7.1 Introduction to Strategy

Strategy vs Tactics

Strategy is our racing plan based on wind, wind shifts, and current. Tactics, on the other hand, are techniques we use for positioning and control of other boats or groups of boats. Strategy involves the big picture; tactics focuses in close. Strategy is long term and planned, tactics is more immediate and spontaneous.

Strategy is Wind, Wind shifts, and Currents

There are three factors in planning strategy. We look for better wind. We try to take advantage of wind shifts. And we try to get favorable (or not unfavorable) current. The relative importance of each factor depends on how variable each is (Fig. 1).
7.2 Predicting Conditions

Our strategy is based on the expected conditions. The more accurately we can predict the wind and current, the more confidently we can form our strategic plan. As we discussed in Chapter Two, our predictions are derived primarily from our own observations during the hour before the race. We revise our predictions as we continue to observe conditions during the race.

The figure shows a sample Wind Graph based on our pre-race observations. By carefully tracking the wind, we can more accurately predict the wind for the race (Fig. 2).
strategy based on observed and predicted conditions. The numbers listed here show a history of conditions prior to the start and during the first leg of a race. This information will help us plan and update our strategy. We plot the numbers to get a visual image of the wind pattern. This particular wind chart shows a very regular pattern of oscillations.

**Predictable vs Unpredictable**

One issue in our strategic planning is our confidence in our forecast. When conditions are highly predictable, we can pursue our strategy with conviction. When we are unsure of what to expect, our strategy will change. First, we would not pursue the strategy as wholeheartedly. Second, we would devote more than the usual amount of attention to watching for changing conditions which might require us to change our strategy.

Our strategy will depend on the predicted conditions and our confidence in that prediction. When we are able to predict conditions accurately and confidently, our strategic planning is relatively easy. In practice our predictions often prove less than accurate, and our planning boils down to playing the odds to reduce risks and increase possible gains.

**Strategy and Conditions**

As we said, our strategic planning revolves around the expected conditions. When we know what to expect, we will be able to make a firm plan. When our forecast is uncertain, then our plan will be less well defined.

Strategy and conditions are related in another way. The more variable the wind and current, the more important strategy will be to our success. In stable conditions boat speed will be the dominant concern. Our focus depends on what we see as the key to success in today's conditions.

**7.3 Wind**

**Wind Strength**

Find more wind. Sail in stronger wind more of the time and you can't lose. There are several things to look for to find more wind.

Look for wind on the water. Stand up in your boat and look upwind. Puffs create dark patches on the water. It is tricky to distinguish shadows, changes in bottom color, and differences due to sunlight; but the wind is there if you can pick it out.
The wind changes near shore. Most of our racing is done close enough to shore that winds vary across the course. Often there is better wind near shore. When the wind is blowing onshore the thermals near shore create more wind. In an offshore wind the thermal mixing near shore sometimes pushes the stronger winds from aloft down to the surface. At other times the wind is lighter near shore. By paying attention and keeping records, you will be able to anticipate the change in wind as you get near shore.

Clouds often bring more wind. In partly cloudy conditions, check under the clouds to see if there is more wind. In a clearing northwest wind with rows of cumulus clouds, there are usually down drafts of stronger wind around the clouds. If you see frontal clouds or building cumulus go to them—they are associated with wind.

**The Favored Side**

A windward leg will often have a favored side. Boats sailing to one side will have an advantage due to favorable wind, wind shifts, or current. Sometimes it is difficult to anticipate which side is favored. After observing the first leg we will have a better idea for the second time around. If conditions don't change, then we would expect the same side to be favored again.

Also, after seeing particular conditions in a local area a number of times, we will be able to anticipate which side will be favored (Fig. 3).

*Fig. 3 - We divide the windward leg into left, middle, and right segments. Often there is a favored side. We sail to the favored side of middle, but avoid the corners.*

**Time Out for Terminology**
Before we go on about the favored side a few details of terminology must be cleared up: The favored side of the course carries some strategic advantage. The favored tack takes you to the favored side. This should not be confused with the long tack, which is the predominant tack on a skewed beat, (i.e. a beat where we spend more time on one tack than the other. Often it is strategically correct to sail the long tack first - that is, the long tack is often the favored tack. At other times the favored tack might be the short tack (Fig. 4).

**Fig. 4 - Don’t confuse the long tack with the favored tack**

### Why is This Side Favored?

Hopefully we will know not only which side is favored, but why. Knowing the reason will help us determine if conditions have changed and the advantage has changed as well. If current is the factor, for example, then a change in the tide can reverse the advantage. If the advantage is due to the geography of the surrounding shore, then the advantage will endure until the wind changes (or, if you race on the west coast, the shore line is re-configured by an earthquake).

### Right, Left, & Middle

In our discussion of strategy we will divide the windward leg into three vertical segments; representing the left, right, and middle of the course. When our strategy favors one side or the other it is generally best to sail to the right or left of the middle, but not beyond. There are several reasons to avoid the extreme sides. For one, our strategy may prove to be wrong and a total commitment would make it difficult to recover. Second, as we shall see, there are strategic and tactical reasons to avoid the corners, since they can leave us out of position and with few options. We would only sail to
the extreme sides if:

- We are confident about our strategy and
- We must go to the extreme to get the advantage.

