northeasterly
Large seas close to shore.
Convergence effect.

124. Pointe au Maquereau

Winds Easterly or Northeasterly
Convergence effect accentuated by corner effect.

125. Northwest Miscou Point to Maisonnette Point

Winds Westerly, Northwesterly, Northerly or Northeasterly
High waves and shoals.

Difficult access to all bays.

126. Miscou Island (Northwest side)

Winds Northwesterly
Cross seas accentuated by Miscou and Shippegan shoals. Wind shifting to Southwesterly, along shore.

127. Port-Daniel

Winds Easterly
Strong swell.

128. Baie de Paspébiac

Winds Southwesterly
Strong swell.

129. Bathurst

Winds Northerly, Northwesterly or Northeasterly
High waves at harbour entrance.
Shoals and funnelling effect.

Dangerous.
Tidal currents make access difficult.
Without appropriate information, avoid this area, except in fair weather.

130. Petite rivière Cascapédia and Rivière Cascapédia

Winds Northerly or Northwesterly
Very strong wind from valleys. Channelling effect.

131. Heron Channel

Winds Westerly or Easterly
High waves over shoals. Funnelling effect between Heron Island and New Brunswick coast.

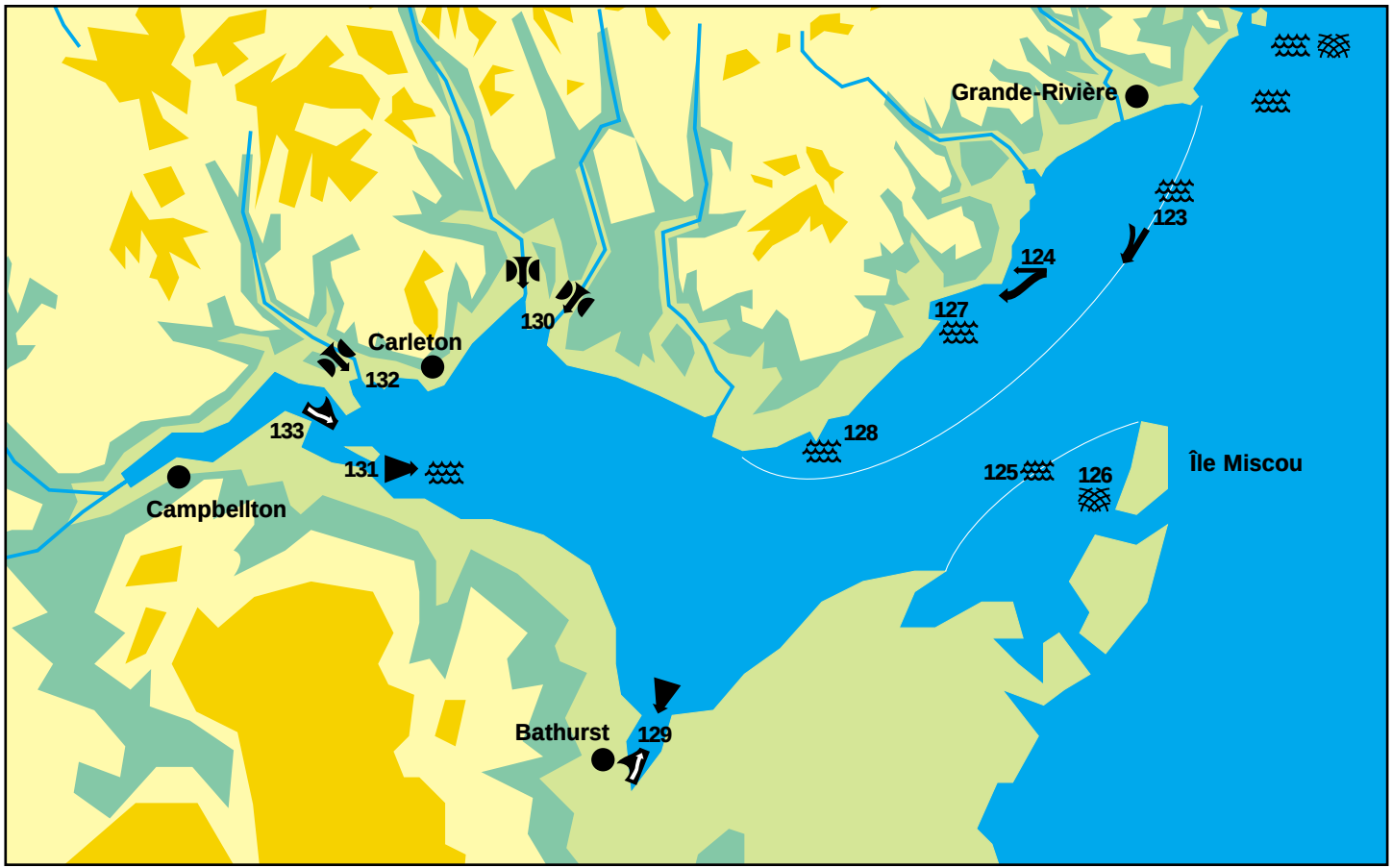
132. Rivière Nouvelle (baie Tracadigache)

Winds Northerly or Northwesterly
Very strong wind from valley.
Channelling effect.

133. Eel Bay

Winds Easterly at ebb tide
High waves. Shoals and river current.
Funnelling effect from Baie des Chaleurs.

Gaspésie Baie des Chaleurs



Îles de la Madeleine

Another magnificent part of the St Lawrence are the Îles de la Madeleine, which lie right in the middle of the Gulf, 40 nautical miles off the nearest shore.

The islands are swept by winds from every direction. Their sheltered lagoons, where the wind blows freely, are a windsurfer's paradise.

Shoals are to be found everywhere around the islands, and form a crescent from Pointe de l'Est to Rochers aux Oiseaux, with Île Brion in the middle. They produce high seas.

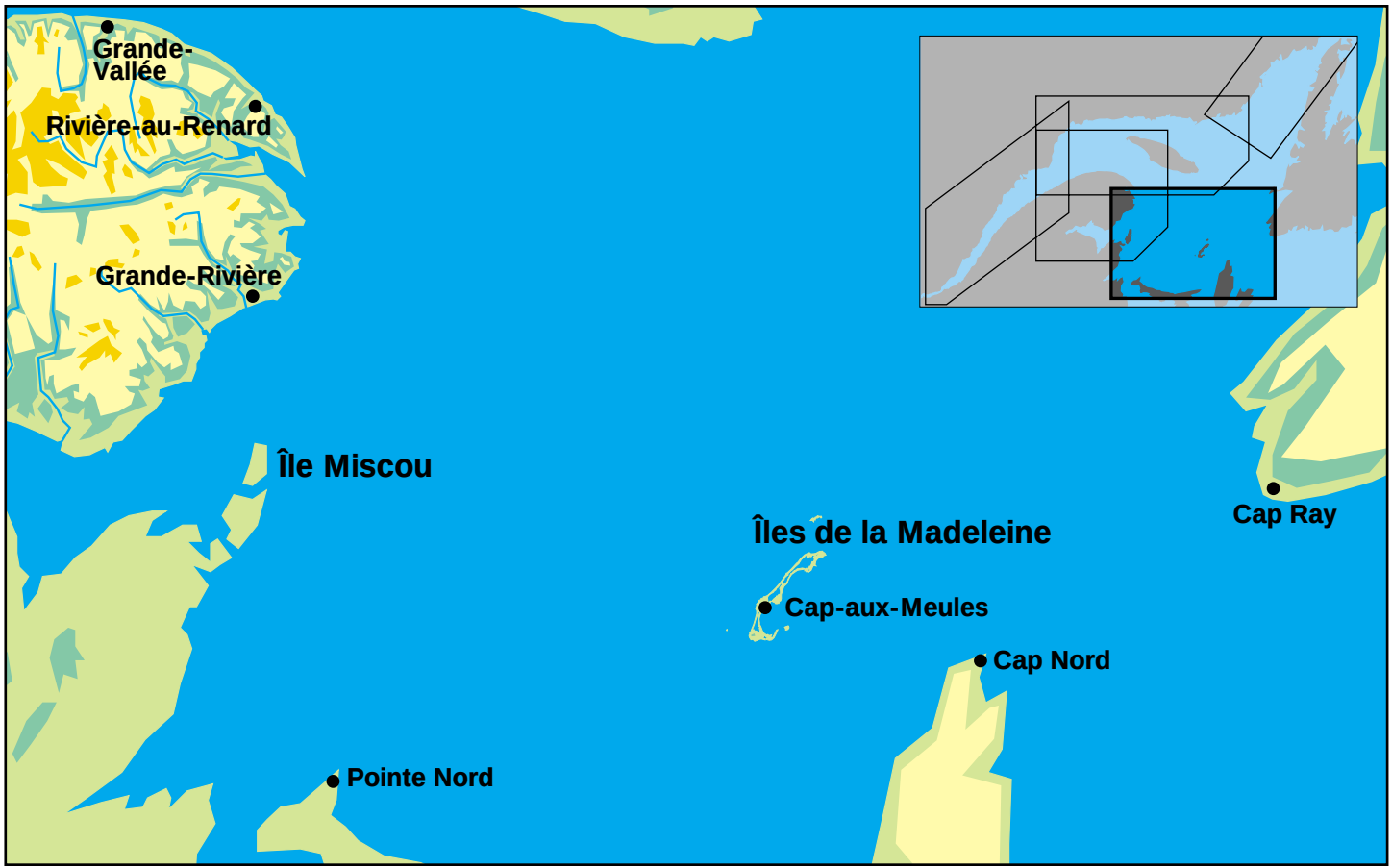
Watch out for winds in the Eastern part of the section. They may herald a storm that will bring a strong Northwesterly wind.

