

## **Martin 242 standard racing approach**

### **June 24, 2015**

This document was written with the intent of being shared with other people because I like tough competition and helping others to improve their game.

It is also largely written for conditions in the Pacific Northwest, where there is a lot of ocean current and the wind is generally lighter with flat-water conditions. Waves tend to be 1-2 feet at most.

There is some commentary regarding conditions in Los Angeles (Marina del Rey), where large ocean swells with small wavelets on top are always in play, and the wind ranges from light to moderate, with very modest current.

There is also a bit of commentary re lake sailing, such as Sylvan Lake, Alberta, where the water is usually very flat with no current, and the wind is very shifty and puffy.

One last factor is that the sails used by the author are Sobstad (main and jib) and North (spinnaker). As such, the main and jib are very similar to North sails, which are also cut quite full, as are UK's, but note later in this document that the North sails have much less luff curve than the UK's.

In contrast, the Ullman mainsail is much flatter than the other mainsails, which means that mast tensioning would probably be different. With that in mind, the author sailed 171, an older 242, which has an original 25-year-old mast, which is softer than the new masts that are very straight and stiff. As such, rig tensioning was changed on the author's new boat, 304, to accommodate the Sobstad mainsail, which required loosening the lowers more than on 171 to accommodate the Sobstad luff curve, which is greater than the Ullman luff curve (which is designed for the new straight masts).

### **The 4 Stages of Racing:**

**Stage 1:** No excuse to lose: win the race at the dock by eliminating all boat-related performance issues: hull, keel, and rudder condition; spars; equipment; ropes; sails

**Stage 2:** Continuous improvement: Get your crew dialed up through repetitive training and racing, and also arrange for a few good extra people in your Crew Pool so you rarely run short of crew. And advance crew management is an essential component of racing, such as weekly update emails with the crew rotation schedule laid out 6 weeks in advance, coupled with race results so everyone in the Crew Pool is aware how the Team is doing as the season progresses. And never underestimate the ability of inexperienced, unfocused, or physically weak crew members to contribute to poor performance at a regatta. Upper body strength is particularly critical for handling the pole, jib, mainsheet, and cabin-back.

**Stage 3:** Get your race strategy, tactics, knowledge of the Rules, and starting capability

nailed, and learn to use a tactical compass like a Silva 103R and also a Velocitek or similar. A thru-hull Speedo also helps you calculate current velocities (via contrasting speed thru water against speed over ground) if you are in a tidal area.

**Stage 4:** Get your head out of the boat while racing: look at wind, wave, and current conditions several miles away in all directions (particularly when sailing downwind), as well as geographic features (remember that wind flows like water around land contours and other large objects: witness what happens in the Gulf Island channels and the Round Bowen Race); observe competitor performance on either side of the course; **let your crew run the boat (don't be a micro-manager)**, and encourage your crew to look around and provide tactical input: 4 heads are better than 1. It is also critical to remain calm at all times when racing, especially when everything is going wrong. **The best racers are the ones who can keep their emotions in check.**

The trick to sailing with your "head out of the boat" as skipper is to be able to do a combination of two things in order to keep your boat moving at 99% of optimal speed: sail by feel; and use your direct and peripheral vision to determine if you're doing OK relative to the other boats while you are looking around.

Many top skippers are able to maintain 99% boat speed while they're looking around, and are prepared to continue to look around even if boat speed drops down to 95%. The slight drop in boat speed is more than won back by having the tactical knowledge gain from looking around the racecourse at all the variables.

There are of course times when there is no need to look around, and then a top skipper will focus in like a laser on sail trim, telltales, weight placement, etc., but that's maybe 25% of racing at most. In variable conditions the author of this document looks around all the time. The feeling is that a skipper who stares at telltales 90% of the time will be mid-Fleet or worse consistently, unless they have a good tactician on board who is on the ball 100% of the time.

### **Basics:**

- Bottom, keel and rudder should be scrubbed weekly if the boat lives in the water, depending on the level of marine growth that occurs. In salt water it is mandatory, and in fresh water you can probably stretch it out to a month or so, but beyond that you start getting a fuzzy (slow) bottom.
- Use 600-800 grit sandpaper on the bottom of the hull at least every month just to knock down little bumps of dirt or marine life that accumulate over time that don't get eliminated by regular hull cleaning, and over time migrate to 1200 grit or higher. Initially, 280-320 is just fine for our average boat speeds, and migrate to 400 over time.
- If possible, keep a dehumidifier or at least a ceramic heater running all the time inside the boat to reduce moisture levels and also mildew.

- If necessary, use a wet-dry vac before racing to suck out water from the primary accumulation points, unless the dehumidifier or heater was able to eliminate all the water first.
- Loose weight in the cabin (bags, motors, equipment) should be stored forward, around the keel area or just in front of it. Some people like having the weight slightly aft rather than forward: it's a choice.
- Check the tide height and current (not applicable in inland areas like Sylvan Lake)
- Check the wind direction
- Do a few tacks upwind and write down the tacking angles, ideally using a Silva 103R compass or a Tacktick
- Determine if one side of the course is favored due to wind, tide, or both. We usually spend 20 minutes before the start of each race analyzing the race course, as opposed to testing our boat-speed against other boats.
- Hoist the spinny to make sure it goes up and down OK
- Check if the line is square
- If you have a Velocitek Prostart, punch in the line ends, but check that the Committee does not make any subsequent changes in the last few minutes. Also note that the reading at the pin end is wonky right after you hit the button, as it'll usually display 5-7 metres, as opposed to zero, but once you circle back to the line it displays correctly.
- Get a line sight, if possible, as a backup to any electronic device
- If you can't get a port end line sight, get a starboard end line sight instead. It may mean looking backwards occasionally in the last 30 seconds before the start, but it's better than nothing
- Time the line in seconds, or at least get a general idea
- Assign someone to be prime tactician and someone else to call time at the start. It sometimes works to rotate the tactician role on a race-to-race basis so more people get experience with it, but at a minimum everyone should be looking around and feeding observations to the skipper and tactician.

### **Rules of Thumb:**

1. **Rule #1:** Determine your Strategic Positioning first (which side of the course upwind and downwind based on wind, current, and geography), followed by Tactical Positioning (clear air, boat-on-boat and Fleet positioning, playing the shifts)
2. **Rule #2:** Where is the strongest wind on the course, and make sure you factor that in to your starting game plan.
3. **Rule #3:** Win the start or at least ensure you get a very good start (usually the first boat to sheet in wins the start - 12 seconds in advance in a 49er, and in keelboats such as a Martin242, full or near-full speed at the start is critical and can take up to 30 seconds to develop. Note that a Farr 40 keel and rudder combo stalls out at 4.5 knots, and sheeting in below that speed causes the boat to slip sideways)

rapidly into a leeward boat. A Martin 242 is no different, but has a lower stall speed due to the relative sizes of the keel and rudder).