Caught on the Wrong Side: Now What?

What should you do if you sail to the favored side, get half way up the beat, and realize it is not the favored side after all? That is a tough question. Often it is surprising how close you end up to the leaders if you bail out half way up the leg and cut your losses. On the other hand, the ultimate frustration is bailing out early and then seeing those who stuck with it come out ahead in the end. Curses.

Of course, never having made such a mistake myself, it is hard to offer insights. I can offer a few ideas based purely on the experience of others:

- Don't overcommit to begin with-play the middle. (Now you tell me!)
- Hedge your bets. When in doubt stay with the pack.
- Be realistic about how things are going; don't kid yourself.
- While you ponder what to do sail toward the middle, not further into the corner.

Performance Racing Tactics

by © Bill Gladestone

Chapter 7 - Upwind Strategy

7.4 Wind Shifts

The second strategic factor is wind shifts. Shifting winds allow us to reach the windward mark more quickly than we can in steady winds.

When the Wind Shifts

When the wind shifts, our close-hauled compass courses change. With each shift one tack is lifted up above its earlier course, and the other tack in headed below its previous course. When one tack is lifted the other is headed, and vice versa. Our goal upwind is to sail each tack when it is lifted. By sailing the lifted tack, we sail a more direct route to our upwind destination (Fig. 5).
the other tack will be headed away from the mark.

**Sail to the Shift**

The fundamental upwind strategy is to sail toward the new wind or wind shift. As we will see, this strategy keeps us on the lifted tack. The application of this principle changes with different types of shifts; but the fundamental rule-sail to the shift-never changes.

**Tracking Conditions**

The best way to keep track of wind shifts is track your close-hauled compass course. Before and during the race keep a record of compass headings and establish a range of highs and lows for each tack. By recording the shifts, you can look for patterns (see Figure 2) and anticipate upcoming shifts.

Of course, reading the compass only tells about a shift after it has arrived. In addition to the compass, observe the wind on the water and watch its effect on other boats. Work to recognize and predict shifts before they arrive.

**Types of Shifts**

Wind shifts are generally categorized in two types: oscillating and persistent. Oscillating winds shift back and forth, like windshield wipers. Persistent shifts swing gradually in one direction, like the hands of a clock. A shift to the right is a clocking shift, or "veer;" a shift to the left is called a "back" (Fig. 6a, b).

*Fig. 6a - In oscillating shifts the wind swings back and forth*
From experience we know the real world is more complex than simple oscillating or persistent shifts. For starters we are going to look at strategy in these two textbook types of shifts. After that we will look at other variations.

**Oscillating Shifts**

We will look at wind shift strategy by first looking at the textbook strategies for oscillating and persistent shifts.

The basic strategy in an oscillating breeze is to tack with the shifts. As the wind shifts one tack is lifted so we can point closer to the mark (or average wind) while the other tack is headed further away. When the wind shifts again the advantage will be reversed; whenever one tack is lifted the other is headed. By coming about when headed and sailing on the lifted tack, we can take advantage of the windshifts to improve upwind performance. We use the term staying in phase to describe the process of tacking on the headers and sailing on the lifts.

Sometimes the wind shifts gradually back and forth. This is seen most often when the winds are coming over open water. At other times the shifts hit all at once. We see this when the shifts are coming off shore, or in the northwest winds after a cold front.

On starboard tack a higher compass reading is a lift, a lower number is a header. On port lower is a lift, higher is a header. It is most important to recognize headers since they suggest it is time to tack. Use the phrase Port, Higher, Header as an aid to remember the correlation between compass readings and shifts.

**Get in Phase**

By collecting wind information before the race and updating information as the race progresses, we should know at any moment whether we are sailing a lifted, headed, or average course. If conditions change, our lifted
and headed numbers will have to be adjusted.

Out of Phase

Sailing in oscillations seems pretty straightforward. If the shifts come in a regular cycle and no one gets in your way, it should be easy to stay in phase. Somehow it doesn't always work that way. If you find yourself out of phase, sail the tack which takes you closest to the mark, or towards the next puff, while you sort things out.

Unbalanced Legs

Tacking as the wind crosses the average works great if the wind spends equal time on each side of average and the mark is straight upwind. This is not always the case. When the leg or shifts are not balanced, then the crossover angle for tacking must be adjusted to match. For example, if the leg is skewed to three times as much starboard as port, then we'll need to sail on starboard for three quarters of the wind range, and port for one quarter.

Similarly, if there are other strategic considerations, our tacking angles may be skewed. For example, if there is better wind or current to one side of the course, we would only sail away from that side at the extreme end of the shift spectrum.

