## A Darth of Riparian Vegetation: lack of sediment or lack of water?

In an effort to give the sediment hypothesis a fair chance I decided to play CSI-Ventura using photos from Google Earth. The next sheet shows a range of photos, taken from 1994 to 2009, of a location just below the Santa Ana Bridge (I've left out a few photos when multiple sets covering the same year were available). This is just a single spot, but I looked at 5-6 different locations and came to the same conclusion at each. I've circled two areas in each of the photos, both red circles identify a recognizable clump of trees.

There have been some course changes in the river over the years – the most noticeable being between 1994 and 2002 – but, by and large, most of the channel changes have been relatively minor. What I find most amazing is what has not changed: all the trees seen growing in 1994 are still there in 2009, *and there appear to be absolutely no new trees*. No change in almost 18 years, in neither circled area, *nor*, as far as I can tell, *anywhere else*. To illustrate how extraordinary I find this, I've shown two photos of the Ventura River further downstream – taken from the same spot – the first in May of 2005, following the extreme flow flows of that winter, the second taken approximately two years later.

The first S. Ana aerial photo was taken late in a dry-year (16" rainfall in Ojai) and substantial growth seems to have occurred during the 8 year interval until the next photo (2002, an even drier year with 7.8"); not much of a surprise since the 90s were one of the wettest decades on record, with 3 very big water-years (1993 with 41.4", 1995 with 42.4" and 1998 with 49.2"). The next big wet year was 2005, and we can see water still flowing (and algae still growing) in the Dec. 2005 photo. We can also see additional areas of green – areas that do not appear in any other photo. Besides the trees, there are what must be dry-land shrubs that hang on from year to year, but growth is extremely sparse and plants are widely separated – exactly what you might expect in an extremely arid environment.

So here are my conclusions: In spite of soil (which must be present under the existing trees), appreciable sediment flow (which must have occurred during all the big years, from un-dammed upstream contributions and fines – at a minimum – flowing over the spillway of Matilija Dam), a relatively undisturbed environment (no trees are missing and channel changes appear to be minor) and adequate nutrients (surfacing groundwater below this point is characterized by high nitrate concentrations), no substantial vegetative growth has taken place. (I could go further: in dry years, like 2007, growth visually appears to be stunted.) We must therefore look elsewhere for the limiting factor. To me, lack of water in a "losing" reach subject to intense evapotranspiration stress would seem to be an obvious suspect.





Photos of VR02 (off of Stanley Drain) taken from the freeway turnout at the upper levee gate; note the vegetative growth that had taken place in only two years following the flood flows of the winter of 2004-05.