Weather Conditions and Currents in Vineyard Sound for the Sonar Worlds

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Cape Cod is famous for moderate temperatures, strong sea breezes and strong tidal currents. The sea breeze is due to the southward orientation of the shoreline, which means that the thermally induced sea breeze is nearly aligned with the prevailing southwesterly gradient wind. This pattern is most common in July and August, when the Bermuda High is strongest. In September, the sea breeze still occurs, but the differential between air and water temperatures is diminished and the Bermuda High is sometimes displaced by weak frontal systems. Southwesterlies are still the most common winds, but they are not typically as strong as mid-summer conditions. Here are the statistics on the wind conditions at Vineyard Haven, several miles from the race course:

Average high air temp: 70-72 F (20-22 C)

Average low air temp: 54-62 F (12-17 C)

Average water temp: 68 F (20 C)

Winds: 50% daily peak wind speeds >15 mph (13 kts)

12% daily peak wind speeds >20 mph (17 kts)

50% SSW-W

25% WNW-N

25% N-E

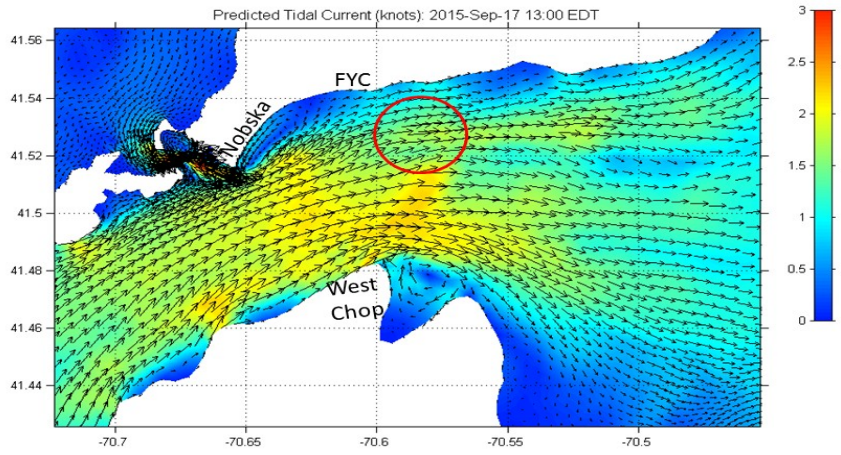
The southwesterlies are the steadiest, as they are relatively unobstructed by land and tend to be associated with stable atmospheric conditions. Northwesterlies are puffy and shifty, just like most of the East Coast. Easterlies are also shifty, for reasons that I do not understand.

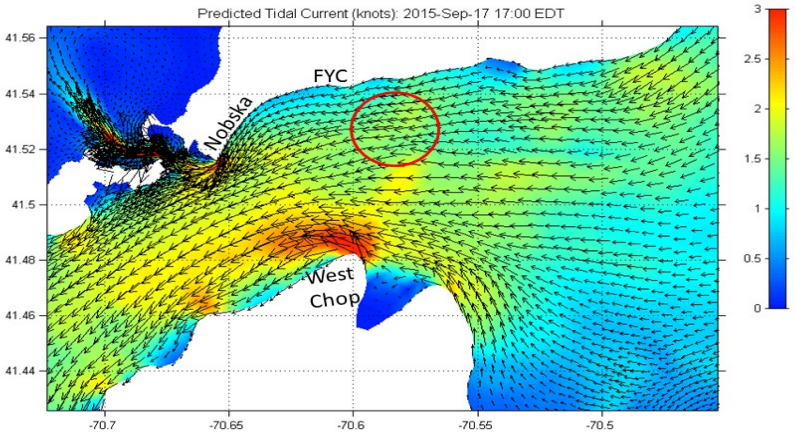
Tidal currents are strong in Vineyard Sound, and particular attention should be paid to the times of slack and maximum currents, as they will have a major influence on the positions of laylines. It is interesting that the currents are so strong, because the tidal range is very small in Falmouth. The currents are caused by the intersection of two tidal regimes – the Mid-Atlantic Bight to the west, and the Gulf of Maine to the Northeast. The tidal range is a lot greater in the Gulf of Maine, and high tide occurs about 4 hours later than the Mid-Atlantic Bight. So the currents in Vineyard Sound and Nantucket Sound pour back and forth because of this regional offset in tidal conditions.