**OSCILLATING EXAMPLE**

Pre-Race Data

In preparation for our 12:15 start we periodically record and plot our wind information. Using the close-hauled compass course on each tack, we are able to calculate the wind direction. The Wind Graph from our Race Planner shows the following (Fig. 7):

- An oscillating breeze, shifting back and forth.
- Starboard tack headings ranged from 170° to 185°.
- Port tack headings ranged from 260° to 275°.
- We tack through 90°; from 170° on starboard to 260° on port, or from 185° to 275°.
- The wind speed is a steady 8 to 9 knots.
Fig. 7 - The Wind Graph above shows the plot of an oscillating wind over time. Using this information, the tactician is able to plan a strategy to take advantage of the shifts, shown by the checkered boat, above. The black boat ignores the shifts, and falls behind.

Stay in Phase-Tack on the Headers
Coming off the starting line, we are sailing on starboard with a compass course of 180° to 185°. These are high numbers for starboard tack, which means we are lifted. Gradually our course drops to between 175° and 180°. This is an average course, neither headed or lifted, and we can sail on either tack.

Soon the crew reports that our course has dropped below 175°. Other boats are showing similar angles. We are headed. We tack. As we settle on port tack the compass reads 260°-265°, low numbers which mean we are lifted on port tack. As the numbers rise, we are getting headed. Remember: Port, Higher, Header. When our course falls below our average, we tack again and sail lifted on starboard.

As the plot shows, we continue tacking on the headers in the oscillating shifts. Gradually we find ourselves to the left of the middle of the course. We use the time when the wind is at the average direction to sail on port tack, which returns us to the middle. We sail on starboard only when lifted above 180°; we sail on port for any heading between 260° and 270°.

A New High!

Further up the leg, we are sailing lifted on starboard. Compass readings show a course between 180° and 185°. Gradually we are lifted to 190°. At this point lights should flash, bells should ring, and sirens should sound. 190° is beyond our range of oscillations. We are lifted higher than ever before.

We may have to reevaluate the conditions and modify our strategy. What is causing this new reading? Helmsman error? Changing weather? Are we closer to shore? Are there any new clouds? What is going on with the rest of the fleet?

Is this a momentary aberration, after which we will return to earlier conditions? Or is this the beginning of a persistent shift? Perhaps the wind will continue to oscillate, but over a new range.

The key is to first recognize that something new is happening. The next step is to evaluate the change and make plans accordingly. Ideally we would have seen it coming-either from wind on the water, an expected shift near shore, or by observing other boats (in an earlier class-we are leading our fleet, remember).

The Impact of Shifts-Don't Miss 'Em

Meanwhile, one of our competitors has sailed off the line on starboard tack and continued one third of the way up the leg before tacking. From
there he sailed across the course on port tack, to the starboard tack layline. Ignoring the shifts has left our rival out of phase and sailing headed half the time. On the other hand, he has only had to tack twice! On a two mile beat with 10° oscillations, a boat which sails in phase will be minutes ahead of a boat which ignores the shifts. That's even after we throw in the cost of a couple of extra tacks!

A little later, we'll pull out our slide rules and find out just how big a deal windshifts are, but for now, just remember: Track the shifts, and hit 'em!

Similarly, if there are other strategic considerations, our tacking angles may be skewed. For example, if there is better wind or current to one side of the course, we would only sail away from that side at the extreme end of the shift spectrum.

**Persistent Shifts**

The strategy in a persistent shift is to sail toward the new wind. If the wind is shifting to the right, then go right. If the wind is shifting left, go left.

**Sail Headed**

In a persistent shift, one tack is continuously getting headed while the other is getting lifted. Our strategy is to first sail the tack which is getting headed, then sail the tack which is getting lifted. Why? The tack which is getting headed is getting worse all the time. It is headed now, but will be headed more later. Sail it now before it gets worse. The tack which is getting lifted is improving all the time. If we sail it now we will be missing a better lift later.

**Are you Sure it’s a Persistent Shift?**

How hard is it to split with the fleet and sail into a header? Without our pre-race info, weather forecast, and/or observation of other boats on which to build our strategy, it would be crazy. Even with good information and a well thought out plan, it is hard to stick to your guns as the fleet tacks away. If you know what is coming, then go to it. Position yourself to the favored side of the fleet.

**The Rewards**

How much do you gain by sailing into a persistent shift? It depends how far the wind shifts and how far you are separated from your competition; but in a word - Plenty.
PERSISTENT EXAMPLE

We know from our Wind Graph that the wind is gradually backing. Our starboard tack readings for the hour before the start show a trend: $30^\circ > 25^\circ > 20^\circ > 15^\circ$. The port tack compass readings are similar: $120^\circ > 115^\circ > 110^\circ > 105^\circ$. Starboard is getting progressively headed, while port is getting lifted. The forecast tells of a low passing to the south. We expect the wind to continue to back (Fig. 8).

\[
\begin{array}{c|c|c|c}
\text{Time} & \text{Wind Speed} & \text{Wind} \\
\hline
11:15 & 8 & 120 \\
11:20 & 9 & 30 \\
11:25 & 9 & 30 \\
11:30 & 9 & 25 \\
11:35 & 9 & 115 \\
11:40 & 9 & 110 \\
11:45 & 9 & 110 \\
11:50 & 10 & 110 \\
11:55 & 10 & 110 \\
12:00 & 10 & 125 \\
12:05 & 10 & 160 \\
\hline
\end{array}
\]

Fig. 8 - Wind Graph and strategy for a Persistent Shift.