As the summer progresses, the Northwesterly wind will produce higher and higher seas along the North Shore because of the fetch and the wind's strength.

Even if the tidal currents are less than one knot, remember that they will be stronger around points and at the mouth of lagoons.

In spring and summer, humid air from the warmer waters to the South and Southwest of the islands brings fog

Îles de la Madeleine



Îles de la Madeleine

Chart 4451

134. Northwest side, particularly Pointe Hérissée area

Winds Southwesterly
Wind strengthens. Convergence effect.

135. Northeast side

Winds Northeasterly
Breaking waves produced by numerous reefs and shoals.

Navigation becomes very difficult.

136. Pointe de l'Est

Winds Northwesterly, Northerly and Northeasterly, at ebb tide
High, breaking seas, particularly off point. Produced by crossing of 2 Westerly currents from both sides of point.

137. Île Brion and Rocher(s) aux Oiseaux

Winds from any direction
Corner effect.

Winds Northeasterly
Heavy, cross seas Southwest of Rochers aux Oiseaux

138. La Perle (reef)

Even when winds 15 knots, from any direction
Breaking waves.

139. Île d'Entrée

Winds from any direction
Corner effect.

140. La Passe

Winds Southerly and Southeasterly
Breaking seas, especially at ebb tide. Shoals between Dune Sandy Hook and Île d'Entrée.

141. Southwest side

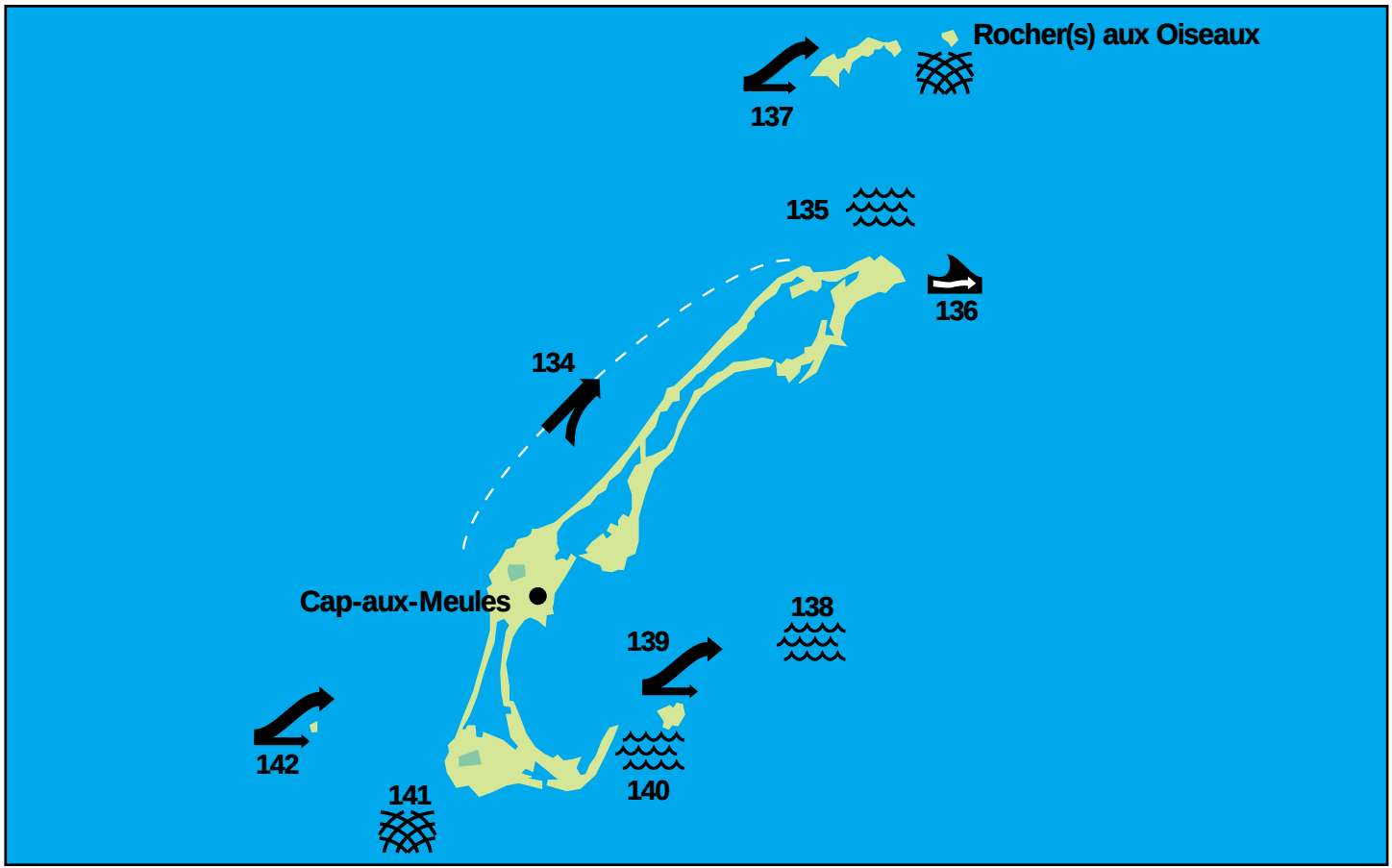
Winds Northeasterly
Cross seas. Refraction effect in lee of all islands.

Seas may become very confused.

142. Le Corps-Mort

Winds from any direction
Corner effect.

Îles de la Madeleine



Sailors take warning

White-outs

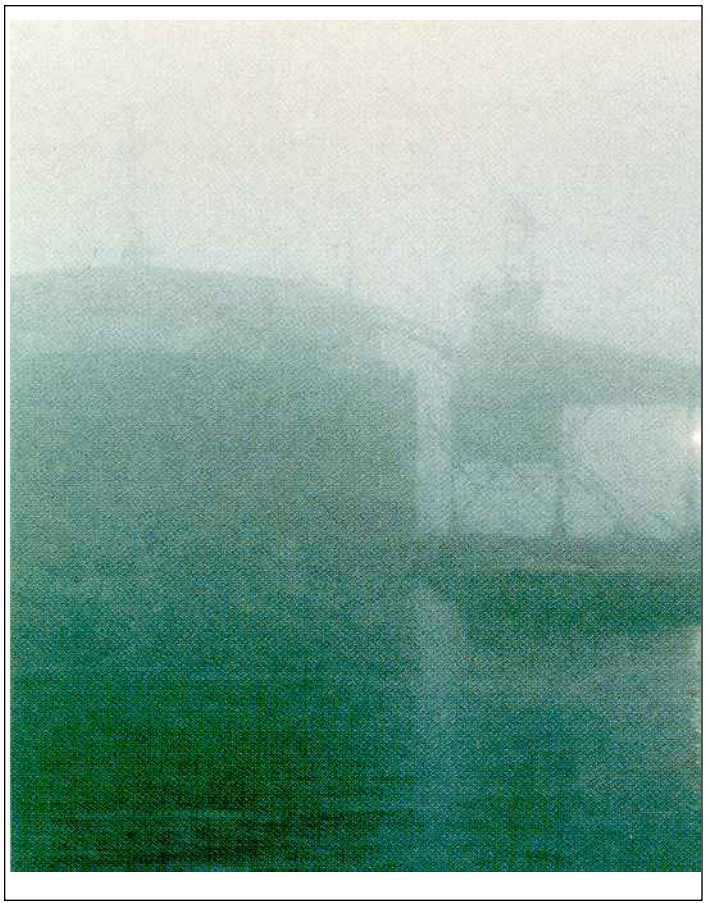
The sky above us

Keeping a weather eye

Fair weather and foul

The unexpected

White-outs



Pierre Pelletier

Minganie

- “Oh, no! Not fog! All our careful planning for nothing. The locals were right in saying we might well be completely blanketed in cloud this morning, after that lovely warm yesterday!”