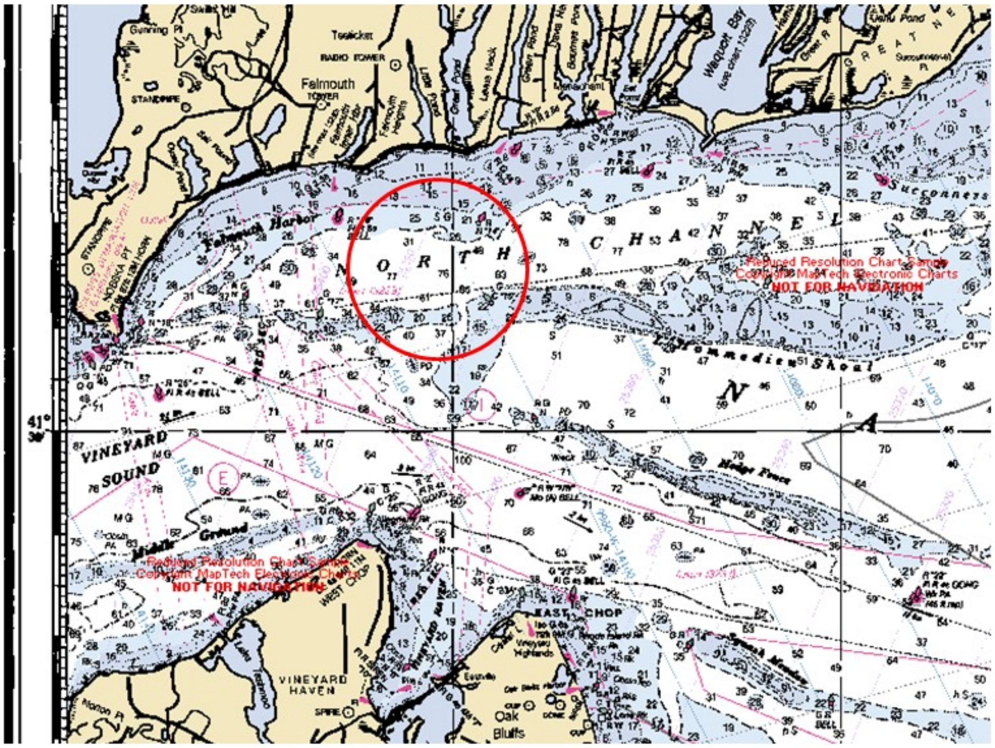
Flood tide is toward the northeast in Vineyard Sound, and it is well predicted by Boston tide height (slack is around high water in Boston – go figure!) The currents will be average during the 4 days of the Worlds, with typical maximum currents of around 2 knots. Strong eddies occur in association with the major headlands, such as Nobska Point (near Woods Hole) and West Chop on Martha's Vineyard. The normal race-course for Falmouth Yacht Club's weekend racing is close enough to Nobska that a huge advantage is gained by either getting into or out of the tide, depending on which way it is going. However the race course for the Worlds will be to the southeast of Falmouth Harbor, where the currents are moderately strong but also relatively

uniform across the race-course. There may be some small-scale influence of L'Hommedieu Shoal, a ridge of sand that extends eastward through the race course.

This map shows an example of the results of a numerical model of the predicted tides for the days of the Worlds. The racing circle is shown in red. The rest of the maps can be clicked below.



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Oak Bluffs
41°
38'