Sail to the Shift
Coming off the starting line on starboard tack our compass reads 15°. A minute later it reads 10°, and a few minutes after that it reads 5°. With each little header some of our competition tacks away. Some tacked to port on the first header off the line. Others have gradually bailed out as the header continues.

Eventually, with the compass reading 0°, we tack over. Our course on port tack is 90°. We are short of the layline to the mark. Gradually we are lifted, first to 85°, then 80°, and finally 75°. We are lifted to the mark, far ahead of those who tacked out early.

When should We Tack?

The choice of where to tack is a little tricky. Theoretically we want to tack so we will be lifted exactly to the mark. This curved lifted layline would give us the full advantage of the shift without sailing any extra distance. This is a tough call, to say the least. A more realistic approach is to tack short of the layline. Then, as you approach the mark, tack out again, and take another guess. Don't overstand or you'll be sailing extra distance. As you get closer to the mark, you should be able to make an accurate layline call.

Another (tactical) perspective on where to tack is to maintain position between the fleet and the shift. Don't sail to the corner-just get a controlling position.

So Much for the Competition

Coming off the starting line on starboard, we gradually got headed. Some of the fleet played the header as an oscillating shift, and tacked out. They expected to be headed again (on port tack) before tacking back to starboard. This was a big mistake. We knew from our Wind Graph that we were in a persistent shift. We used persistent shift strategy by sailing into the header, towards the new wind.

The boats which tacked out early kept getting lifted further and further on port tack, which made starboard tack look worse and worse. The port tack boats ended up sailing what is known as the great circle route, getting lifted around the outside of the mark.

Too Far Ahead

If the fleet goes right and you think the wind is going left, then position yourself to the left of the fleet. Don't split completely with the fleet, for two reasons:
First, if you split and you are right, you will end up way ahead, and everyone will think you were just lucky. You don't want to win by too much; just a comfortable margin that will let everyone see who is out front.

Second, if you split with the fleet and happen to be wrong, you are sunk. (Somehow it is not unlucky to be half a mile behind—you are just bad.) Hedge your bets.

**Other Types of Shifts**

As we said above, pure oscillating and pure persistent wind shifts are quite rare. There are infinite variations.

One variation is a mix of persistent and oscillating shifts. This mixed condition is characterized by oscillating shifts gradually shifting one way or the other—veering or backing—over time.

Several other types of wind shifts occur. One is a major shift where a new wind completely replaces the existing wind. This can happen suddenly, or after a period of calm. Winds vary in other ways. There are geographic shifts caused by the configuration of land and thermal wind shifts created by the heating of land. There are also differences in the wind due to differences in current (as we will see below), and there are shifts caused by the movement of weather systems.

**Mixed Conditions**

Often conditions are not a pure form of persistent or oscillating shifts. Instead we end up with a mixed condition, combining both oscillations and persistent characteristics. The strategy in a mixed breeze is to favor the side toward the persistent shift while playing the oscillations. Part of the trick in coping with these mixed conditions is to realize that the range of oscillations is gradually changing. The high and low numbers on each tack will be increasing or decreasing. What was once a header may now be the median, with a new lower header on the way.

When conditions are too confusing to diagnose, the fall back strategy is to sail to the mark. Which ever tack takes you closer to the mark is preferred until there is reason to do otherwise.

**Mixed Conditions Example**
Here is an example of strategy in mixed conditions (Fig. 9).

Pre-Race Data

Our pre-race data is listed in the Wind Graph. It shows mixed conditions. The trend is veering, but we have oscillations as well. Our strategy will have to

<table>
<thead>
<tr>
<th>Time</th>
<th>Course</th>
<th>Wind Gy</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:15</td>
<td>8</td>
<td>25.5</td>
</tr>
<tr>
<td>11:16</td>
<td>10</td>
<td>34.5</td>
</tr>
<tr>
<td>11:20</td>
<td>9</td>
<td>33.5</td>
</tr>
<tr>
<td>11:25</td>
<td>9</td>
<td>34.5</td>
</tr>
<tr>
<td>11:30</td>
<td>10</td>
<td>2.5</td>
</tr>
<tr>
<td>11:35</td>
<td>10</td>
<td>25.5</td>
</tr>
<tr>
<td>11:40</td>
<td>9</td>
<td>33.5</td>
</tr>
</tbody>
</table>

Fig. 9 - Wind Graph and strategy for Mixed Conditions.
consider both; we will also have to keep a keen eye out for changes in conditions. One thing to look for is stronger breeze to one side. Is the trend shifting and building (as in this example) or shifting and fading.

... And They’re Off

It is interesting to see the different strategies which emerge from these difficult conditions. Some of the fleet will treat the beat as though they were sailing a persistent shift. Others will tack on the headers. Some will try to balance the mix. And still others will be confused and uncertain of how to handle the conditions.

As the fleet moves up the beat in mixed conditions, the apparent leaders will change with each shift. Often it is unclear until the last shift of the leg who will come out ahead.

