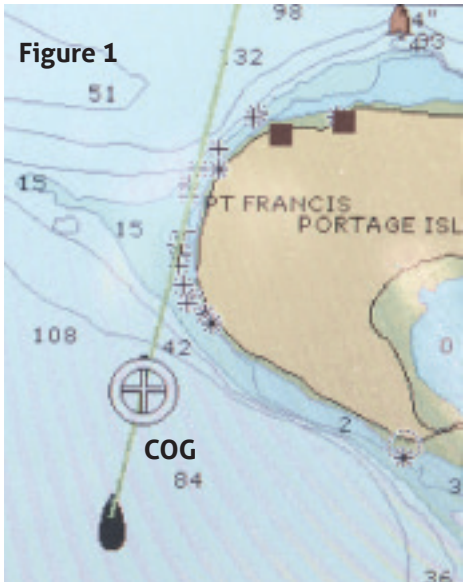
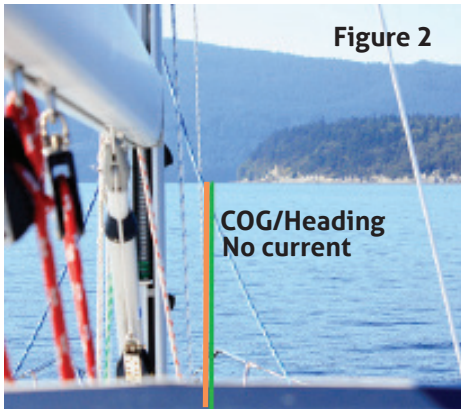
The Easy Way to Deal with Set and Drift

Using your chart plotter's COG

Current can be a friend or a foe. In October's article (titled 'Going with the Flow') we discussed using current to our advantage, making it a friend. But this is frequently not possible, especially when the current cuts across our path. Side currents are at best an annoyance that we need to deal with and at worse can be dangerous because they can easily put an inattentive boater on the rocks. The goal of this article is to show how to keep these currents in the category of easily handled annoyances.





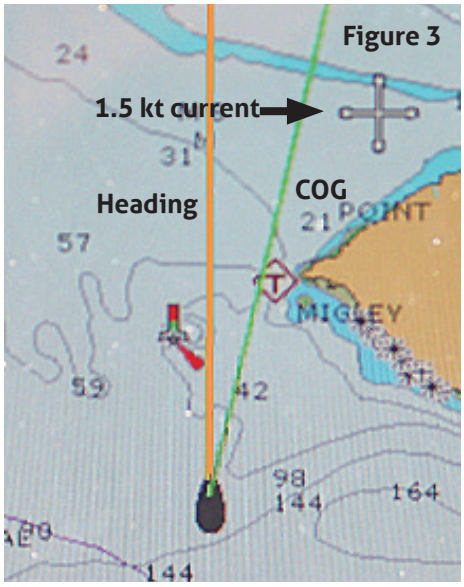
A few definitions to start with: *Set* is the direction a current flows and *Drift* is its velocity. *Heading* is the compass course a boat is being steered. *Speed Over Ground* (SOG) and *Course Over Ground* (COG) are the velocity and direction a boat is moving relative to fixed objects. Both SOG and COG are affected by the boat's heading, speed, current, wind, waves, etc. – they are the net of all forces acting on the vessel.

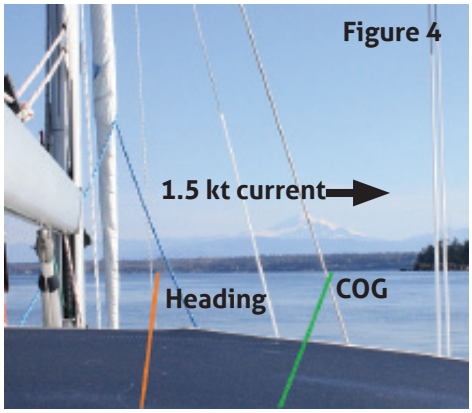
Calculating the impact is easy when a current is going with or against a boat: it either adds to or subtracts from the boat's speed relative to the ground and has no impact on its course. For, example, a boat traveling at 6 knots through the water and fighting a 2 knot current will be 'making good' 4 knots. In other words, its *Speed Over Ground* (SOG) will be 4 knots.