4. **Rule #4:** - Stay between your competition and the next mark. If you get off to one side of them, even by 50 feet, it creates a passing lane for them to do an end run around you.
5. **Rule #5:** - Stay with the pack – they're usually right, and unless you are absolutely convinced that you've seen something on one side of the course that they haven't, and can smoke everyone by going for it, you can't afford to lose the whole fleet by letting them get away from you.
6. **Rule #6:** – Stay near the Committee Boat in preparation for an upcoming start sequence. Many boats have wrecked their regattas by sailing far away from the line, particularly before the first race of each day, and then been unable to get back to the line in time when the Committee started the race sooner than expected or the wind dies down.
7. **Rule #7:** – Don't get rolled downwind, as it usually results in a freight-train of boats passing you, and gybing away after being rolled rarely works in that type of situation – many, many boat lengths are lost. And most crew never designate anyone to look aft for puff cards the whole time on the downwind leg, to their great detriment.
8. **Rule #8:** - The crew and skipper have to decide in advance of the event if they are there to party or to win – it makes a difference to overall performance. Drinking lots of alcohol and staying up late each evening at a regatta generally impairs the average crew's performance on subsequent days. (This is 100% true in the author's case)

### **The Start:**

- Standard: port tack approach, 5-6 lengths below the line, tack to starboard into a hole at 25-30 seconds in good breeze, 45 in very light air. Vary on occasion with a starboard tack approach if conditions warrant it, and do what Ben Mumford did in the 2012 NA's: carve up tight underneath your competitors and accelerate thru their lee – it's devastatingly effective
- **80% speed at 10 seconds, full at 5 seconds**
  - Remember that the M242 with full crew is a heavy boat and takes up to 10 seconds to get up to full speed in breeze, depending on wind conditions, and the lighter the wind, the longer it takes – sometimes as much as 30-60 seconds in very light air
  - 6 knots of speed = 9 feet per second, and 5 = 7. If you are going full speed 2 boat lengths below the line, you are 50 feet away, or 7 seconds at 5 knots.
- Someone who is not handling a sail should count down the last 30 seconds so the skipper is totally free to focus on the last-minute tactical situation.

- If you are not very experienced at starting, at all costs stay away from the pack, and move up or down the line accordingly – clean air is gold.
- Ditto re not trying for a pin end or Committee Boat start – it’s high risk, and only very experienced starters will come out alive from these two corners, and meanwhile there was probably lots of room mid-line...and clean air...
- Try not to tack for at least 2 minutes if conditions remain stable – during this time the pack thins out as boats get pushed back due to dirty air (exceptions are if you are heading into a hole; or if more wind suddenly appears somewhere else that you need to tack to get to; or if you get a big header, and by tacking you cross a lot of boats; or if you got a bad start and would be sitting in dirty air for way too long; or if most of the fleet tacks away from you and you’re flying solo and decide you don’t like your positioning on the course after all; or if you are about to cross a tide line and there’s bad current on the other side of the line)
- Starting near a favored end is not as important as starting near an end that allows you to get towards stronger wind, or a favored windshift, or better current. Sometimes a start line can be favored by as much as 55 degrees, but it can still be better to start at the unfavored end if it pays off in the longer term (such as a Wednesday Night Race in Vancouver on September 11, 2013). It can sometimes be amazing the effect of wind or current differentials at one end of the line versus the other, and these effects only become apparent after the start when everyone is trying to go full speed. A few knots of additional wind pressure at one end of the line or side of the course can make a large difference in boat speed over a sustained distance. Ditto re a bit of current differential. See more about this in the “Pressure-based Racing” subsection below
- In addition to prior related points on this issue, starting near a favored end is also not as important as starting in clear air in the middle or even an unfavored end, and travelling at full speed at the start and thereafter. The ability to punch ahead of the pack and maintain clear air for several minutes (or longer) adds back many boat lengths that may have been given up by not going for the favored end of the line, plus you have the advantage of maneuvering room that other boats don’t who might have started in the middle of a cluster of boats.
- Turn off ratcheting mechanisms and use winches quietly so competitors can’t hear you sheet in
- Drop below the line as required so you get enough runway to accelerate in, and rely on the Velocitek to gauge distance-to-line
- Score each start: raise the “great start” percentage up to 80% (or as someone said recently, drop the “poor” start percentage from 40% down to 20%, because that will have a way bigger impact than making already great starts slightly better.
- Make sure you check that the Race Committee has not changed the start line during the last 5 minutes, and if they have, make sure the Velocitek gets updated if you use one. Some RC’s change the line even during the last minute.

#### **Upwind:**

- **It is imperative to get clean air after the start in a M242** - foot down sharply or tack immediately until you get it, and keep it for the rest of the beat. You can

usually foot below one boat, but trying to go below two is very risky, and you may get spat out the back of the pack as a result due to excessively dirty air.

- In addition, if you find yourself well back of the leaders on the beat, and fighting it out for clear air with everyone else, remember that one way to make up a lot of ground is to be the first boat to tack for the windward mark so you keep clear air for a substantial portion of the final part of the beat. Many positions can be made up in this way, especially in big fleets of 20+ boats, and especially in westerly winds (there is a geographic lift that kicks in as you go further to the north on port tack, so you can, usually, get increasingly lifted on port tack as you head out to the mark, even though you are fighting a bit more current than the inshore boats). Same principle in other wind conditions: keep clear air at all costs, and don't sail past the lay-line to get it unless there is absolutely no chance to tack earlier for the mark because the leaders took all the available slots.
- Have at least one person watching the wind and other boats – the more the better
- Don't over-sheet the mainsail or the jib - occasional adjustments are OK, which is where the value of 2:1 sheeting on the jib in breezy conditions really pays off
- Don't wiggle the tiller - keep it steady (especially in flat water, but not so much as waves get bigger and bigger) – the rudder is a big spade and can slow the boat down if it is adjusted too much.
- Neutral, as opposed to weather, helm is the desired goal: do whatever you must to attain neutral, or near-neutral, helm. This includes dropping trav, changing rig tension, adjusting sail shape, adjusting the jib cars, shifting weight, hiking harder, whatever.
- Boom should generally be on the centerline, and all the mainsail telltales flying initially
- As a test of correct mainsheet tension, I generally pull the main in until the top telltale just starts to break and flop against the sail. Sometimes I'll leave the tension there, or ease it back out a fraction until the telltale flies properly again, particularly if I'm in a slight footing mode, and especially in choppy water where I want to punch thru the waves and not pinch at a lower speed.
- One experienced racer says you should sheet the mainsail looser than you would normally think due to wind shear at the upper levels of mast
- I set the jib cunningham tension generally in light to medium air at the point where there is a faint suggestion of small wrinkles up the luff. In strong wind I usually eliminate all luff wrinkles.
- The mainsail cunningham is left loose except when it's very strong wind and we're trying to depower the sail, and particularly any time I have to drop the traveler to depower the boat.
- The outhaul is generally pulled on reasonably tight even in light air and flat water, so that there is maybe a 4-5" gap in the middle of the boom at a maximum, and in heavy air it gets pulled on extremely tight to help depower the sail. In the mid-range conditions, we've found that having a fairly tight outhaul is fast, where there may be only an inch of gap in the middle of the boom.
- Drop the traveler down as the wind increases - use it as throttle control, particularly when the wind is puffy, because the helmsperson can't depower the

boat enough in a puff by luffing up – only dropping the traveler all the way down at times will work.