Keep Fighting

In mixed conditions you are never out of it. Keep working, keep trying to decipher the next shift. There are plenty of opportunities to catch up (and more than enough chances to get confused). If you find yourself baffled, try to re-group. Everyone will have their moments—if you can keep from going to pieces during your bad moments, you'll have another chance for good times.

Geographic Shifts

We do most of our racing near shore, where the interaction of the land and water affects our sailing wind. Further offshore conditions are more stable and predictable; but along the coast, wind conditions are difficult to predict.

There are many ways the shoreline changes the wind. First, the shoreline funnels the wind. The wind shifts to follow the shoreline. Second, offshore winds tend to shift more perpendicular to the shoreline (Fig. 10a). Third, winds shift around obstacles such as hills, buildings, and thermal domes in areas with lots of pavement (Fig. 10b).

Fig. 10a - Offshore winds tend to shift more perpendicular to the
Fourth, the heating of the land creates thermal winds—sea breezes—which blow towards shore during the day.

Fifth, the thermals create turbulence and mixing which can pull the upper winds down to the surface. These upper winds are generally shifted to the right of the surface winds.

The effect of these geographic changes can be either persistent or oscillating. In offshore winds, there will commonly be a mixed effect—with puffs coming from shore lifting the tack which is parallel to shore, and with those lifts being stronger the closer you get to shore.

The thermal effects on an onshore wind usually create a persistent shift from the prevailing wind direction to the normal sea breeze direction (Fig 11).

These shore effects are described in more detail in Chapter 13: Weather later in this book.

**Weather System Wind Shifts**

**A Major Change**

As weather systems move or weaken, one wind can replace another. A prevailing wind may be pushed aside by a thermal, or a new weather system wind may arrive. Whatever the cause, there are occasions where a
new and different wind appears and all the earlier information becomes irrelevant.

If we can anticipate this change based on forecasts or observations (new clouds etc.) and be in position for it, there can be tremendous gains. But beware-There is a danger in chasing the predicted conditions and expecting a shift which does not arrive as scheduled. Summer weather systems often stall or even disappear as the get to the coast.

Squall Winds

Another type of weather system wind is a localized late afternoon squall. These can turn the entire fleet on its head. These squalls create two opportunities-one as the squall hits, and the other as the squall passes.

Be prepared. If you are ready and can continue to race through the squall while others scramble, huge gains are possible. Sail toward the new shift to avoid windward work once it arrives, and be ready to shorten sail. A squall drill should be part of your crew training.

If the squall is localized, then after the squall passes conditions often return to the conditions which existed prior to the squall. If the squall is part of an advancing cold front, then conditions behind the front will be entirely different from earlier. By recognizing the type of squall you may be able to anticipate conditions during and after its passage.

Wind Shear

*Wind shear* is a condition where there are layers of wind—one at the surface, and the other aloft. Wind shear is uncommon. It occurs most often over smooth cold water early on a spring day, or at night.

There is a boundary layer of cool air on the surface, and a different wind aloft. Sail trimming with the wind 30°, 45° or even 180° different from the deck to masthead can be baffling, to say the least.

Generally the upper wind will become dominant. Fundamental wind strategy says sail toward the new wind-in this case sail toward the upper wind, as it will eventually displace the surface wind. If you are a small boat in a mixed fleet, don't forget to look at the mastheads of larger boats. Sometimes you will be able to find a wind shear (and a clue to the expected wind) which does not show at your masthead (Fig. 12).
Wind shear is the stacking of two winds, one on top of the other. The upper wind usually displaces the lower wind.

Don't confuse wind shear with wind gradient. Wind gradient is the tendency for winds at the mast head to be stronger than those at deck level. It exists almost all the time, and is more dramatic in light air, less pronounced in heavy air.

The Impact of Windshifts

It is often difficult to predict the wind. Is it worth it to try to figure out what the wind is going to do next? How much difference does it make? Here's an example:

The Impact of Oscillations

We'll start first with a boat sailing upwind, with a tacking angle of 90°. Using trigonometry (yikes), we find that the distance sailed is 1.42 times the straight-line distance. To sail to a mark one mile upwind, the boat will have to sail a total of .71 miles on port tack, and .71 miles on starboard tack.

If the wind is oscillating as little as 5° either side of the median, then performance improves significantly. To sail to a mark one mile upwind, the boat will have to sail a total of .64 miles on port tack, and .64 miles on starboard tack. By taking advantage of the shifts, the distance sailed is reduced to 1.28 times the straight-line distance. To sail to a mark one mile upwind, the boat will have to sail a total of .64 miles on port tack, and .64 miles on starboard tack. A savings of .14 miles!

If the wind is oscillating 10° either side of the median, then performance improves dramatically. To sail to a mark one mile upwind, the boat will have to sail a total of .57 miles on port tack, and .57 miles on starboard tack. By taking advantage of the shifts, the distance sailed is reduced to 1.14 times the straight line distance. A savings of .28 miles!