The calculations become more difficult when the current is coming from the side. In the old days, meaning more than about ten years ago, most of us sailors had two options when it came to steering in a side current. We could get out the current tables, the chart and our navigation tools and plot a course that would correct for the expected set and drift. Or we could take an educated guess. I will admit I guessed most of the time.

There were two reasons why I frequently guessed: the first was the hassle, I was lazy. And the second was that even if I had taken the time to calculate a course it would likely have been wrong - especially here in the Salish Sea. Calculating a course works well if the set and drift are constant but here, in our inland waters, they are anything but. This is especially true in the San Juan and Gulf Islands. The currents there get pushed all over the place by the islands and underwater features so speed and/or direction can vary widely from one side of a channel to the other. So, how does one get from ones side of a channel to the other without getting pushed around? The easy way is to use the course over ground (COG) vector on your chart plotter.

Most chart plotters have several vectors: current, wind, heading and course over ground are commonly available. This last one (COG) is the only one I use as the others are frequently inaccurate. What makes them inaccurate is the lack of a true heading, which is needed to calculate and/or display these vectors correctly. On most pleasure craft the heading is provided by the fluxgate compass attached to the autopilot. And fluxgate compasses do not easily provide a reliable true heading. They do work well for relative headings, which is all an autopilot needs. When you turn on one of these other vectors, say the one for heading, it will show the heading the fluxgate indicates; on our boat this





will be anywhere from zero to twenty degrees off. Obviously, if you have a gyro or GPS compass onboard these vectors will be much more accurate.

One other note, if you have radar and overlay its output on the chart plotter this same issue comes into play. The heading from the fluxgate is used to orient the radar images so they will frequently be rotated relative to the chart. This can be corrected by changing the relative bearing setting. Sorry for the asides but I felt this information was worth passing on.

So, back to using the COG vector: What is it? And, how does it work? Figure 1 shows a COG vector as a green line. The plotter constantly recalculates the direction the boat is moving, relative to the ground, and displays a line from the boat's current position outward. Because this calculation is done using the boat's actual GPS position it takes into account her speed and heading through the water, current, windage, wave action and anything else affecting movement. It is also an average of several readings, so if the vessel is turned to a new heading it will likely take thirty seconds for the COG line to settle. On most chart plotters the COG vector can be set to display an infinite distance. I like mine set this way so I can zoom out and see if we are going to lay a distant object.

At the time Figure 1 was captured, there was virtually no wind or current. At the same time I took the picture in Figure 2, it shows visually where we were going. The orange line I added to this picture shows the boats heading – note it matches nicely with the COG shown on the chart plotter. And, yes, I was aware we were headed for the rocks - I headed toward the point intentionally to make it easier to see the agreement between the picture and the plotter.

The next day, we were heading home and had a fairly strong current (about 1.5 knots) coming from our port side. We were trying to get around Point Migley on Lummi Island, but the current was sweeping us into the island. In order to correct for this I had to steer 15 degrees to port. Figure 3 shows the chart plotter view of this – the orange line shows our heading and the green line shows our COG (I added the orange line later). Figure 4 shows how this looked from the cockpit.

I like to use the COG in the same way I use tell tales – I steer the boat using a visual reference point beyond the bow and I look at the tell tales, the COG or both, every couple minutes and make small adjustments as needed.

The real beauty of using the COG vector is that it constantly adjusts to changing current, wind, etc. So if you steer a course that keeps the COG pointing to where you want to go, you will get there in the shortest, fastest way possible. Obviously, this statement assumes 'normal' conditions: for example, if there was an eddy going in your direction on the other side of the channel it might be faster to go over and use it. The point is this, using the COG vector allowed me to easily adjust for changes in the speed of the current and keep the boat on a straight line over ground.

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Hopefully this information will make your travels in our current filled waters a bit less challenging.

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