In summer, on the St Lawrence, you may sometimes run into persistent fog so thick you could cut it with a knife.

Sailing in such conditions is very difficult, unless you have radar. A ship might well be lurking behind each fog bank.

Three types of fog

The worst type of fog, because it is the most persistent, is created by cold waters and warm, moist wind from the South. It will remain until it is blown off by a dry wind from another direction - *Advection fog*.

The fog that appears on rainy days with light winds may be just as dense. Once the rain stops, a Southwesterly or Westerly wind should follow and sweep it away - *Frontal fog*.

The third type of fog forms along the shore on a clear night but doesn't last long. The land breeze will carry it a short distance offshore. The morning sun will generally dissipate it - *Radiation fog*.

Because of their particularly cold waters, the Tadoussac, Pointe-des-Monts, Havre-Saint-Pierre and Strait of Belle Isle areas are especially prone to fog.

On-the-Sea

- "Hey, Mom, look at that enormous black cloud headed our way! What should we do?

- Quick, help me tie everything down and shorten the sail. It's sure to hit us in a couple of minutes. Don't be afraid!"

Squalls

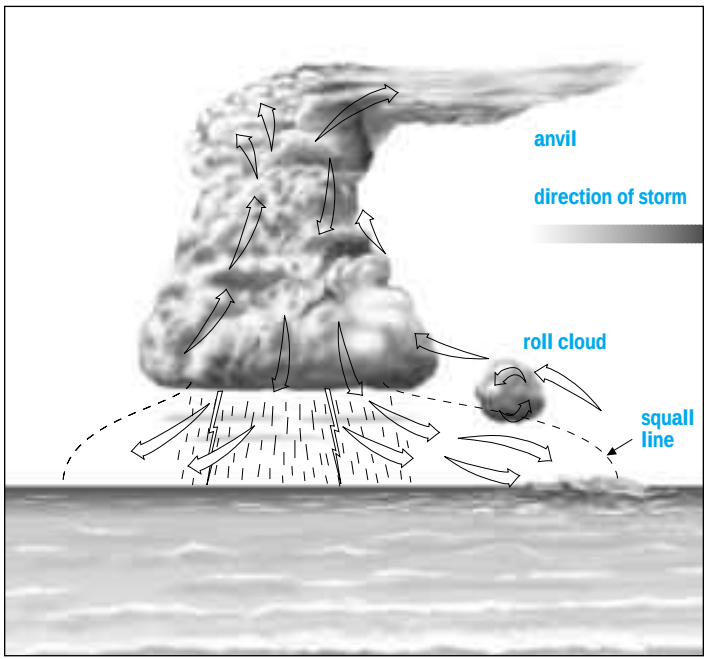
A huge, black, anvil cloud is approaching. At its base, a roll cloud is moving very quickly above a choppy sea. Spray is blowing. The wind picks up speed quickly and shifts. Get ready for a good blow.

A squall is a sudden gust of wind that literally sweeps the sea. The wind rages and often thunder, lightning and heavy showers make for a dramatic scene. Squalls are so violent that they can tear the rigging and keel a sailboat over on its side.

If the squall is produced by an isolated thunderstorm moving out from the shore, it should disperse as it moves offshore. It is often possible to avoid these storms by altering course.

This phenomenon, which normally lasts 10 to 20 minutes, may go on for several hours if it accompanies a cold front, but won't necessarily continue with the same intensity as it hit with.

You can often see a cold front approaching – there will be storm cells along much of the horizon. As the cold front passes, the gust of wind will create a cross sea that will make for difficult sailing.



An anvil-shaped cumulonimbus cloud approaching generally means that you are in for a squall.

Keeping a weather eye

You have probably heard about depressions or lows, without knowing exactly what the words mean, other than simply bad weather. There are a number of signs that a low is approaching.

In the following example, the centre of the low is approaching from the Southwest and moving North of Baie-Comeau. The typical weather sequence for someone on the Trajectory A-B will be as follows:

1. high streaky white clouds move rapidly toward the East
   - a light Easterly wind begins to blow
   - the barometer starts falling
2. a veil of cloud follows, along with a halo around the sun
3. the cloud cover thickens
   - the sun appears to be behind smoky glass
   - greyish streaks hang from the clouds
   - the barometer continues to fall
   - the wind becomes Southeasterly and freshens
4. it starts raining
   - haze forms and is replaced by fog
   - the air becomes warmer
   - the swell is now from the Southwest

Warm front

5. the wind is now blowing from the Southwest
   - the barometer falls more slowly
   - the sun begins to pierce the clouds
   - the air becomes warmer
   - visibility improves

The weather is pleasant. The warm front has just passed. This is the warm part of the low.

6. off in the distance you can see large anvil clouds
   - thunder rolls
   - the barometer continues to fall slowly
   - the clouds have dark streaks hanging down
   - turbulent roll clouds threaten
   - a West-Northwest swell produces cross seas

Cold front

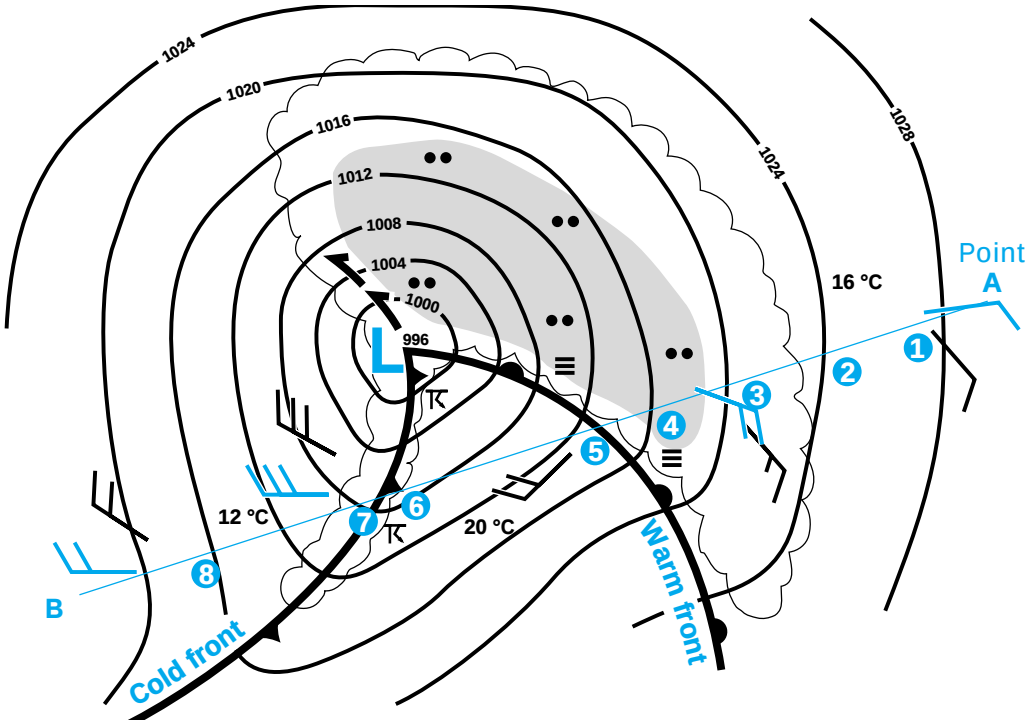
7. the wind suddenly shifts to West-Northwest and doubles in speed
   - showers reduce visibility
   - the barometer starts to climb quickly
   - the air becomes cooler

A squall has just occurred, associated with the passing of a strong cold front.