At a boat speed of 6 knots this represents over 2-1/2 minutes in one mile! That's right - 150 seconds per mile! These numbers are for a boat sailing the wind shifts perfectly. If your windshift efficiency is only 40% of optimum, you'll still save one minute per mile! (Fig. 13)
7.5 Current

Current adds complexity to strategic planning. The obvious, and primary, strategic concern is to seek out better (more favorable or less adverse) current. When the current is not uniform across the course, it can be an overriding strategic factor. Currents run stronger in deep water than in shallow, and faster in narrows than in open water. Below points and around bends, eddies can develop.

Adding further complexity is the fact that currents change. Correct strategy can change dramatically over a period of hours. Storms and strong winds can distort surface currents and delay tides, sometimes making tide tables useless (Fig 14).

Wind Driven Current

Currents are not limited to rivers and tidal basins. In the Great Lakes, for example, currents of one full knot are possible. Currents build when strong winds drive the surface water. After the winds abate, the currents reverse as the water, which has been stacked up at one end of the lake, returns to level (Fig. 15).
Wind can create current. Wind driven current can exaggerate or reverse tidal currents in shallow bays. And it can create currents where there otherwise would be none. After the wind has pushed water to one end of a basin, the current will reverse when the wind subsides.

When the current is uniform throughout the course, it affects the laylines and sailing angles to the mark. If it is running across the course, then it can also change the balance of time spent on each tack (See Fig. 16).

![Diagram of current](image)

**Fig. 16** - When the current is uniform throughout the leg, the biggest impact is on laylines into the mark. Current can also skew the course, changing the balance of time on each tack.

**When Current is Not Uniform**

When the current is not the same across the course area, then we must seek out the advantage. Differences across the course can shape our strategy. Unless there are dramatic differences in wind conditions a current advantage is key to strategic planning.

*Current to one side*
Obviously if the current is stronger to one side seek out that side if it is favorable, and avoid that side if it is adverse. A favorable current, running against the wind, can set up a pronounced chop. Look for this. Sail into the choppy water and ride the current upwind. Similarly, smooth water can indicate wind and current running together. Avoid this area upwind (Fig. 17).

Fig. 17 - When there is stronger current to one side, go to it if favorable, sail away if adverse. The advantage can change with the tides.

Current across the course

When the current runs across the course and is stronger in one part of the leg, you want to take advantage of the change in sailing wind caused by the current. Sailing bow into the current you will be lifted; sailing with the current astern you will be headed. For example, in ten knots of wind and one knot of current the sailing wind is shifted 6°. With one tack lifted and the other headed, the effect is a 20% advantage in VMG (Fig. 18).

Fig. 18 - When current is not uniform, take advantage of the shift in sailing wind. In this example we have 10 knots of wind, 1 knot of current, and boats tacking through 90°. The current gives one boat a 6° lift, the other a 6° header. The lifted boat's VMG is 20% better than the headed boat's. (VMG is normally .71 of boat speed. The shift is 6° because arc-tan 6°=1/10. A 6° lift creates a VMG of .78, a 6° header creates a VMG of .63. .63/.78=.80. I'm glad you asked.)

Predictable, to a Point
Current, whether tidal or river generated, is predictable. Tide tables and current charts should be studied, and their predictions compared with observation. When the current runs strong it is often more reliable and predictable than the wind; a small current advantage translates into big gains.

In tidal areas the advantage can be fleeting-or reverse-over the course of a race. Obviously we need to pay attention to changes in the tide.

Changes with Wind Conditions

The wind can upset current predictions, particularly in shallow water. A strong wind blowing over a long period can overwhelm tidal effects, pushing surface water and delaying or reversing tides. When the winds abate, the current distortions will remain until the water has had a chance to return to level by flowing in the direction opposite the earlier wind. Winds can also create currents where there otherwise are none, as mentioned above.

Effects on Sailing Wind

Current changes the sailing wind for a boat. The sailing wind is the sum of the true wind over the bottom and the current. The net effect of current on the wind reinforces the effect or the current. A favorable current creates a favorable change in the sailing wind, and an adverse current makes for an unfavorable change in the sailing wind (Fig. 19). Details are explained in Chapter 13: Weather near the end of this book.

Fig. 19 - The vector of the current is added to the true wind to create our sailing wind.

Develop Local Knowledge

One key to success in current is to develop local knowledge. Keep records of how the current runs in various wind and tide combinations. Our
strategic plan is only as good as the information it is based on. Accurate current information is critical to good strategic planning.

Performance Racing Tactics
by © Bill Gladestone
Chapter 7 - Upwind Strategy

7.6 Strategy vs Rivals

While dealing with other boats is really a tactical issue, other boats can enter into our strategic planning. Late in a series we may be concerned with particular boats which are close to us in the standings.

It is good strategy to consider your close rivals, but do not let them distract you from sailing your own boat properly. There is a danger in becoming preoccupied with the opponent. The rivals are but one strategic factor. If you sail your own boat well, the rest should fall into place. If you sail badly, then you stand a greater chance of losing your private war.

The basic strategy when ahead is to stay between the competition and the next mark (Fig. 20). When behind the basic strategy is to split with the rival, but not simply for the sake of splitting. If you are behind and the rival is going the right way, splitting will leave you further behind. You have to be patient and look for your opportunities. For further discussion see Chapter 8: Upwind Tactics, next. There are times when you may be close enough behind in the race to be able to preserve a lead in the series. In this case the strategy is simply to follow the rival. You must, of course, consider handicap time differences when evaluating your position.