- It is worth experimenting with modest or greater amounts of backstay in windier conditions so as to not only tension the forestay but to also stabilize the mast tip in big waves. Backstay tension may also reduce the need for excessive main leach tension. One experienced racer feels that a bit of backstay in windy conditions is better than dropping the traveler, but the author prefers the opposite (old habits die hard).
- Boat heel varies with wind speed, but generally I go with 5-10 degrees in light air (3-4 knots), 5 or so in medium (Don Martin advocates sailing flat in more than 3-4 knots, focusing on balance), and then just try for the best in heavy air, using the traveler as “throttle control” to increase or decrease power and thus boat heel. Some people I know sail their boats flat in light conditions, but it feels weird for me, so I don't do it very often. That said, in the 2013 NA's in Cowichan Bay, in 7 knots of breeze and flat water on Day 3 we hiked out as far as possible and kept the boat absolutely flat with our 780 pounds, and had superior boat speed. We had also bladed out our sails so they were very flat – and the jib was sheeted in as hard as possible.
- Weight forward upwind - helmsman should be right up against the aft side of the traveler in medium to heavy air, and in light air I'll sometimes be in front of the traveler, or at least straddling it, because usually one crew or more is to leeward
- Jib cars should stay in the same position all the time in flat water, except for moving back one to three holes in 15-20 knots, and four to five holes above 20 knots, particularly if the waves are huge and it's imperative to foot thru them as opposed to pointing. This is especially important re the jib cars in chop and breeze for Ullman sails, as the jib has a much longer foot length than Sobstad's.
- An experienced racer suggested that you consider loosening the uppers and maybe the lowers a bit in chop for new masts, and check carefully with regard to old noodlespars. 3 turns on the uppers and 1.5 turns on lowers relative to the base settings make a huge difference. In MDR at the 2013 Midwinters we had a base of 41 upper and 38 lower, but switched to 38 & 35 in the lighter MDR breeze on the Saturday and were very fast.
- **Stay in the middle of the course and avoid the corners**, particularly in a Vancouver easterly/southerly or lake sailing when there are lots of shifts. The exception is a drag race westerly to the beach in English Bay in Vancouver, or if there are multiple classes that started ahead of the M242's or if you are mid-Fleet: in both cases the middle can have less wind pressure due to boat traffic and you need to “sail to the edge” to get clear air.
- **Decide if you are going to point or foot - it makes a difference.** I tend to be a footer, and others are pinch-machines, so decide what you like best. I can sometimes switch gears and go into pinch mode, but usually only if I'm trying to force someone to tack away who is to windward of me, or if I'm trying to lay a mark, or if I'm trying to get the most out of a puffing lift.
- We generally have a geographic wind shift in a westerly breeze, where you get headed going into the beach on starboard and lifted as you go out on port. The effects can be magnified by the tidal current. As such, you generally err on the

side of footing going into the beach (in order to keep max wind pressure in the sails), as opposed to pinching, and when on port tack you take advantage of the wind lift by erring on the side of pinching, rather than footing. So the very general Rule is: bear off into a heading breeze and pinch in a lifting breeze.

- It's basically the same as when you get hit by a heading puff: you bear off in it, whereas if it's a lifting puff you'll naturally be able to pinch up in it because it just keeps lifting you as you dig into it. Another related tactic we use is that if we are sailing along and see a puff ahead of us that's slightly on our front left side that's looking very likely to be a header, I'll foot quite a bit to get to it because then I'll dig into it even faster and decide if I'll keep footing into it or tack. Conversely, if I see a puff coming slightly on my front right side that's going to be a lift, I'll pinch up ever so slightly to hook into it sooner than if I'd erred on the side of footing. We are talking about very few degrees of course alteration in both examples, but that can rapidly translate into multiple boat lengths of gain.
- If you can overcome the natural reluctance to foot when required re breeze and focus on pressure-based racing; coupled with match-racing opponents upwind and downwind, plus ensuring your "Excellent" and "Good" combined start percentage is above 60%: these are the kinds of things that move you steadily towards consistent "A-game" performance over time.
- Watch where the pack is going - they are generally right – and you can lose way too many boats if you head off in a different direction
- Approach the weather mark on starboard if possible - it's safer – and in stronger wind when you are on port tack and heeled over on a M242 it is almost impossible to see other boats under the boom – the jib and mainsail are massive visibility blockers, unless you have see-thru UK-Halsey sails or big windows in your mainsail.
- If you get into a port-starboard altercation it is imperative to blow the mainsheet off to duck the other boat – dropping the traveler alone will not enable the helmsperson to be able to alter course enough because the mainsail will keep the bow from falling off enough. If your boat has a non-ratchet mainsheet block, it should be replaced with a ratchet version to reduce point loading on the mainsheet cleat: it's a major safety issue.
- Count down to a tack so the crew can get ready (3, 2, 1, tack)
- **Roll-tack the boat in light to medium air** rather than doing a flat tack or a leeward-heeling tack.
- Don't tack too often if you can avoid it - it slows you down, and you can lose as much as 2 boat lengths in 8-10 knots of breeze, and more in lighter air, and even more in wavy light air conditions like you find in LA.
- We tend to have one person tack the jib, even in heavy air, depending on skill set and strength. On occasion we'll have one person release the old sheet and the other pull in the new one.
- The best tacking technique with 1:1 sheeting is not pulling in the jib sheet hand over hand, but rather to wait until the jib is just going thru the eye of the wind, taking out the slack in the jib sheet as it is approaching that point, and then using all your body weight to lunge against the jib sheet, with your body falling in the direction of the new windward side, as opposed to an aft or other direction. In this



manner even a 120 pound fit person can suck the jib block-to-block in 20 knots of breeze, and only occasionally have to cross-sheet to get the last inch or two. That said, having 2:1 jib sheets for anything above 5 knots of breeze does make life easier when a multi-race series is factored in or if you are racing in LA and need to adjust the jib constantly in the waves.

- It is worth experimenting with “boxing” the jib, perhaps mostly in very light air conditions. To do so, you go into the tack, trim the jib in slightly as you go, let the wind fill slightly on its back side (that way the jib is pulling the bow around, not the rudder (which is neutral, ideally)), and then you complete the tack on the new side. The author does not box his jib, however...

### **Weather mark:**

- No-pole hoists are OK and should be practiced due to the fact that the M242 jib can be furled in seconds, unlike other boats without furlers. In addition, using the tweekers during a pole-less set can help stabilize the spinnaker – put each tweeker at about 2’ above deck level
- Spinnaker sheets and guys should have been placed in front of the winches and jib bull’s-eyes, and over the jib sheets, with the tails inside the cabin and behind the spinnaker bag, so that the cabin-back person does not create issues during the hoist. In this manner the person handling the sheet and guy will not end up dealing with a cluster\*\*\*\* during the hoist, as all the cabin-back ropes will be well away from the spinnaker sheet, and the spinnaker will come out of the bag cleanly.
- An alternative is that the spinnaker flyer stands in the cockpit all the time, and thus the prior elaborate work-around is not required. But if the spin sheet is passed forward to someone on the bow, then the workaround is required.
- Everyone should talk about the hoist a few minutes before getting to the mark, and check that everything is ready
- Bear off sharply at the mark and dig to leeward of the boats ahead of you - there are exceptions, though, usually due to lighter air or traffic
- **Go to the side where the wind and or tide is strongest** - remember what worked upwind and interpolate that for the downwind leg

### **Downwind:**

Downwind sailing is all about optimal VMG (velocity made good) towards the next mark.

Sailing dead downwind (DDW) in slop can be really slow, but you may find that coming up only 10 degrees or 20 at most will give you a huge boost in speed - as much as 25-30% (ie - going from 3 knots to 4 knots), so it is very important to see how fast you are going DDW, then come up 10 degrees and see what happens to your speed, then try 20.

Also - one gybe or the other will be faster depending on two major factors: which side the wind puffs are coming from, and what angle you are sailing at relative to any wave swell.

It's the same principle as upwind sailing.

