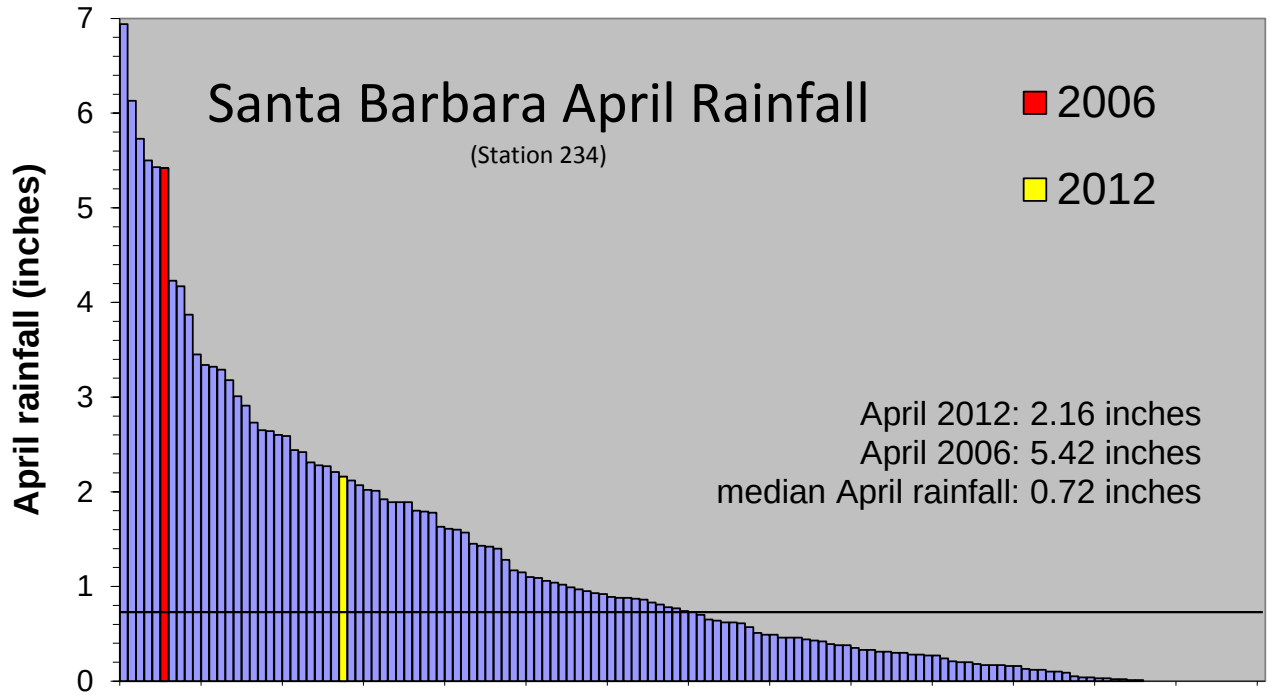
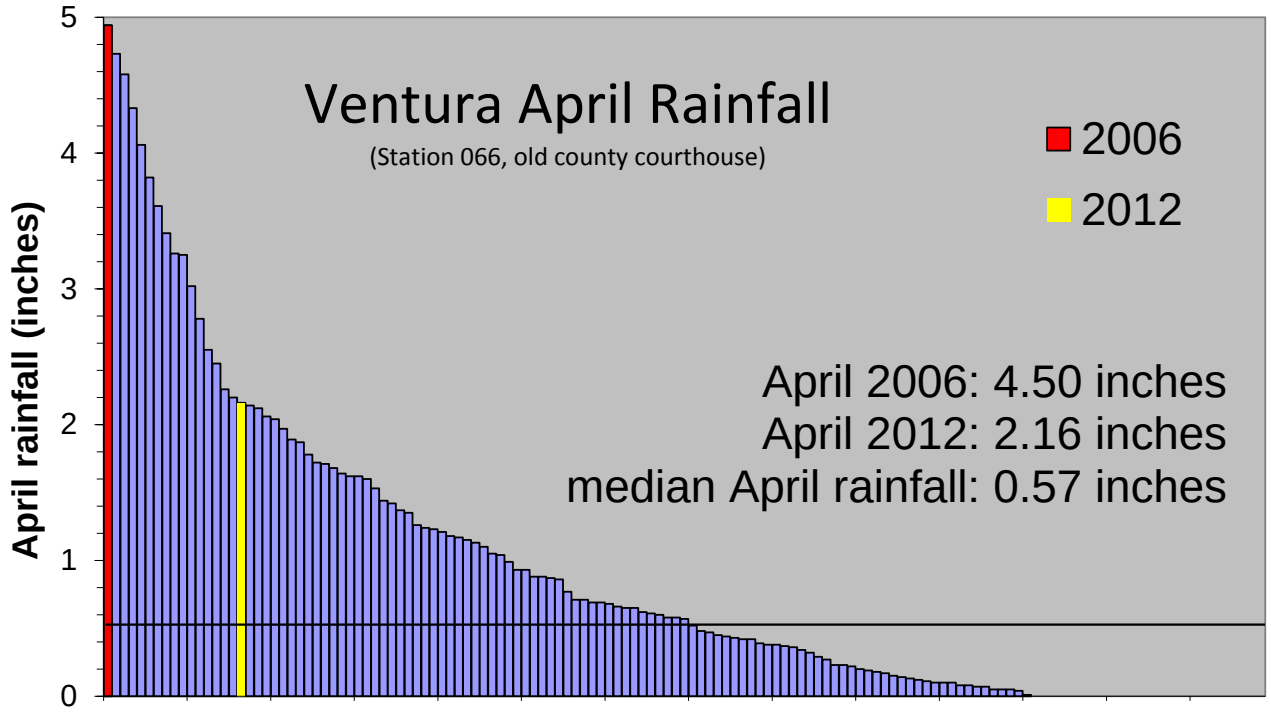
April Rains