8. the sky clears
   - the wind drops, but there is still a good breeze
   - the humidity level drops
   - visibility improves
   - the barometer rises more slowly
   - a high has moved in
   - the good weather continues until the next low appears.

The low has moved North of the St Lawrence, as is generally the case during the summer. *(If you find yourself under the North part of the low, the scenario will be different because you will be spared the passing of the fronts.)*

Keeping a weather eye



Low seen from above and in cross-section

A indicates a fixed point offshore from Baie-Comeau.

Symbols

- rain
- thunderstorm
- fog

Isobars

1008 (millibars)

Wind

- out at sea
- deviated by the land

Speed

- 5 knots
- 10 knots
- 25 knots from the West

Direction

Fair weather and foul

The complexity of the atmosphere is due to the air's perpetual motion. The direction of the air is influenced by various phenomena related to the Earth's rotation, solar heating, and winds created by thermal exchange in each hemisphere from the equator to the poles.

In the Northern hemisphere, the Earth's rotation creates an enormous air circulation moving from West to East, becoming warmer in the South and cooler in the North, and picking up or shedding water vapour, all depending on the topography.

The wind is the perceptible manifestation of the air's perpetual motion. We tend to have the impression that wherever we happen to be the wind is blowing in a straight line. But this is only an illusion because we are so small compared with the gigantic dimensions of the atmosphere.

In fact, the wind, whose speed and direction we perceive through the objects it moves, is only a tiny part of the air masses travelling in a clockwise or counterclockwise direction. The term *clockwise* refers to spiral motion in the same direction as the hands of a clock.

High

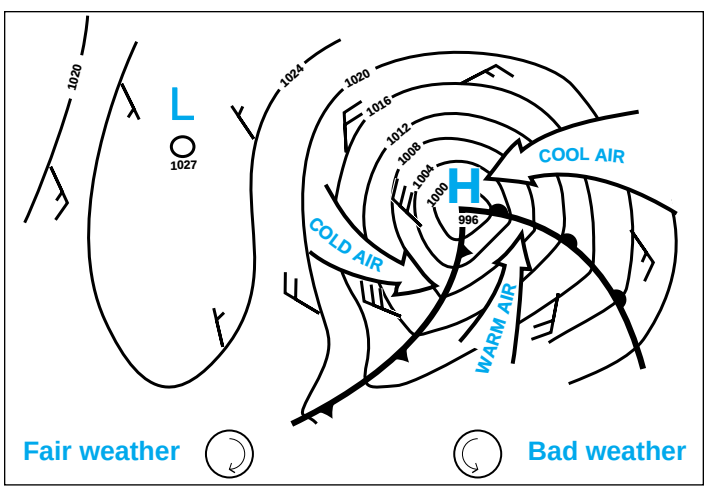
When the air mass, in our hemisphere, is moving in this direction, it is turning around an invisible axis created by the area in which the pressure is highest. This area is called a high and is generally associated with blue skies and cooler temperatures.

Low

Bad weather, with all the clouds, rain, thunderstorms, gales, abrupt changes in temperature and violent winds it brings, is associated with a low. The air moves in a counterclockwise direction, around the area in which the pressure is lowest.

Why does the air always follow a circular path? Gustave Coriolis, a Frenchman, explained its motion by saying that it is influenced by the rotation and spherical form of the Earth.

It is interesting to note that when you are out at sea, facing into the wind, the centre of a low is always on your right. In the St Lawrence valley, because of its channelling effect on the winds, it is more tricky for mariners to determine the exact location of a low



Baie de Gaspé

- "I had just sailed in from the Îles de la Madeleine. I anchored on the West side of the wharf at Anse au Sauvage for shelter from the light waves coming from the East. The next morning, about 08:30, the wind shifted, picking up into a breeze from the Southwest.

- "I checked my lines and went below to finish my breakfast. I had barely touched my coffee when the wind came gusting out of the West.

- "I just barely had time to get up on deck before the storm struck. I couldn't get away. I jumped onto the wharf and prayed to God that the wind would stop beating my boat against the side. What a storm!"

Sudden storms

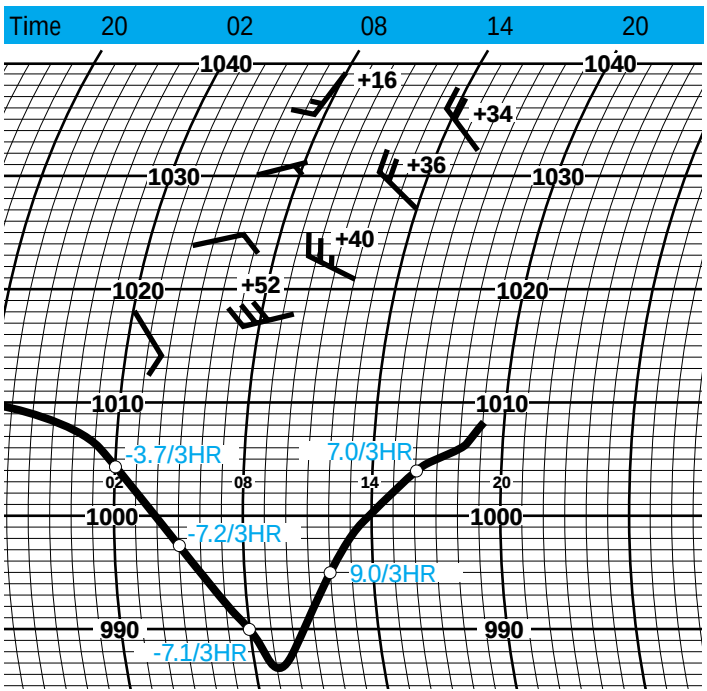
Such storms blow up so suddenly that no one can see them coming.

This was the case at about 08:00 on the morning of September 3, 1980, when a low reached the western tip of Anticosti, at **983** millibars. This low pressure system marked the end of the explosive development of a rather insignificant low, observed at 22:00 the previous evening, at **1006** millibars, over Lac Saint-Jean. This development would have been difficult to predict.

The abrupt and steep drop in barometric pressure was the only obvious indication that such a violent phenomenon was about to occur. This example illustrates the importance of keeping a barometer or barograph where you can see it at all times.

Barometric pressure

If the pressure is falling at a rate of 1 millibar an hour and the wind is freshening, you should consult the latest forecast. If the pressure continues to fall or starts falling even more quickly, the weather is about to change drastically for the worse. **DANGER**



September 3, 1980. 3-hour pressure tendency and wind observation at Gaspé Airport, the day of the incident.

Pierre Pelletier

The watchers

Radiograms

Radiograms

Weather information is essential to mariners. Meteorologists provide an exclusive service for mariners, preparing marine forecasts daily and issuing warnings whenever weather conditions pose a danger.

Below is an example of a weather bulletin prepared by Environment Canada forecasters.

Synopsis

Synopsis at 23:00 Saturday, and expected outlook to 20:00 Sunday.

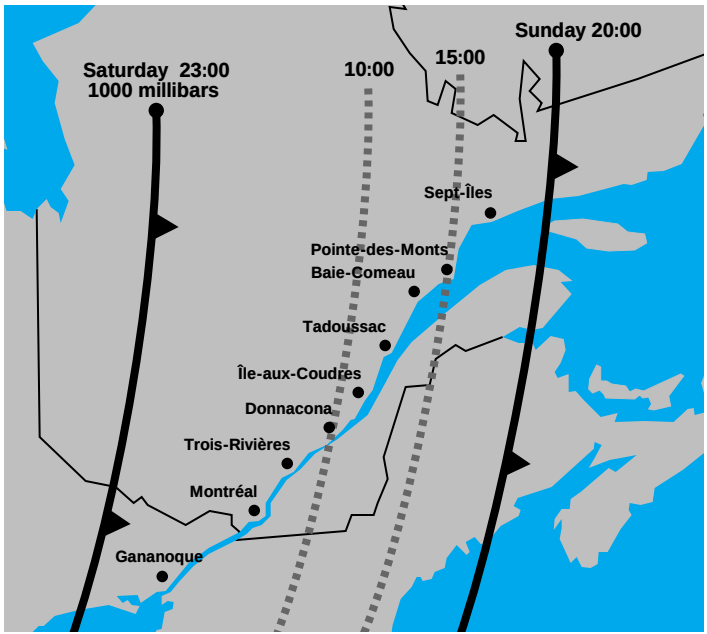
A 1000 millibar low, 150 miles East of Baie James with a cold front extending toward Lake Ontario, will be over central Labrador this evening, with a cold front extending to the South of Maine.