Also, it is critical to always be sailing in the strongest puffs possible, because wind pressure wins out every time over other factors.

Always be on the lookout for puffs downwind (we have a person who sits looking aft all the time), and it is OK to alter course as much as 30 degrees if it gets you rapidly to an approaching strong puff (especially in lake sailing), and when you get it you bear off again and speed past your competitors who did not get to the puff as fast. Upwind also be on the lookout for strong puffs, and aim at them sometimes to get there first.

Other factors:

- Keep the spin pole outboard end down 6-8" from horizontal, says North Sails, if you have one of their spinnakers – the sails are cut differently from the past types
- Weight forward in light to medium (15knots) - helmsman should be in front of the traveler, cabin back person also, and other two crew up by the shrouds, one of whom is flying the spinny
- Heel the boat to windward when dead downwind if you can (except when it is blowing 18 knots or more – boat control is much more important so you don't do a windward death-roll in a big puff. And in very light air it's best to heel to leeward to assist the spinnaker)
- Hold the tiller rock steady (this also seems to apply in LA, where excessive steering in waves downwind hurts your VMG, so only occasional adjustments should be done)
- Try not to gybe too often – it slows you down
- Try to roll-gybe the boat a bit, rather than a flat turn. This takes even more practice than roll-tacking.
- The 242 is very responsive speed-wise to slight changes in direction downwind to take advantage of puffs or lulls. We are constantly trying to sail as low as possible depending on wind-strength, but will adjust the course to windward by a few degrees if a lull in the wind occurs. All this is done thru very small adjustments in the tiller, coupled with small shifts in crew weight as required.
- The spinnaker is susceptible to performance degradation due to over-sheeting. My rule of thumb is that the trimmer should always be letting the sheet out, rather than always pulling it in, or holding it in place for long periods of time, and the windward edge of the chute should always just be on the verge of curling.
- Slight curling on occasion of the leading edge is fast.
- Don Martin suggests:
  - In 6-12 knots of windspeed you want the breeze to flow across the main from leach to luff, hit the spinnaker, reverse direction, and then blow forward, rather than using the spinnaker to trap the wind and be pushed by it. As such, the spinnaker is acting like a main and jib upwind.
  - The vang should be eased, because you want the mainsail leach to breath
  - The boom should not be out more than 45 degrees
  - The pole should be max aft
  - The helmsperson should steer the boat in a S-curve downwind which is 1 boat-length wide and about 5 boat-lengths long.

- The spinnaker sheet should not be adjusted: let the helmsperson steer the boat up when the wind lulls slightly, and down when the boat hits max speed again after being heated up.
- The apparent wind shifts forward, especially when the boat is rolled slightly to windward, and goes way aft when the helmsperson heats the boat up a bit at the end of the S-curve

### **Leeward mark:**

- **Don't force room at the mark - it all averages out over time**
- Count down to a gybe or hoist/takedown so the crew can get ready (3, 2, 1, gybe). I usually give a 10-15 second advance warning re take-downs, followed by the 3 second countdown.
- In general, we take the spinnaker down earlier rather than later, as it is critical to be in full control at the mark rounding, and also to be able to spin right around the mark and tack immediately onto starboard if we want to. Many boats can be gained (or lost) at the leeward mark rounding.
- We'll sometimes disconnect the pole and put it away up to 10 seconds before taking the chute down.
- Think about what side of the course will be favored based on the last upwind leg, and what you saw downwind
- Determine if there are any changes occurring due to tide or wind
- **Keep your speed up during the mark rounding** – remember how long it takes a 242 to get back up to full speed at the start line: the same applies at a leeward mark rounding, and you may want to tack immediately after rounding the mark behind another boat or two, so you cannot slow down too much beforehand and pull it off.

### **Crew Positions & Roles:**

#### **Start:**

One person handles the jib

One person handles the main & traveler

One person calls time

Helmsman steers and gauges the start

Everyone watches out for boat traffic and provides tactical input

#### **Upwind:**

One person handles the jib except in windier conditions, especially if cross-sheeting is required

One person handles the main & traveler (with some input and assistance from the helmsman on occasion)

One person does the bulk of the tactics, sharing with the helmsman and anyone else who is tactically inclined, but everyone looks out for wind puffs and other tactical elements

Helmsman steers

**The windward mark:**

One person handles the jib, furler, up/downhaul, spinnaker hoist, and stays on the port side

One person goes forward for the pole

One person handles the sheet & guy, and stays on the starboard side

Helmsman handles the main & traveler

**Downwind:**

One person handles the up/downhaul and guy, and generally stays on the port side

One person stays forward by the shrouds and flies the chute, unless the decision is to fly it from the cockpit, which is perfectly acceptable

One person sits by the shrouds and watches for wind puffs and provides tactical input

Helmsman handles the main & traveler

### **The leeward mark:**

One person uncleats the jib furler, handles the up/downhaul, does the spinnaker takedown, and stays on the port side

The forward person (who may also be flying the chute) puts away the pole

One person handles the jib sheet and hands it off to the foredeck person when they finish with the pole, and then moves aft to help pull in the rest of the main and set the traveler  
Helmsman handles the main & traveler initially, and then does a hand-off when the first jib person moves aft following the hand-off of the jib to the bow person

### **10-Knot Windspeed Break-Point Section:**

It has become apparent that at the 10-knot wind speed point, the rig needs to be adjusted, as well as potentially sail type, due to differences between the sail shapes, per this photo comparing a North mainsail with a UK one:



The North sail also has about 6 more inches of foot material than the UK sail.

**Under 10 knots:**

- The Sobstad main & jib work fine because they are very full sails and add power, regardless of mast stiffness levels.
- The North brand is also fine because it's a fairly full cut
- The Ullman main is very flat and is not ideal. It also has less luff curve than the Sobstad and North sails because it is designed for the new straight masts
- The North spinnaker is fine for downwind use, as is the Ullman brand.
- Rig tension on my newer mast can be set at 38/25 to allow for more mast and forestay sag to add power. On an old mast, the setting could be a bit narrower due to the inherent mast bend in the older, softer, spar, but note that Scarlet sails with almost zero lower tension, so clearly there is no issue with a large delta.
- Blocking the newer mast aft might add more power, but might overly distort the Sobstad main because the draft would be way too forward, and the lowers would have to be let off even more to compensate.

**Over 10 knots:**

- The Sobstad main is less effective because of its full cut, even with max outhaul and cunningham. You get overpowered quicker than with a flat cut mainsail.
- The Sobstad jib seems fine because it can be bladed out via moving the jib cars way aft and increasing the downhaul tension so there are no luff wrinkles, but a flatter jib would also be more effective, most likely.
- The North brand is probably in a similar position because of its similar cut.
- The North spinnaker is fine for downwind use, as is the Ullman brand
- The Ullman main is probably best due to its flat cut and also the fact that the lesser luff curve maps better to my "newer" mast, because I can pull on the lowers more than with the Sobstad (which is designed for more luff curve and thus a pre-bent mast), which in turn tightens up the forestay more in +10 conditions
- Rig tension can be set at 44/38 to greatly reduce mast and forestay sag and thus reduce power in turn. With an Ullman main, the lowers could be probably 41+, not 38.
- The mast needs to be blocked forward to induce mast pre-bend.

Note that Craig Strand's rig was 45/35 for 10-12 knots of breeze on May 31, 2014, and he was very fast and pointed higher than us. He used North sails, but also outweighed us by probably 100 pounds. I had Mike Wainwright, Tara, and Kate on board, so we were probably 675, at most.