Fig. 20 - Cover your chief rivals. Stay between them and the next mark or the wind.

7.7 The Land of Opportunity

It happens, even to the best of racers. All of the sudden you find yourself at the tail end of the fleet. Who knows how you got there—a third row start, a miserable first beat, a big shift, a boat handling disaster. I will not dwell
on the ways to fall behind; at that, it seems, we are all uniquely qualified.

The Most Important Race

So, you're back in the pack. What should you do? Before getting into details, recognize that in any regatta or series your worst race is often the most important. One astronomical score can shatter an otherwise competitive record. The ability to bring that astronomical finish down to earth is the mark of a champion, and success starts with attitude.

Don't Dwell

As a skipper you should take charge. Never mind how we got into this mess-let's focus on getting out of it. (Besides, more than likely it was your fault.)

How Many Can we Pass?

When you find yourself at the wrong end of the fleet, don't get depressed. You are in The Land of Opportunity—there is a whole fleet of boats waiting to be passed. Don't wait for a miracle to save you. Get to work and grind 'em down, one at a time. You're not going to win this race; that is no longer the goal. Actually, winning is redefined for this race. Winning is passing as many boats as you can (Fig. 21).

Fig. 21 - The Land of Opportunity.

Sail Fast & Go the Right Way

Don't panic. Settle down and work on boat speed. You will not pass anyone without good speed. Concentrate on speed, and you should be able to knock off a few tail-enders easily.

Go the right way. In The Land of Opportunity you must concentrate more on your overall strategy than on immediate tactics with those nearby. Upwind, figure out which side of the course is favored and head that way. Back here it is hard to sail the middle; all that gets you is traffic and bad air. You must pick a side. Do it carefully—you can't afford another mistake. If you are not sure which way to go (maybe that's how you landed in the Land of Opportunity), look to the leaders for guidance. The leaders are
probably doing what is right. Others will gamble against the odds in hopes of passing the leaders. Our goal is pass the gamblers.

Sail Clean, Fast, Smart

On the reaches, you can save distance by sailing the rhumb line while letting others waste distance sailing high and then low. Avoid luffing duels, plan well ahead for the inside position at roundings and, above all, keep sailing fast.

Running legs offer an opportunity to attack those ahead. For all you need to know about Running Strategy and Tactics, skip ahead a few chapters. There are real opportunities here.

The Promised Land

Hopefully you've fallen behind early, so you have plenty of time to catch up. Play the shifts and work the favored side; and keep sailing fast.

Position yourself carefully to pick up a few boats at each mark rounding. Look ahead for changing conditions and be ready to respond.

Every boat you pass is worth a point, and it is easier to move from 15th to 5th than it is from 5th to first. When you find yourself in The Land of Opportunity, keep cool, sail fast, go the right way, and avoid confrontations. You can reach The Promised Land. The End (Fig. 22).

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Fig. 22 - When you fall behind (as on the previous page) get to work. With grit, determination, and a little luck, you can reach The Promised Land.

7.8 Local Knowledge

Consistent success in a local area depends on local knowledge. You must learn to recognize local conditions and know the strategy which is called for. When I raced collegiality at Yale, our team captain, Steve Benjamin, required us to complete a regatta report for every regatta we sailed. All the regatta reports were compiled into a notebook. Later, when I went racing on the Charles River in Boston, for example, I could refer to dozens of reports by my teammates covering the boats and sailing conditions I would face.
Local Knowledge: Racing in Annapolis

Each year it seems I race a regatta or two on Chesapeake Bay, out of Annapolis. The northern bay offers a challenging sailing venue. It is close enough to the ocean to be affected by sea breezes, and far enough north to be battered by cold fronts in early fall, when I seem to do most of my racing there. Winds come from all points and in all strengths. The currents run strong and vary widely across the bay. The winds have a big effect on the current, sometimes making a joke of the tide tables.

Disclaimer

Following are my impressions. God save you if you are foolish enough to follow my strategic advice when you go racing on Chesapeake Bay.

South East/South Sea Breeze

Comes in on top of prevailing southerly or when no other weather pattern is firmly in place. South East to South winds are generally shifty but not strong. Current is important, since this wind takes us diagonally across the bay. Beware of getting too far in toward the Eastern Shore. The breeze tends to run lighter and more southerly there, lifting starboard and making it painful to tack out onto port-and easy to take the great circle route. Against the current you must get very close to the eastern shore to avoid the current in the main channel, and this often leads to great circle route just described. It seems better to stay right to avoid some current and still keep breeze. Tendency to clock also favors the right.

With an outbound current, sail to the main channel to get current advantage, but stay right once in current. Avoid the left corner.

South/South West Sea Breeze

The sea breeze will fill and reinforce a South to South West wind. As the breeze builds, it does not back to the south as might be expected (since ocean lies to S.E.). Winds around 200º-210º roll straight up the bay. Winds tend to clock, and lift inshore between Tolley Point and Thomas Point.