Ahead of the cold front, winds...

How to use this information

With map* in hand, draw a line from a point 150 nautical miles East of Baie James, to another point over Lake Ontario, and mark it with *23:00, Saturday*. Draw another line from central Labrador to the South of Maine, marking it with *20:00, Sunday*.

It is then easy to estimate that the cold front will pass over Tadoussac at noon, and Pointe-des-Monts at 15:00. This will allow you to determine when the wind will shift, as indicated in the weather bulletin issued for this area.



The 10:00, 15:00 and 20:00 reference marks indicate the probable positions of the cold front, according to the information in the weather synopsis.

* The map in the publication entitled "**Weather Services**" was designed for this purpose. You may wish to laminate the map.

To follow the cold front's trajectory, you need only tune in to **Weatheradio** for the latest weather observations and to Coast Guard Radio.

The following are examples of marine forecasts and warnings, prepared and issued by Environment Canada meteorologists.

Area forecast

Forecast for the St Lawrence for today and outlook for Monday.

Tadoussac to Pointe-des-Monts.

Winds from the Southwest, 15 to 20 knots, shifting to West to Northwest, 20 to 30 knots in the afternoon. Local visibility reduced to fair in haze this morning. Risk of thundershowers this afternoon. High today from 15 to 18.

Outlook for Monday... Winds from the West to Northwest, 10 to 15 knots.

For the Gulf, significant wave height forecasts are also issued. These correspond to the average height of the highest one-third of all the waves present.

Warning

Marine gale warning for that part of the St Lawrence extending from Île aux Coudres to Île d'Anticosti, issued by Environment Canada, Montréal, at 15:00, Monday, March 11, 1991.

A 960 millibar low, 400 miles Southeast of the Îles de la Madeleine, is slowly drifting North. In these areas, a Northerly gale of up to 40 knots will pick up tonight as the low approaches, and could even reach 50 knots near the South shore and the mouth of the Saguenay. These winds will persist until at least Tuesday afternoon.

The word **mile** as used in marine forecasts always refers to the distance in **nautical miles**.

Weather warnings are issued on a priority basis by **Radiométéo** and the Coast Guard.

Environment Canada... First for Weather, All the Time!

Garde côtière canadienne

The four seasons

Wind aplenty

Vessel icing

Ice cycle

Wind aplenty

On the St Lawrence, as the weather becomes cooler, it also becomes more threatening.

Summer

The summer months are obviously the best time for pleasure boaters and water sports. Just look at the statistics!

There is plenty of wind for sailors, both on the River and in the Gulf. You may even encounter some squalls or gale force winds, but not very often.

The troublesome lows generally pass to the North of the St Lawrence valley. The bad weather they bring affects us less in the summer than at other times of the year.

The other three seasons

As the days shorten, the wind gains strength. From early autumn to late spring, peaking in the winter, the wind speed picks up, reaches its maximum and falls off again as with each passing low.

In fact, the closer one is to the low pressure centre, the more unpleasant the weather is apt to be. Since the St Lawrence is on the winter track of low pressure systems, these months will naturally offer the worst weather.

From mid-autumn onward, lows unleash violent storms in the estuary and the Gulf.

At these times, navigation becomes so dangerous that vessels are sometimes lost with all hands in the Gulf, even though the meteorologists get their weather warnings out as quickly as possible.

The wind, from 0 to 63

Strength	Light	Breeze	Strong	Gale force	Storm force
Knots	0 to 12	13 to 19	20 to 33	34 to 47	48 to 63
	%	%	%	%	%
January	44	29	23	3	1
February	47	33	19	0,5	0
March	50	30	19	1	0
April	57	28	14	1	0
May	67	23	8	0	0
June	66	23	10	0,3	0
July	74	23	3	0	0
August	79	18	3	0	0
September	67	22	10	0,05	0
October	57	27	15	0	0
November	43	34	22	0,1	0
December	46	29	24	0,1	0

Monthly averages of hourly data gathered at Pointe Heath, at the Eastern tip of Anticosti, from 1985 to 1989. Table does not include gusts, which may be 20 to 25 % stronger than the winds shown.

The Pointe Heath reporting station is part of the Québec network of Environment Canada.

Among the pleasures that winter has to offer is freezing rain, which covers everything, including windshields, in an icy glaze. At sea, these conditions can quickly become dangerous.

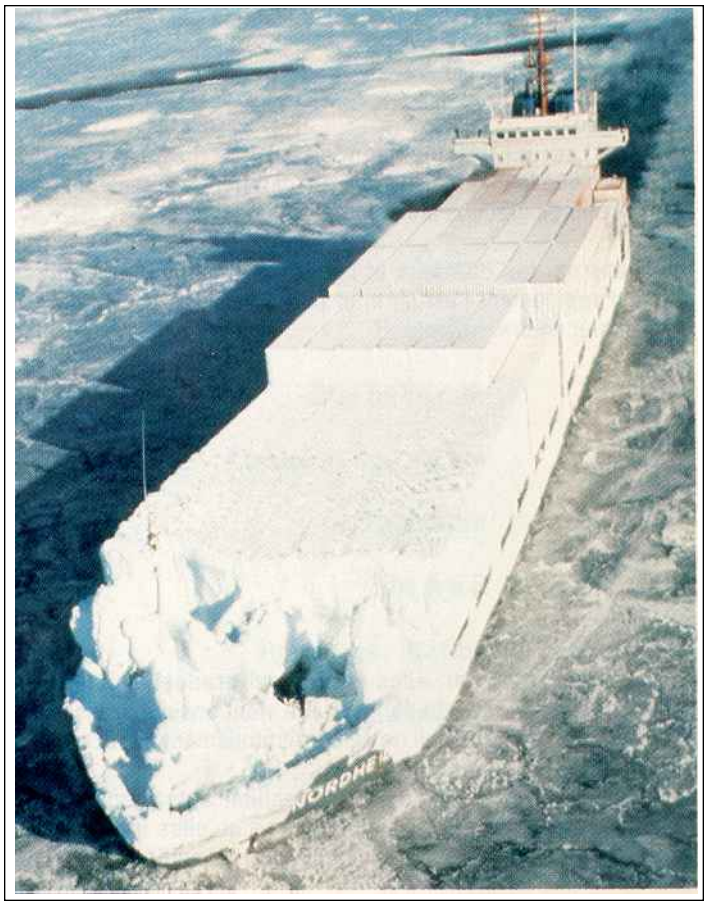
Weight of the ice

In the Gulf and on the River, there is a risk of vessels icing as soon as the air temperature falls below -2 °C.

Icing is caused by spray thrown up from the hull and by the wind onto the vessel's superstructure, once the wind reaches about 40 knots.

Several tonnes of ice can accumulate within a few hours, causing the vessel to capsize or even sink.

Marine warnings are issued automatically whenever there is a risk of significant icing. Freezing sea spray occurs from November to April in ice-free areas



Garde côtière canadienne

Ice cycle

Who would expect to find ice at Québec? It may be perfectly natural for those who live there, but quite astonishing for visitors from the South.

Ice making

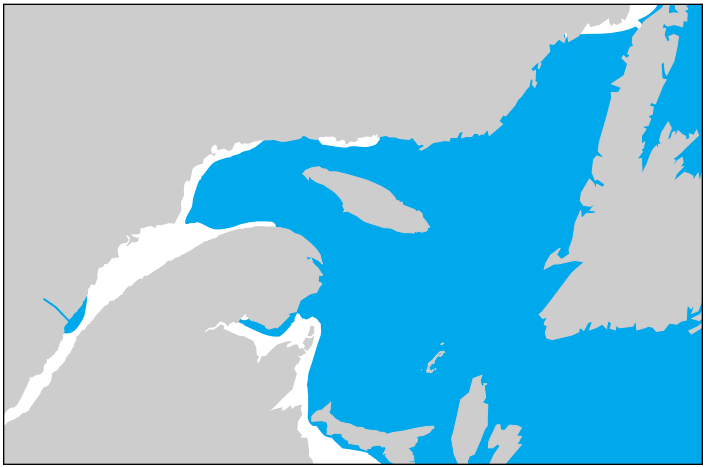
The St Lawrence is an enormous ice-making machine. It starts in December, forming ice floes between Montréal and Québec.