Jim Hyslop's rig was 44/36, and was also very fast in spite of being under 600 pounds: maybe 580. We only beat him by one point after 5 races. He used older North sails, and the jib was recently re-cut.

### **Strong Wind Section:**

The backstay needs to be tightened up to at least snug (and preferably the backstay wire or rope should be 3-4" tighter) before you start going downwind – it keeps the mast from breaking over the bow when puffs hit while your spinnaker is flying.

Mainsheet tension is what creates forestay tension (since most boats generally don't put on backstay tension upwind, and just snug it instead, but it is worth experimenting with more backstay tension, as previously mentioned). In moderate to extreme conditions some boats have reported success using their backstay upwind to depower the rig, so it is worth trying, especially if your crew weight is below 600 pounds.

Blade out the jib – tighten the jib cunningham to eliminate all wrinkles, tighten the leach line to stop the jib leach from vibrating excessively, drop the jib cars back 2-3 inches and crank the jibsheet as tight as need be (probably block-to-block). Cross-winch to get all weight to windward while grinding it in.

Note that 2-3 battens in the jib leach will help stiffen it and prevent or reduce leach curl in strong wind, which deflects air into the backside of the mainsail and distorts it.

Blade out the mainsail via super tight outhaul and cunningham (downhaul). Also tighten the foot and leach lines if either edge is vibrating.

Traveler down to leeward all the way (pull it up in lulls – it thus acts as throttle control, unless you are able to use the backstay to do the same)

Main sheet on super tight (2 people pulling is required to get the last inch of tension – usually the helmsperson with one hand and the other person with both) - but to release it from the cleat needs a strong downwards bang or two with a foot (especially if you are unlucky enough to have a non-ratcheting mainsheet block), even if you have to slide down to leeward initially to get at it. Note that boats that use the centre post for mounting the mainsheet pulley and cleat have an advantage over systems where the trav car and mainsheet cleat end up on the leeward side of the boat. The system also reduces the load on the trav car by about 20% or so relative to the old systems where everything is mounted on the trav car.

The helmsperson has to feather the jib in strong puffs (and ideally anticipate them) and wait for the boat to get less heeled and under control again (even dropping trav to leeward the instant the puff hits will still result in a heeled boat, so dropping it a few seconds earlier is best).

Easing the mainsail in puffs distorts the main, decreases forestay tension, powers up the jib, causes the jib luff tension to decrease, thus causing wrinkles (and paradoxically results in a powered-up boat relative to one that does not let go of the mainsheet).

Therefore the helmsperson just has to be on the ball to feather up in puffs and ride them out. Not fun, but effective. By the way, the mainsail will flail a lot in the strongest puffs

(especially if your jib leach is not twisted enough via the cars being moved aft, which otherwise causes air flow to be directed towards the mainsail), but it's the jib that matters in these situations, not the main. All forward progress depends on the jib, with a bit of a boost from the main now and then when it stops flailing.

Tightening up the jib luff tension beyond a certain amount causes the jib to become the forestay (and runs the risk of ripping it in half if you did ever pull the main on super tight like you should), and therefore rakes the mast forward a bit, which is slower.

As mentioned earlier, if after doing all of the below you are still overpowered, try a bit (or more) of backstay upwind.

To release the jib, don't stand yanking upwards on the rope to try to break it free of the cleat – it won't work most of the time. Wear gloves, put your hand beside the cleat, grab the rope, and try rolling the rope sideways out of the cleat. Or put a winch handle in on the windward or leeward winches and crank pressure on slightly and then take the rope out of the cleat (this is not fast, but it is effective). However, if using a winch handle, the helmsperson has to wait until the crew is ready to tack, and needs to allow for enough time in close-encounter situations, and thus preferably avoid them.

You can only furl the jib dead downwind, and slight pressure on the jib sheet while furling is essential to get a good clean and tight furl.

With regard to the spinnaker hoist, pre-guy up to the forestay (or as far as you can), hoist the spin up all the way as fast as humanly possible while it is still blanketed by the mainsail, pull the guy back 3 feet or whatever is appropriate, and only then pull on the sheet. Then furl the jib ASAP.

**Tweakers are STRONGLY RECOMMENDED for windy conditions** because they:

- choke the chute down on both sides and thus stop it from rolling side to side (which is the surest way to induce a broach)
- move the pulling point of the spinnaker up to the shrouds, and thus vastly decreasing the risk of a weather or leeward broach due to the spinnaker no longer pulling on the back end of the boat and causing it to slew one way or the other. This is an especially important system to install in large wave or short steep chop regions because of the tendency of the bow to be pushed down into wave troughs due to the spinnaker and mainsail load and then slew to one side or the other when boatspeed drops and the sail pressure increases (because the apparent wind shifts aft).

Crew weight should be moved aft downwind to keep the bow from burying itself in the troughs and submarining (lots of fun, BTW), with water coming right over the deck past the mast and into the cockpit. For those that have not experienced this, the next step is a wild wipeout, the likes of which you'll talk about for years. Crew generally gets ejected from the boat in these types of wipeouts, so it then turns into a major safety issue.



The spinnaker should be taken down well in advance of the mark rounding. Many crews underestimate the time requirement and difficulty of handling a spinnaker takedown in very windy conditions, especially when it starts flailing. If you are not confident putting up a chute in 20-25 knots, don't: it is not worth it.

If a spinnaker gets away from you and turns into a kite, grab the sheet, pull it in a bit (or a lot – more is better), and then blow the spin halyard all the way out to lay the spinnaker horizontal on the water, and then pull in on the sheet as fast as humanly possible, preferably with 2 people doing it. Neatness is irrelevant: what counts is getting the wet mess into the cabin and out of the wind.

Don't blow the guy until most of the spin body is in the cabin (but odds are it probably got let go somewhat in the first place which initiated the kite-flying exercise). There are scenarios where it makes more sense to pull the guy in first, but the pole is probably still attached and slows things down waaayyy too much if you take time to put it away. This is a maneuver where seconds count before you start shrimping the spinnaker or running over it. Speed is essential.

A note re knots in the end of the spin halyard and sheets: there are two schools of thought on this – use them or don't use them. My personal preference is to use knots (figure 8's), because I never want to lose complete control of the spinnaker, no matter how hairy it gets. Others may not sail with strong crew like I do, and may want the option to “blow everything” and just let the spinny sail away, to (hopefully) be retrieved later. Others tie a knot only in the spin halyard, but if the sheets are let go in this scenario you end up flying the spin from your masthead for a long, long, time. Maybe one of your crew will get lucky if the boat is pointed dead downwind and they happen to catch a flailing sheet, but not likely: the sheets usually also fly well in front of the boat bow, and it's not much fun standing there hanging on to the shroud while the boat rocks side to side and up and down in the waves. Plus you could bury the bow and submarine because the mainsail on its own is powerful enough in wild wind conditions to induce this.

If the wind and waves are really hairy, sometimes prudence is required, and not flying a spinny is the best move. Instead, flying the main and jib wing-and-wing (possibly with a pole on the jib clew) can result in acceptable speeds downwind, without the heightened risk of a wild spinnaker-induced wipeout.

## **Pressure-based Racing:**

There are two fundamental ways of racing: one is to focus on wind shifts and the other is to focus on wind pressure.

Generally speaking, in light to medium air, wind pressure is king, and in heavy air the wind angle is king.