April is not usually regarded as a rainy month along the South Coast, at least not like January, February or March, the months that usually give us most of our precipitation. Or October, November, December, our next three highest rainfall months. It does tend to rain more in April than in September or May (not to mention all the months I left out, when rain is rarer than a truthful politician). Typically, come April, we get about three-quarters of an inch here in Santa Barbara, a little over half an inch in downtown Ventura (these would be median values – half the recorded years getting less than this, half more). But sometimes there are exceptions. The biggest, most recent exception, being 2006 when Ventura had the greatest amount of April rainfall ever recorded (the record goes back to 1874): 4.5 inches. And Santa Barbara received 5.42 inches, the sixth highest total in a record going back to 1868. (There is some journalistic license being exercised here. Measuring rainfall is a far from precise endeavor and differences between even correctly sited and relatively close measuring stations can often vary by considerable amounts. Not to mention that stations are often moved over time. I'm mostly using data from Santa Barbara's downtown Flood Control station, #234, and Ventura's old Courthouse station #066, and from the older stations these newer locations replaced.)



The above chart shows the long record of Santa Barbara's April rainfall, arranged from highest to lowest. The space on the right, after the blue bars run out, represents all the April's with zero rain. April 2006 (in red) stands out, not quite the highest (that honor goes to April 1965 when 6.94 inches were recorded), but pretty high. This year we've gotten around 2.16 inches (the yellow bar), not bad when compared with the 0.72 inch long-term median (represented by the black line), but nowhere near a record.

A similar graph, but for downtown Ventura, looks like this:



Unfortunately, a wet April has not done much to alleviate what will end up being a very dry 2012 winter. From here on out we can expect very little more; the typical May rainfall is only 0.06 inches in Santa Barbara, and an even more anemic 0.01 inches in Ventura (median values). We sometimes get greater amounts but it's best not to count on it. It looks like we'll end the winter with about 11 inches in Santa Barbara, 9-10 in Ventura. This is quite a bit below the respective long-term medians of 15.8 and 14.2 inches (average annual October through September rainfall in Santa Barbara and Ventura is 18.2 and 15.4 inches, respectively; the average is higher than the median because the distribution is skewed towards the high end – most years are below average).

With annual rainfall roughly 30 % below the median, and 40 % below average, we can expect very low summer flows in our creeks and rivers; mainly because there has been almost no recharge in the under-lying water tables that provide almost all dry-season flow (the rare exceptions being excessive agricultural runoff and nuisance urban contributions that find their way to the stream, and point sources such as Ojai wastewater treatment plant effluent which keeps the lower Ventura River watered in drought years).

Figure 1, which shows the average daily winter flows (October-May) measured at the Foster Park gauge on the Ventura River for 2008-2011, and for 2011 up to the end of April, indicates that we can expect this year to be much like 2009, a similarly dry year (with slightly greater rainfall, 11.3 and 10.4 inches in Santa Barbara and Ventura, respectively). The saving grace this coming summer, as in 2009, is that the previous water-year was relatively wet; wet enough to provide significant groundwater recharge. If anything, we're in better shape this year having had significantly greater rainfall in 2011 than in 2008.

Note that the past winter shows no significant major storms, i.e., no major sudden increases in flow such as occurred in 2008 and 2011. Ecologically this means there has been no significant movement of sediment downriver nor uprooting of aquatic vegetation and riparian plants; our streams and rivers look pretty much the same today as they did last fall.