Pushed along by the currents and prevailing winds, the ice quickly reaches the estuary and extends East of Les Méchins by late December.

A sea of ice

From January to late February, ice gradually covers the entire Gulf. Ice from the March break-up in the estuary adds to the accumulation in the Gulf, which doesn't completely disappear until May.

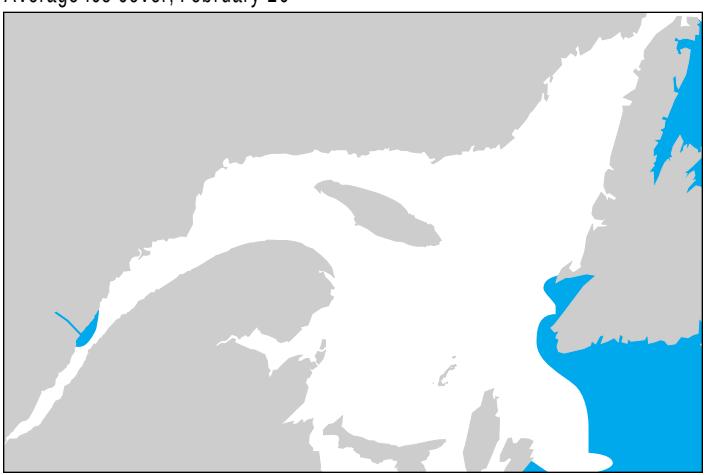
One advantage of sea ice is that it limits vessel icing, since it prevents waves and thus spray from forming



Average ice cover, January 1

Average limit Open water

Average ice cover, February 26



Extra

Beaufort scale

Force	Wind speed km/h	Wind speed Knots	Descriptive term	Effects observed at sea	*Effects observed on land*
0	less than 1	less than 1	Calm	Sea surface like a mirror, but not necessarily flat.	*Smoke rises vertically.*
1	1 to 5	1 to 5	Light air	Ripples with the appearance of scales are formed, but without foam crests.	*Direction of wind shown by smoke drift but not wind vanes.*
2	6 to 11	4 to 6	Light breeze	Small wavelets, still short but more pronounced. Crests do not break. When visibility good, horizon line always very clear.	*Wind felt on face. Leaves rustle. Ordinary vane moved by wind.*
3	12 to 19	7 to 10	Gentle breeze	Large wavelets. Crests begin to break. Foam of glassy appearance. Perhaps scattered whitecaps.	*Leaves and small twigs in constant motion. Wind extends light flag.*
4	20 to 28	11 to 16	Moderate breeze	Small waves, becoming longer. Fairly frequent whitecaps.	*Raises dust and loose paper. Small branches are moved.*
5	29 to 38	17 to 21	Fresh breeze	Moderate waves, taking a more pronounced long form. Many whitecaps are formed. Chance of some spray.	*Small trees in leaf begin to sway. Crested wavelets form on inland waters.*
6	39 to 49	22 to 27	Near gale	Large waves begin to form. The white foam crests are more extensive everywhere. Probably some spray.	*Large branches in motion. Whistling heard in telephone wires. Umbrellas used with difficulty.*

Beaufort scale

Force	Wind speed km/h	Wind speed Knots	Descriptive term	Effects observed at sea	*Effects observed on land*
7	50 to 61	28 to 33	Near gale	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind.	*Whole trees in motion. Inconvenience felt in walking against wind.*
8	62 to à 74	34 to 40	Gale	Moderately high waves of greater length. Edges of crests begin to break into the spindrift. The foam is blown in well-marked streaks along the direction of the wind.	*Breaks twigs off trees. Generally impedes progress. Walking into wind almost impossible.*
9	75 to 88	41 to 47	Strong gale	High waves. Dense streaks of foam along the direction of the wind. Crests of waves begin to top-ple, tumble and roll over. Spray may affect visibility.	*Slight structural damage occurs, eg. roofing shingles.*
10	89 to 102	48 to 55	Storm	Very high waves with long overhanging crests. Dense white streaks of foam. Surface of the sea takes a white appearance. The tumbling of the sea becomes heavy and shock-like. Visibility affected.	*Trees uprooted. Considerable structural damage occurs.*
11	103 to 117	56 to 63	Violent storm	Exceptionally high waves. Sea completely covered with long white patches of foam. Visibility affected.	*Widespread damage.*
12	118 to 133	64 to 71	Hurricane	Air filled with foam and spray. Sea entirely white with foam. Visibility seriously impaired.	*Rare.*

Handy references

On board

- [ ] Safe Boating Guide
- [ ] Nautical Charts
- [ ] Sailing Directions
- [ ] Tide and current tables
- [ ] Marine Weather Guide
  The Secrets of the St Lawrence
- [ ] Weather forecasts

Winds

	knots	mi/h	km/h	Beaufort
Light	0 to 12	0 to 14	0 to 22	0 to 3
Breeze	13 to 19	15 to 22	24 to 35	4 to 5
Strong	20 to 33	23 to 38	37 to 61	6 to 7
Gale	34 to 47	39 to 54	63 to 87	8 to 9
Storm	48 to 63	55 to 73	89 to 117	10 to 11
Hurricane	64 and +	74 and +	118 and +	12

Barometric pressure

millibars or hectopascals	kilopascals	inches of mercury
1000	100	29.5

Douglas seastate scale

Code	Type of sea	Significant wave height (m)
0	Calm	0
1	Smooth	0 to 0.1
2	Slight	0.1 to 0.5
3	Moderate	0.5 to 1.25
4	Rough	1.25 to 2.5
5	Very rough	2.5 to 4.0
6	High	4 to 6
7	Very high	6 to 9
8	Pecipitous	9 to 14
9	Confused	more than 14

Not to be confused with the Beaufort Scale

Reference works consulted

- Climatological Charts of the St Lawrence
  Environment Canada, Québec Region, 1984
- Comment descendre et remonter du Saguenay en passant par la Petite rivière Saint-François
  Commander Jules DesChamps, CPS
- Douglas seastate scale
  Dictionnaire de l'Océan, Conseil international de la langue française - Paris, France 1989
- East Coast Marine Weather Manual
  Environment Canada, Atlantic Region, 1989
- Gulf of St Lawrence
  Notes. Ice Climatology, Environment Canada
- Gulf of St Lawrence Marine Weather Guide
  Environment Canada, Atlantic Region, 1991
- Le français au bureau
  Cajolet-Laganière, Hélène, Les Publications du Québec, 1988
- Le Guide nautique de la Côte-Nord
  Club nautique de Sept-Îles inc.
- Marine Weather Hazards Manual (West Coast)
  Environment Canada, 1990
- Météorologie marine
  R. Mayençon, Éditions Maritime & d'Outre-Mer, 1982
- Nautical Charts
  Hydrographic Service of Canada, Fisheries and Oceans Canada
- Répertoire toponymique du Québec
  Commission de toponymie du Québec, 1991
- Sailing Directions - St Lawrence River and Gulf
  Hydrographic Service of Canada, Fisheries and Oceans Canada
- Yachtsman's Guide of the Saint-Laurent
  Québec Sailing Federation
- Weather at Sea
  David Houghton and Fred Sanders, Highmark Publishing Ltd, 1988

Suggested publications

- Connaître la Météorologie
  Richard Leduc et Raymond Gervais
- Learning Weather
  Canada Communication Group - Printing
- Climatological Charts of the St Lawrence
- Marine Weather Services
- Weather Services for Mariners, Fishermen and Yachtsmen
  Environment Canada
- Safe Boating Guide
  Canadian Coast Guard, Transport Canada

Meteorology courses

As an aid for mariners, this publication deals only with the wind's behaviour over different topographical features and the sea, and with the sea's behaviour.

To find out more or to specialize in meteorology and sailing, you may wish to enrol in one of the many courses offered by various institutions and groups, all of them drawing on the wide-ranging knowledge and experience of seasoned mariners.