Once you have reached maximum boat speed upwind or downwind you start focusing on wind angle as opposed to wind pressure. That said, even in windy conditions there can be large variances sometimes in wind pressure, so aiming at the strongest, deepest puffs all the time can pay off.

The differences in boat speed can be dramatic depending on whether or not you are in a puff, and how long you stay in the puff. See the section below called “VMG & Pressure” for a few examples, which are by no means extreme in terms of frequency: we typically pass multiple boats on upwind or downwind legs if we’ve done a better job of calling wind pressure than the rest of the pack – and gaining up to 10 boats on a leg of the course happens every now and then.

Lake sailing tends more of a wind pressure venue. Don’t get confused by thinking in terms of wind shifts in light to medium air when you should be thinking in terms of pressure zones on the lake. It is not uncommon to gain 20+ places downwind in a 6-7 race Series, which makes all the difference by the end of the regatta.

With regard to determining if you’ve been lifted or headed upwind when hit by a big puff, which generally results in a maximum 10 degree pressure-based lift, the general rule of thumb is that if you have been lifted less than 5 degrees in a big puff, it’s worth looking at tacking because you’ll likely be lifted more than that on the other tack.

Downwind the reverse is true, whereby if a big puff hits and you are lifted by more than 5 degrees, it’s worth looking at gybing because you’ll be on a tighter angle on the other gybe, thus sailing a faster course. However, before tacking or gybing, make sure you are solidly into the new puff because if you tack or gybe too early you can have the majority of the puff sail right past you, whereas if you’d hung on for another 10 seconds you would have extended its lifespan by a significant amount.

With this in mind, it is critical to determine if the puff is a small one that will be short-lived (say 30 seconds or less), or a big one that will last for several minutes. The latter are the ones worth really digging into and staying with as long as possible, even if multiple tacks (or gybes) are required over a period of minutes, just to be able to keep sailing in stronger pressure for as long as possible. The angles will take care of themselves as long as you don’t lose sight of fleet positioning and where the weather or leeward mark is.

Remember: in strong puffs you will have tightened up your tacking (or gybing) angle by as much as 20 degrees (10 on each side...). In fact, on a downwind leg, if you are sailing

in quite variable lighter-air conditions, going from 2 to 10 knots of airspeed depending on puff cards, with your spinnaker pole ranging from being on the forestay versus all the way back (sailing by the lee) your gybing angle on one side alone can vary by as much as 70 degrees, or 140 for both sides combined. These are huge numbers.

And for the puffs that are 30 seconds or less in duration it's worth considering just staying on your current course instead of tacking (or gybing) if a bigger, stronger puff is approaching in another few hundred yards or there is some other tactical or strategic consideration in play. You lose 2 lengths minimum while tacking or gybing, and by the time you've finished it you'll have pretty much run out of the puff and are back into the wind you had before you tacked or gybed. Therefore, using a 30 second puff to accelerate 1-3 knots temporarily is not a bad thing.

On our boat we get everyone looking around for puffs on the water, and try to determine early on if they are tending to come from one side or another (see the "General English Bay Observations" table below re Vancouver winds). It also really helps to have top quality polarized sunglasses on at all times (Dirty Dog, Kaenon, Maui Jims, etc.), even in cloudy and rainy conditions, because the ability to see wind pressure contrasts on the water surface hundreds or thousands of yards away is critical to being able to determine the length, breadth, and power of approaching puffs, and how many there are. Standing up on your boat on occasion is also very helpful, because the elevated view is worth lots in terms of a better perspective.

#### **VMG & Pressure (as calculated by Matt Alexander, 4-time M242 NA's winner):**

VMG is calculated as the Cosine of the difference in degrees multiplied by speed. So if you're aiming at the mark and you're going 5 knots your VMG is 5. If you're aiming 45 degrees to the mark, going 5 knots your VMG is about 3.75... at 30 degrees it's about 4.3 knots... so a 15 degree shift creates a VMG delta between the two boats going 5 knots of about .55 knots.

At 6076 feet per nautical mile you get about 100 feet per minute per knot ... so if you had a 15 degree shift in the same wind and wave conditions for 5 full minutes the boat on the better angle would gain 500' X .55, or around 250 feet ... about 10 boat-lengths.

During the 2011 North Americans on a downwind leg, when Daisy and Trolleycar crossed 10 lengths astern of us in Zip, dug into the right side and then gybed back 10 lengths ahead, they gained 20 boat-lengths in about 5 minutes – or a VMG speed differential of  $24 \times 20 = 480$  feet in 5 minutes or approximately 1 knot of boat-speed VMG difference.

The likely scenario is that they hooked into more wind pressure (say 2-3 knots more windspeed) and they were doing 5.5 knots which has the compounding effect of being able to aim 5 or 10 degrees lower on the other course ... Voila ... the difference.

The difference isn't a shift, per se, it's more pressure, and that gives you better boatspeed which leads to more VMG... plus being able to drive a different angle, which leads to even more VMG, and that is what compounds into the massive gains. Same upwind: wind speed drops, you get knocked, you tack over, and you are still knocked (because your tacking angles have increased by up to 20 degrees). And if you get lifted in a puff, you are still lifted on the other tack – it's all due to pressure.

Contrast this to Vancouver where the westerly wind is steadier, plus there is a geographic lift on the south shore (better VMG both directions), which results in sailing downwind on starboard initially, and then flopping onto port. And the current advantage offshore in the flood current is often offset by the worse angle (slower, less VMG). So in Vancouver in a westerly, it's almost impossible to gybe behind a boat, pick a shaft of breeze and pass them... unless it's an easterly, southerly, or northerly, where we do it all the time. So think of the easterly, northerly, or southerly, which is about pressure and positioning yourself where the pressure is coming from (because it is always a lift – unless it's an auto-tack) because better pressure = more VMG.