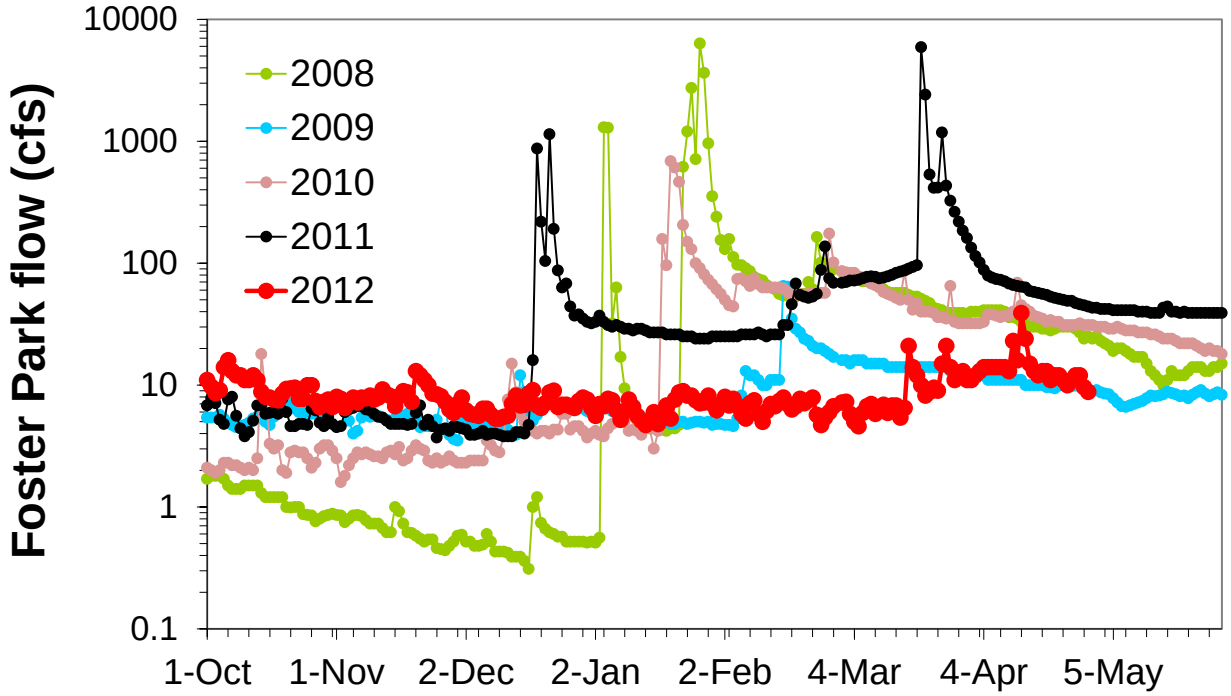


Figure 1. Average daily winter flows, 2008-2012, at the USGS Foster Park gauge on the Ventura River.

While we will see little summer flow, we will also see very low amounts of algae – streams will continue to be dominated by aquatic plants. (The 13-14 April storm – the last upward flow pulse shown in Figure 1 for 2012 – helped put an appreciable dent in whatever algal growth might have taken place by flushing away any earlier algal growth; algae are far more easily washed away than rooted aquatic vegetation.) This does not necessarily mean that there should be little worry over the major problem typically associated with excessive algal growth – dissolved oxygen depletion during night-time hours – on the contrary, it's precisely these conditions of very low dry-season flows when the decay of accumulating organic debris in bottom sediments, aided by whatever algae continue to be present, that have caused most of the problems seen in the past.

I've included two photos to illustrate some of these points: Figure 2 shows Canada Larga just before its confluence with the Ventura River early on April 14, soon after the storm had ended, and again on April 19. Note that flow had practically ceased within that 5-day interval indicating little to no groundwater flow into the stream; in a good recharge year, like 2001 or 2005, flow would continue in this section throughout into September. Figure 3 shows the Canada Larga confluence on the same dates and gives some idea of how fast the new algal crop is growing.

Figure 2. Canada Larga just before its confluence with the Ventura River early on April 14, soon after the storm had ended (left), and again on April 19 (right). Note that flow had practically ceased within that 5-day interval indicating little to no groundwater inflow into the stream; in a good recharge year, like 2001 or 2005, flow would continue in this section into September. Only in other very dry years, like 2002 or 2007 does this lower end of Canada Large go dry in April.

Figure 3. The Ventura River at the Canada Larga confluence early on April 14, soon after the storm had ended (upper), and again on April 19 (lower). The sediment load carried by the April 13-14 storm scoured the late March/early April developing algal crop from stream beds throughout the watershed. This forced the growth of Cladophora – our dominant, early-season alga – to begin anew. The amount of algal growth that had taken place in the intervening 5 days can be seen in the lower photo (the green, below-surface, tint). This location is just below the WWTP where nutrients are plentiful. Elsewhere in the watershed, the lack of sizeable winter storms along with decreased amounts and the increased age of the groundwater supplying streamflow means lower concentrations and amounts of available nitrogen which further restricts algal growth in most of the watershed.