



Since I talked about the possibility of treatment plant effluent as a cause of cladophora die-off in my July algal report, and the similarity of what has taken place this month with Julie's and my observations in 2003, I thought I'd presented some of the data we collected at that time. The above graphs represents Julie's percent cover findings for Foster Park (VR06), Shell Road (VR03) and Main Street (VR01) (for simplicity I have not shown VR02 data).



Figure 1. June 1, 2003: VR01 from the Main Street Bridge (looking upstream) above, VR06 below (again looking upstream). Algae on the Ventura from Foster Park down was healthy and vibrant.

Notice that the peak for filamentous algae (in terms of % cover) occurred around mid-May at sites below the treatment plant, and then decreased abruptly at VR03 – the location closest to the plant and, consequently, the location with the highest nutrient concentrations. The decrease was slower at VR01 further down the river. These decreases were occurring while percent algal cover had yet to peak at Foster Park.

Figure 1 shows the condition of algae on June 1; Julie's research reach was upstream from location shown in the VR01 photo, the VR06 photo shows the actual reach used at this site. Notice also that an abrupt increase in diatoms accompanied the decrease in filamentous algae below the Ojai Treatment Plant; diatom coverage at VR03 increasing from near zero to 70 % as cladophora decreased from 90 to 20 %. Diatom growth further down-river at VR01 was delayed, in step with the delay in the disappearance of cladophora. Data from VR02, at Stanley Drain, fits nicely between that of VR03 and 01. Figure 2 shows the transformations that had occurred by June 18. I've shown a photo from VR02 instead of VR03; unfortunately light conditions on that date were poor at VR03 and the photos taken inadequate.

I have, however, included photos taken at VR03 on July 9th and July 24, 2003 in Figure 3. By those dates filamentous algae had almost totally disappeared from this location and diatom coverage was just below 90 %. Again, I want to emphasize this location, the closest to the treatment plant, had the highest nutrient concentrations of any of the sampled sites. Total dissolved nitrogen ranged between 1.4 and 1.7 mg/L in July (mostly nitrate) and phosphate averaged 0.34 mg/L (as phosphorus). The corresponding figures for Foster Park in July were 0.6 mg/L TDN and 0.05 mg/L phosphate. Note also from the photos that aquatic plants at VR03 (i.e., Ludwiga and water cress) never encroached on the open riverbed to the same extent as happened further downstream at VR02 and VR01 – the river always provided adequate room for algal growth at Shell Road that summer. There was never overshadowing by aquatic plants or riparian vegetation, especially upstream of the bridge.

In my July report I stated that Foster Park flow had decreased from 18 to 7 cfs between June 17th and July 15, 2008, the period covering the death of cladophora at VR03.5. It's curious that on June 1, 2003, when cladophora were still thriving at VR03, Foster Park flow was 20 cfs, but by June 18th, when clado was well on its way towards disappearing, flow had decreased to around 12 cfs. In other words, cladophora below the treatment plant made it's exit when the proportion of effluent to total flow was roughly the same in both 2003 and 2008. Is this evidence? No. But it is suggestive.

Finally, Figure 4 shows the recovery of filamentous algae at Foster Park from it's low point on July 9th (see the graph on sheet 1) to a second peak on August 29th. Off hand, there would seem to be little reason for a resurgence of filamentous algae at VR06 in August 2003, but not elsewhere; nutrient concentrations had continued their slow decrease (TDN to 0.4 mg/L, about 20 % being organic nitrogen, phosphate to 0.04 mg/L) and days were getting shorter. The late VR06 bloom continued into October. In reviewing these photos, an earlier idea of mine, that Foster Park algae had managed a late-June comeback, seems less far-fetched.

Julie's August 13th data show a short-lived resurgence of cladophora at VR03. Makes me wonder whether plant effluent might not have also brought that to a premature close (by then effluent was >40 % of total flow).



Figure 2. June 18, 2003: VR02 above, VR06, looking upstream from the bridge, below. Algae at Foster Park was at its peak, but you can already see the brown cast from diatoms on dead cladophora at VR02; by this date filamentous algae had decreased from 80 to 15 % while diatoms had increased from 20 to 70 %.



Figure 3. VR03: looking downstream from below the bridge on July 9, 2003 above; looking upstream from the bridge on July 24, below. Both scenes were in Julie's study reach. By these dates filamentous algae were almost totally absent while diatom coverage was 85-90 %.



Figure 4. VR06: (above) looking upstream from the bridge on July 24, 2003; this was just after the low point in Foster Park algal cover had been passed. Below, on August 29th a second peak in filamentous algal cover had been reached (!90 %, see graph on sheet 1), and diatom coverage, having reached a peak on July 9th (~40 %) was again down to near zero.