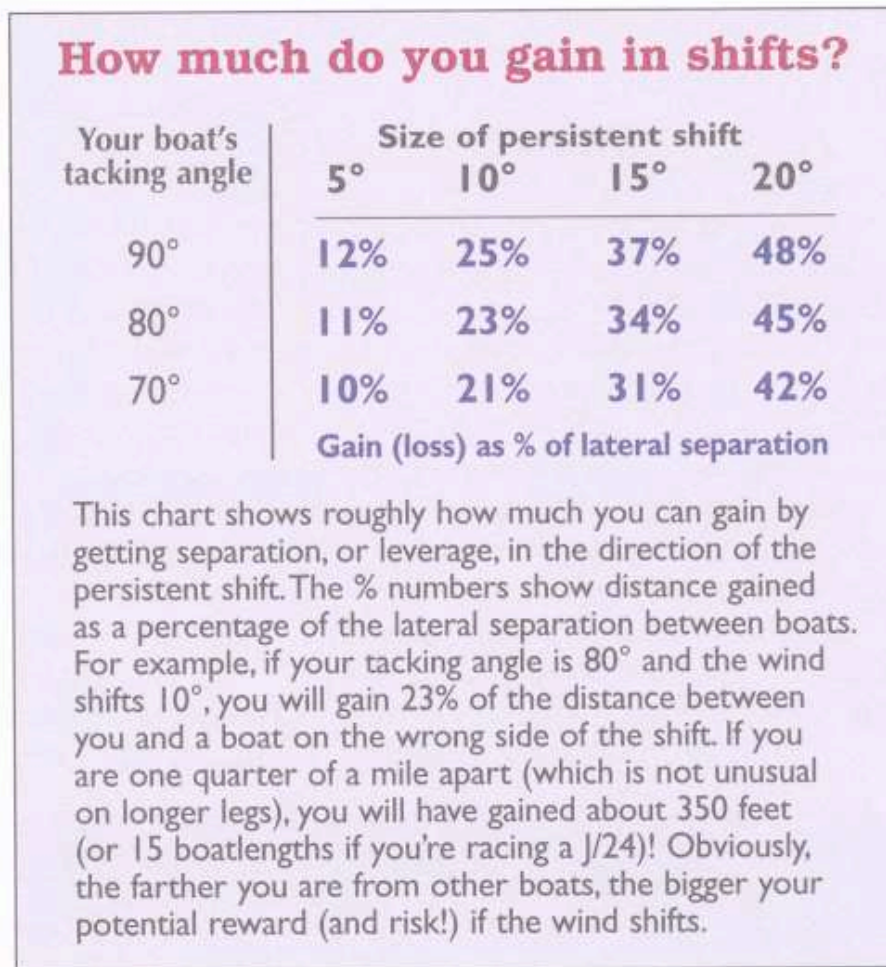
As another extreme example in the 2011 LA NA's, we got hammered upwind when a pressure band came in from the right side (when we were quite far left), and as we approached the weather mark we realized that the 14 or so lead boats were all heading downwind on the left side of the course going away from the pressure (looking at it from the upwind perspective), so we gybe-set at the mark, went hard right in the pressure (or left from a downwind perspective), banged the corner, gybed to starboard (still in more pressure), and rounded a close 2<sup>nd</sup> behind Craig Strand, thus we passed 13 boats. At times on the downwind leg it was clear that we had 1-1.5 knots of speed on the boats on the other side of the course and we were also pointing lower on the same gybe – it was pretty amazing. We then loose-footed under Craig on the beat going to the right again and moved way ahead into a solid lead (which we lost 200 yards from the finish on a port-starboard with Trolleycar).

## **General English Bay Observations:**

If the wind is from:

- East: play the shifts up the middle (wind is confused due to funneling thru the downtown buildings), but watch for the wind going to the North.
- Northeast, heavily favor the North side (wind funnels thru Lions Gate & Coal Harbor / Lost Lagoon gaps) which pays off 99% of the time due to big port tack lifts, even in an ebb current situation where you might be tempted to go for the beach (south side). Wind can be from 25 degrees at Siwash Rock near the yellow can buoy (as it curls around the northwest side of Stanley Park), and on a direct line from Siwash to RVYC, due west of the Wall Tower, the wind was at 60 degrees, which remained the same all the way to RVYC on April 20, 2014.
- Southeast, favor the South side (wind funnels thru False Creek gap)
- South-south-east, favor the East side (wind goes round the Kits hill on both sides)
- South: play the shifts up the middle, but note that some wild long-duration swings can occur one side or the other, with big variations in velocity
- Southwest, favor the West side (wind funnels thru Jericho Beach gap)
- North, favor the West side (depends heavily on prevalent puff direction), plus a westerly can fill in sometimes
- West: favor the beach to get the geographic shift, greater pressure, and current advantage. **However, look out for “wind shear”**, where there is a north-south dividing line, whereby you get lifted on the north side of the line, and headed into the beach on the south side of the line: the north side generally wins out.
- NorthWest: offshore sometimes pays, especially if there is ebb current. During Wednesday Night Races, look for bands of ebb current.

## Windshift Table:



The following is from the RVYC website (*the following descriptions of Winds and Tides on English Bay was developed by Claire Adams, former head instructor at RVYC for the 1997 J/24 Canadian Championship. Assistance in preparing the material was provided by Past Commodore Don Martin and Peter Chandler from the Institute of Ocean Sciences in Victoria. The graphics were provided courtesy of AREA51 Interactive, a website design company in Vancouver*):

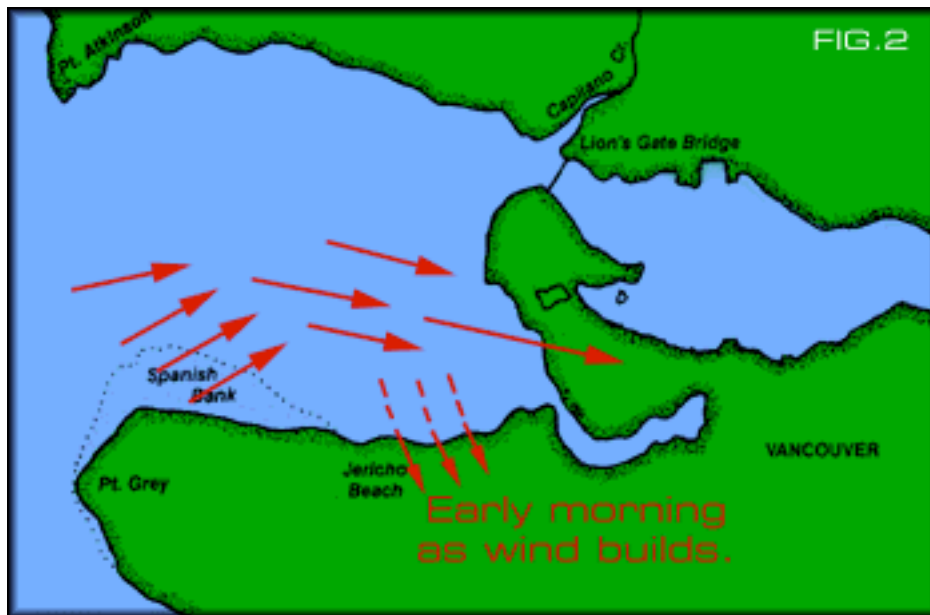
### **Winds**

Generally, fair weather brings a westerly and poor weather brings an easterly. The wind rarely blows out of the north and typically out of the south when it is in a transitional state from poor to fair weather.

#### Westerly:

This is the most hoped for wind and tends to be the most common wind in the summer months. During periods of fine weather the Fraser River valley encourages the production

of thermal winds. This thermal breeze fills in the late morning at around 11 am. It will consistently increase until it hits its maximum for the day at around 2:30 pm. As it fills, it tends to bend onto the south shore. Later in the day, after thermal heating, it will blow more directly down the bay (Figure 2). This will reflect in the windward (heading west) leg of a racecourse by a persistent geographical back (shift to the left). The amount of this back from the leeward to the windward mark can be in the order of 10-15 degrees. As the wind builds there may be temporary oscillating shifts but once filled in, the direction seems relatively stable. Because of this; there are few to no 'passing lanes' so remember that starts and boat speed are at a major premium in a westerly. Typical wind speeds between 6-12 knots rarely rising over 20 knots.