- Cégep de Rimouski — Institut maritime du Québec
  Montréal - Québec - Rimouski
- Cégep de la Gaspésie et des Îles
  Centre des pêches de Grande-Rivière
- Cégeps — Services socio-culturels
- Canadian Power and Sail Squadrons
- Québec Sailing Federation

Our sincere thanks to all our contributors

- Camille-Marcoux ferry captains
- Laurentian Pilotage Association
- Fishermen's associations
  - Grande-Rivière
  - Les Escoumins
  - Matane
  - Rivière-au-Renard
  - Rivière-au-Tonnerre
  - Sept-Îles — Port-Cartier

- Journal *Pêche Impact* – Gaspésie et Îles-de-la-Madeleine
- Members of the Québec Sailing Federation
- Professors at the Institut maritime du Québec – section Plaisance, Montréal
- St Lawrence captains and sailors
- Mingan Island Cetacean Study
- Nordik Express crew
- Canadian Parks Service - Environment Canada - employees at Forillon and Mingan Parks
- Fisheries and Oceans Canada crew members
- Vessel Traffic Services employees at Les Escoumins
- Coast Guard employees, Sept-Îles

Without their participation, it would have been very difficult, even impossible, to prepare the valuable listing of those areas in which sailing conditions are often difficult, if not hazardous.

Special thanks to Terry Knowles and Pamela Ireland, translators, and Christian Bonnelly, geograph.

Working together to ensure safe sailing for everyone!

You can also help to improve this publication, by calling one of our weather offices or writing to us at the address inside the front cover.

Air mass
A large volume of air with uniform properties of temperature and moisture. Air masses extend over thousands of square kilometres.

Breaker
A swell wave that has broken into foam.

Chop
Irregular motion of waves, in which it is difficult, if not impossible, to find one's bearings. Creates a confused sea. Produced on top of rip by wind blowing against the current.

Deep water
Water depths more than one-half the wavelength of a wave.

Fog
Minute water droplets suspended in the air that reduce visibility to less than one nautical mile. Fog is cloud on the ground.

Front
The line of separation between 2 air masses with different temperatures and moisture levels. A warm front is a mass of warm air displacing a mass of cold air, and vice versa.

Haze
Same phenomenon as fog, except that visibility is equal to or greater than 1 nautical mile.

High
A region of high pressure. Air flows outwards and clockwise around high pressure areas. A high is usually associated with good weather.

Isobar
Line on a weather map joining points of equal pressure.

Low
A region of low pressure. Winds flow counterclockwise around the low centre. A low pressure centre is usually a storm centre accompanied by precipitation and strong winds.

Main cabin
On a ship or pleasure boat, the main room in which the crew gathers to plan routes and manoeuvres.

Millibar
A unit used to measure barometric pressure.

Northwest gyre
Slow gyrating motion of sea water. In the Gulf of St Lawrence, this counterclockwise motion may extend over 200 kilometres. The gyre's axis is located in the Northwestern part of the Gulf, between Anticosti and Pointe-des-Monts. Its speed is almost imperceptible: slightly more than 0.10 knot.

Radiocopy
Transcription of a message received by radio, or name of the computer system by means of which such messages are transcribed automatically or are pre-recorded. Radiocopy is an exclusive Weatheradio Weathercopy service.

Radiograms
A message transmitted by radio, in particular by Weatheradio or Coast Guard radio.

Ridge
An elongated area of high pressure, associated with a high.

Rip
Turbulence on the sea's surface that results when 2 currents meet.

Sea
Combined wind waves and swell. **Cross sea -** Confused sea formed when one train of waves moves at an angle to other groups of waves. The sea becomes steep, with short, sharp wave crests. When cross seas combine with an underlying tidal current, the sea surface becomes especially confused and hazardous. Also known as **cross swell. Choppy sea -** Short, sharp, breaking waves. Typically caused by the reflection effect. **Breaking sea -** Unstable sea resulting from steep, breaking or near-breaking waves.

Significant wave height
Average height of the highest 33 % of all the waves present.

Squall
A brief, violent windstorm, often accompanied by rain or snow. Squalls are generally associated with cumulonimbus clouds. If they accompany a fast-moving cold front, they may be of longer duration.

Strong winds
By convention, combination of forces 4, 5 and 6 on the Beaufort Scale to indicate sustained wind speeds in the range of 20 to 33 knots.

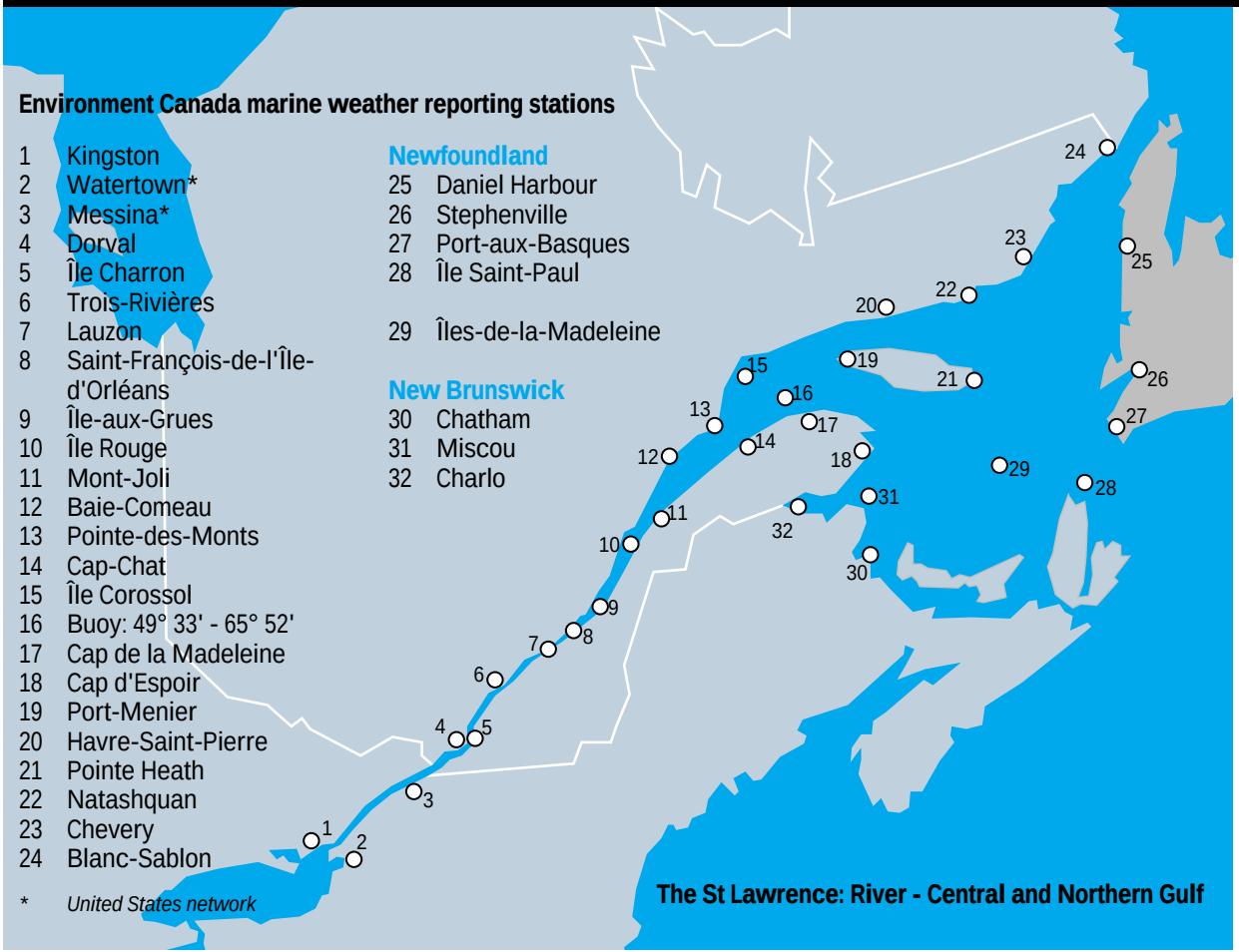
Trough
An elongated area of low pressure, associated with a low, often produces a wind shift and showery weather.

Wave steepness
Slope of a wave that may not exceed 14 %. Beyond that point, the crest will break and the wave will tumble.

