

## CARMEL RIVER AT SCHULTE ROAD: Reconstruction of Steinbeck Era Channel Form

### CARMEL VALLEY, CALIFORNIA



Image source: Graham Matthews (2000)

#### What was done and why?

The bottomlands of Carmel Valley have been heavily urbanized in the last four decades and water table drawdown by municipal well pumps promoted increased bank erosion and channel instability. Near the Schulte road bridge, in a reach described by John Steinbeck in *Cannery Row* (1945), the river channel changed from approximately 24-m wide (80 ft), as had been the case in the 1940s-1970s (as), to being as much as 300-m wide (1,000 ft) in moderate floods in 1980-1983. The underlying cause was water table drawdown from groundwater pumping, which killed willows and cottonwoods, whose roots had stabilized the sandy banks. In an attempt to reverse the severe erosion, the Monterey Peninsula Water Management District (MPWMD) implemented the Schulte Road restoration project in 1988, consisting of channel realignment, construction of pool-riffle sequences and restoration of the riparian vegetation. Initially the riparian vegetation was irrigated, but for the last decade water tables have been maintained by shifting the locus of groundwater pumping downstream, to keep more of the river flowing perennially. Today a dense and diverse riparian woodland is established on the floodplain, which is now inundated during floods every few years, sustaining a diverse riparian flora. The low-flow channel has adjusted but remained essentially stable, a necessary condition given the urban uses adjacent to the river channel.

#### Who was involved?

This project was initiated by the Monterey Peninsular Water Management District as part of their Carmel River Management Program. Design of the restoration was completed by Graham Matthews, then with the Monterey Peninsular Water Management District, based on research by Robert Curry and Matt Kondolf.

### **Where can I see the restoration project?**

The Schulte Road restoration site on the Carmel River is located in Monterey County. Carmel River drains the Carmel Valley region and discharges into the Pacific Ocean. The restoration site is approximately 20 km (12.4 mi) upstream of the coast and located southeast of the Schulte Road bridge (36.5233N; 121.8302W). Collected documents, as well as general project characteristics, may be viewed at the NRRSS Carmel River at Schulte Road website:

[http://landscape.ced.berkeley.edu/~kondolf/NRRSS/Carmel\\_River\\_at\\_Schulte\\_Road/](http://landscape.ced.berkeley.edu/~kondolf/NRRSS/Carmel_River_at_Schulte_Road/)

You can also read about the project in Haltiner et al.:

Haltiner, J., G.M. Kondolf, and P.B. Williams. 1996. Restoration approaches in California. In A. Brookes and D. Shields (eds.) River Channel Restoration (pp.291-329). John Wiley & Sons, Chichester.

with background information in Kondolf & Curry (1986):

Kondolf, G.M., and R.R. Curry. 1986. Channel erosion along the Carmel River, Monterey County, California. *Earth Surface Processes and Landforms* 11:307-319.

### **Why is this a model project?**

This is a model project because bioengineering techniques were used to stabilize eroding riverbanks resulting from bank devegetation resulting from water table drawdown from groundwater pumping for municipal use. The reconstructed channel was allowed to migrate within a narrowly delineated floodplain, based on historical channel configurations observed on historical photographs.

### **For more information on these projects, please contact:**

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