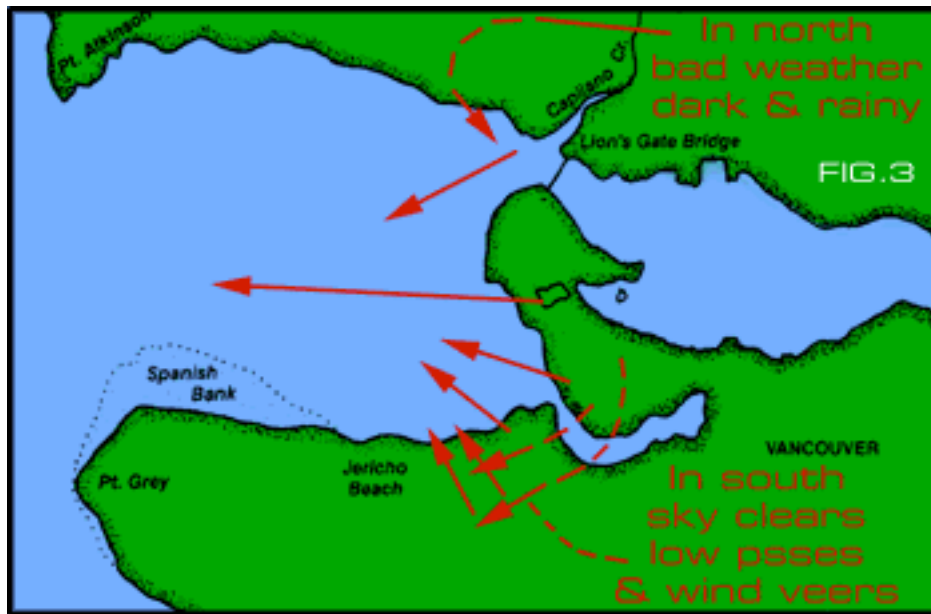
### Easterly:

Easterlies are the result of a depression or bad weather and are often accompanied by rain. The water is smooth and the wind will vary from quite light up to 20 knots. It is much more shifty as you will find both geographic and oscillating shifts often appearing in a layered effect.

There are two dominant indicators to keep eye out for (Figure 3). If it is dark and raining to the left (north) side of the course, the wind will typically shift left. If there is a lightening low in the sky on the right (south) side of the course, then it is signaling the passage of a front. Watch out for a major shift right of up to 90 degrees. These shifts are from the median wind blowing out of the Bay.

Typically a geographic shift to the left on the left hand side of the course occurs, particularly in bad weather, which favors the left hand side of the beat. Be careful; however, the sky lightening low in the south may signify a large right shift in the right hand side of the course as the front passes.

Both of those wind shifts, while they are substantially geographic, may also show up as oscillating shifts. If heading north, don't forget to tack on the oscillating shifts! The key is to be able to respond to the overlay of the two shifts, which may occur at the same time.



### Southerly:

This breeze will rarely last longer than 3-4 hours and typically arises when the weather is changing from poor to fair. There will be a significant shift to the right over time. While the wind is going right, there will be lots of unpredictable oscillations through a range of 90 degrees (45 degrees either side of median).

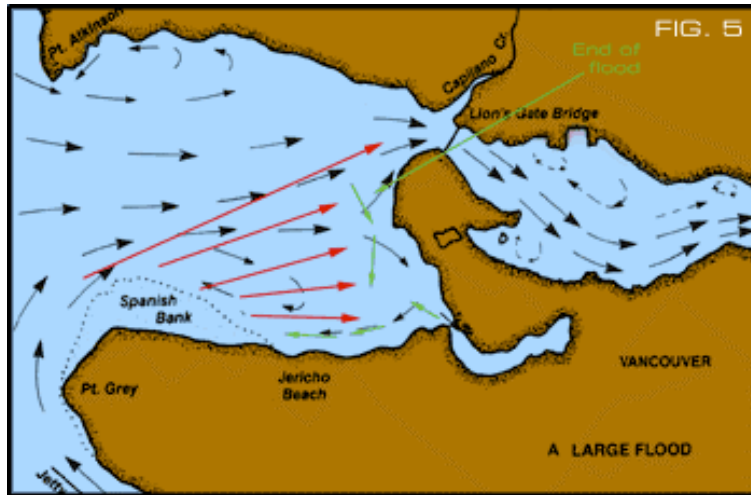
### **Tides**

Tide and current tables are notoriously unreliable because of the barometric pressure, geographic patterns and the condition of the Fraser River. The time tides turn may vary up to an hour from the predicted time. The freighters are a good indicator of the flow of the water in the Bay.

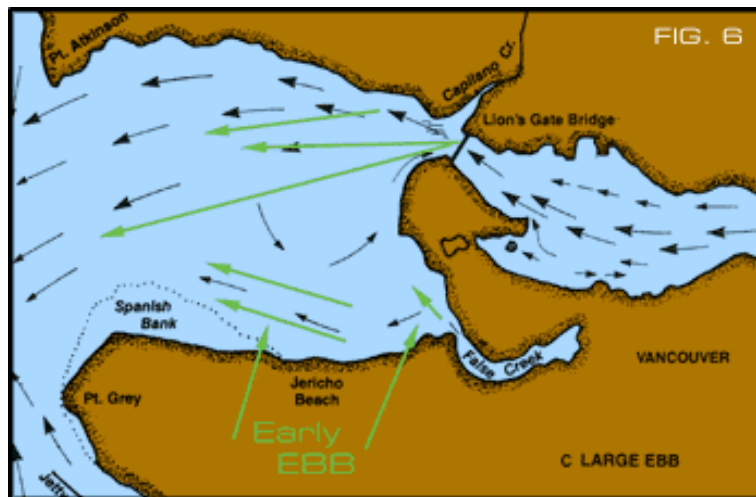
Tide tables for Point Atkinson are useful for tidal height; whereas, tide tables for First Narrows are useful for current change and predicted slack water. Tide tables are available from marine retailers in the area. The current velocity at First Narrows is of no use to racers because it will always be significantly higher than what would ever occur on the race course.

Relatively speaking, the current is always rotating clockwise. The flood is harder outshore and weaker inshore due to the changing depth of the bay. Generally speaking, if you are heading west, sail along the south shore and if you are heading east, sail in the middle of the Bay.





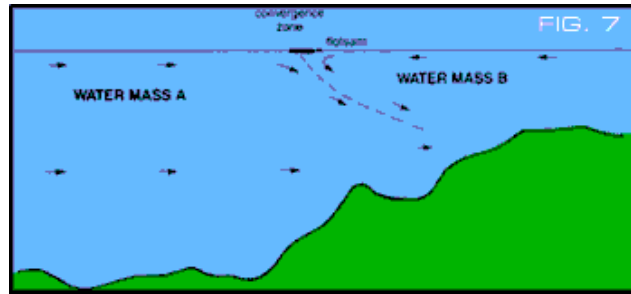
The dominant line of flood flows from Point Grey to First Narrows heading into Burrard Inlet (Figure 5). The dominant ebb occurs north of the race course along the north shore of the Bay due to the outflow from the Burrard Inlet (Figure 6). The most important transition happens from the high flood to an ebb. This is where an often advantageous south shore, backedie easterly current is created (Figure 5).



Two main indicators of current in the water:

1) Well defined Tideline

Normally between the fresher, silty Fraser River water and the clear salt water. This tideline is created by a vertical shear of the two waters (Figure 7). There may be a band of flotsam (floating debris) caught between the surface layers of the two different current regimes.



These tidelines often mark an abrupt change in the speed and direction of the near surface currents; therefore there is almost certainly a benefit to being on one side or another so watch the water carefully. Do not assume what you think to be happening on either side of the tide line to be true. It is essential to test your theory by watching other boats as they sail into the different water.

## 2) Bands of Current

Bands of ripples on the water about 23 metres (75 ft) across running parallel to wind typically occur in flood conditions. These 'tidal rivers' flow to the west so it is important to sail in the rippled water (when heading west). These are likely again the result of the mixing of fresh and salt water.

If the wind is greater than 15 knots you will not be able to see the rows of disturbed water...you will just notice that some boats will seem to have their own personal favourable water. If you do notice a band it is important to sail to it, it is not something that will ever reach you.