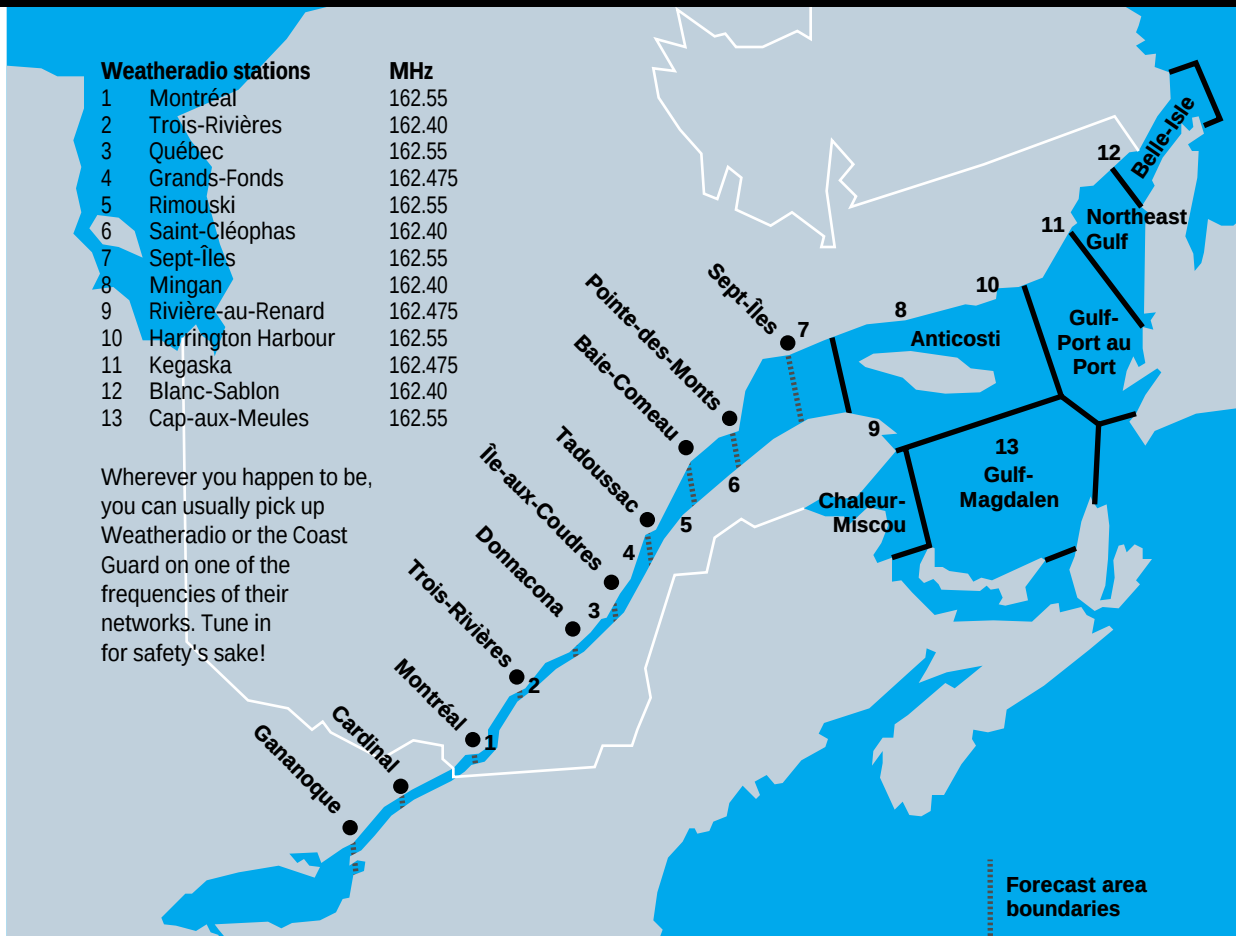
Weatheradio
This is the name of Environment Canada's weather information broadcast network. The network has transmitters in every region. Mariners interested in listening to this network need a receiver which can be purchased from electronic equipment dealers. Many portable models are available. **Weatheradio** signals warnings of severe weather automatically to receivers equipped with special alarm devices for that purpose.

Zephyr
A soft, warm and gentle breeze. For the Ancients, this was the West wind

Stations


Environment Canada marine weather reporting stations
1 Kingston
2 Watertown*
3 Messina*
4 Dorval
5 Île Charron
6 Trois-Rivières
7 Lauzon
8 Saint-François-de-l'Île-d'Orléans
9 Île-aux-Grues
10 Île Rouge
11 Mont-Joli
12 Baie-Comeau
13 Pointe-des-Monts
14 Cap-Chat
15 Île Corossol
16 Buoy: 49° 33' - 65° 52'
17 Cap de la Madeleine
18 Cap d'Espoir
19 Port-Menier
20 Havre-Saint-Pierre
21 Pointe Heath
22 Natashquan
23 Chevery
24 Blanc-Sablon
* United States network
Newfoundland
25 Daniel Harbour
26 Stephenville
27 Port-aux-Basques
28 Île Saint-Paul
29 Îles-de-la-Madeleine
New Brunswick
30 Chatham
31 Miscou
32 Charlo
The St Lawrence: River - Central and Northern Gulf

Areas


Weatheradio stations MHz
1 Montréal 162.55
2 Trois-Rivières 162.40
3 Québec 162.55
4 Grands-Fonds 162.475
5 Rimouski 162.55
6 Saint-Cléophas 162.40
7 Sept-Îles 162.55
8 Mingan 162.40
9 Rivière-au-Renard 162.475
10 Harrington Harbour 162.55
11 Kegaska 162.475
12 Blanc-Sablon 162.40
13 Cap-aux-Meules 162.55
Wherever you happen to be, you can usually pick up Weatheradio or the Coast Guard on one of the frequencies of their networks. Tune in for safety's sake!
Gananoque
Cardinal
Montréal
Trois-Rivières
Donnacona
Île-aux-Coudres
Tadoussac
Baie-Comeau
Pointe-des-Monts
Sept-Îles
Anticosti
Belle-Isle
Northeast Gulf
Gulf-Port au Port
Chaleur-Miscou
Gulf-Magdalen
Forecast area boundaries

Environment Canada *

Baie-Comeau	418 589-8935
Charlottetown	902 566-7060
Gander	709 256-6605
Jonquière	418 548-0980
Mirabel	514 476-3029
Moncton	506 851-6600
Montréal	514 636-3284
Québec	418 872-0061
Saint-Hubert	514 678-3161
Sept-Îles	418 962-8524
Sydney	902 564-7299
Trois-Rivières	819 371-5191

** Weather Offices*

During the pleasure boating season, weather forecasts are also available by taped telephone message. Contact your local weather office for details.

Canadian Coast Guard

Cap-aux-Meules	418 986-2740
Charlottetown	902 838-3722
Mont-Joli	418 775-5392
Montréal	514 928-4425
Québec	418 648-7282
Rivière-au-Renard	418 269-5686
St Anthony	709 454-3852
Sept-Îles	418 968-3118
Stephenville	709 643-5516

Transport Canada

Gaspé	418 368-5661
Sept-Îles	418 962-8229

Local AM and FM radio stations near the St Lawrence River and the Gulf also broadcast marine forecasts.

MARINE EMERGENCIES — **Channel 16**

Search and Rescue — 1 800 463-4393
1 418 648-3599

Environment Canada
Atmospheric Environment Service
100 Alexis-Nihon Blvd
3rd Floor
Saint-Laurent H4M 2N8
(514) 496-2089

Canadian Coast Guard
Transport Canada
104 Dalhousie
Québec G1K 4B8
1-800-463-6868

Canadian Hydrographic Service
Fisheries and Oceans Canada
Maurice-Lamontagne Institute
850, route de la Mer, PO Box 1000
Mont-Joli G5H 3Z4
(418) 775-0502

QUÉBEC ✦ POINTE-DES-MONTS ✦ CAP WHITTLE ✦ BLAN

Weatheradio Canada

162.40	162.475	162.55
	MHz	

Coast Guard

161.65	161.775	161.85
21B	83B	25B
	MHz	

Marine warnings

- Small craft warning — 20 to 33 knots
- Gale warning — 34 to 47 knots
- Storm warning — 48 to 63 knots
- Hurricane warning — 64 or more knots
- Squall line — 34 or more knots
  - cluster or line of squalls
- Freezing spray

Canada