Against the flood, the best tactic is to tack inside the line between Tolley and Thomas (don't forget to honor Tolley Pt. Buoy) to avoid the current. With the wind tending right, all signs lead inshore.

On the ebb, a more moderate strategy is called for; but there is rarely a strong ebb current against a southerly wind. The wind effectively blocks
the current, and wind strategy prevails.

**Westerlies**

The prevailing westerlies can become blustery after a frontal passage. Most cold fronts take the wind N.W. or N., but a post-frontal westerly is not uncommon. The races are generally started near the Eastern Shore, with the windward mark set at the mouth of the Severn River. The wind tends to fan out of the Severn, particularly in the upper half of the beat. Boats sailing out to either side are lifted. They never get a favorable shift for a return tack, and boats come back from the corners headed. The wind also gets lighter off to the sides, with the steadiest and strongest winds coming straight out of the Severn.

Strategy: Play and protect the middle. Don't get driven to the sides.

The reach mark is set in the middle of the bay, south and east of Tolley Point. After rounding the windward mark, particularly on the blustery days, the leg appears too tight for a spinnaker. Go ahead and set. Sail low on the early part of the leg, in the strong winds from the Severn. Later in the leg the breeze will lighten and fair, and it will be advantageous to be able to reach up from below.

**WARNING:** Things don't always work out this way on the first reach. Sometimes a S.W. puff will come off the shore inside Tolley Point and the boats inside will beam reach across, while those down low struggle to
reach up. It depends on the wind direction (S. or N. of W.?) and the position of the mark (the closer under Tolley Point the more likely S.W. puffs are to be a factor).

The second reach across the bay is dominated by current. The same is true of the later part of any leeward leg. The current runs strongest near the mark. Overcorrect for the current to make sure you are sailing with it into the mark. (Work south on a flood, north on an ebb). The wind tends to be much lighter on the Eastern Shore and you don't want to have to fight the current in the main channel.

In the westerlies, the wind tends to be stronger by the river than on the eastern shore. Be ready for more breeze at the top of the leg.

If the frontal passage is weak the sea breeze may push the breeze to the S.W. in the afternoon. A strong front will tend to clock the breeze to the N.W.

North West Wind

After a frontal passage in the fall the strong N.W. winds provide some of the year's best sailing. From a start in mid-bay the windward mark is set at the mouth of Whitehall Bay or off Hacketts Pt. to the east. Coming off the line there tend to be starboard tack lifts, with the boats up the line gaining an advantage. From there the race is often a sprint to the left in search of puffs from the Severn. The puffs are starboard headers, allowing a tack to port and a lifted track into the mark.

North Wind

In a northerly there is no fixed strategy. With the mark set below the bridge there may be some port lifts off Whitehall, but there may also be better breeze in the open part of the bay. If the wind is clocking then plan a strategy to take advantage of the persistent shift. Current can become a big factor. Stay left to avoid an ebb. Go right to take advantage of a flood, though the wind may diminish its strength.

North East Wind

As the frontal wind fades the breeze will clock to the northeast. The temptation is to go right, and that strategy may pay off early in the leg. But if the mark is set under the Eastern Shore the right will be a problem later on. In the second half of the beat boats coming in on port from the left hand side will be favored by more northerly puffs which roll down from the bridge, while those on the right suffer in fickle easterly puffs off the
shore and big northerly headers.

The current can be a big factor, as you will have to cross the main channel on the way to the mark. After a strong northerly there will be little water left for an ebb, but beware the flood which may run longer and much stronger than usual as the bay refills.

Easterly Wind

The easterlies are among the most fickle and difficult of bay breezes. One thing is for sure. Rain is on the way. Stay home, stay dry; put in the storm windows until the rain starts, then watch football on TV If you don't have a good TV go to Marmaduke’s Pub on Severn Ave.

POP Quiz and Homework

Newport Rhode Island Strategy Quiz:

See the Chart Below

We are part of a crew racing in Newport, just outside the harbor, adjacent to Goat Island. The course is Olympic-A triangle, followed by windward, leeward, windward. We are about to complete the triangle and turn upwind. Our skipper wants to know what our strategy should be.
Looking upwind here is what we see:

The sea breeze is blowing steadily across the course, about 15 knots true, and very steady everywhere.

On the right hand side of the course where the harbor opens out into Narragansett Bay, there are waves rolling in with the sea breeze. To the left, smooth water, but the same wind; strong and steady.

Which way should we go?

Upwind: Against the waves to the right,

or in the smooth water to the left? ____________.

Downwind: With the waves,

or in the smooth water? ____________.

Homework:

Make Your Own Local Knowledge Chart

Make a copy of your local sailing area and create a local knowledge chart of your own. List the prevailing wind conditions and strategies for each condition.

What clues help you pick your strategy?

Is a cloudy northerly different from a clear one?

You will be surprised at how often conditions repeat.

If you create your own race planner (or use ours from Chapter 2), print your local knowledge chart on the back. Keep a record of wind and current conditions, and strategies that worked (and didn't work). Also, after each race, write down what you learned about boat handling, and trim, as well as weather and strategy.

When you create your local knowledge chart and written analysis please send a copy to me. Really. I collect them.