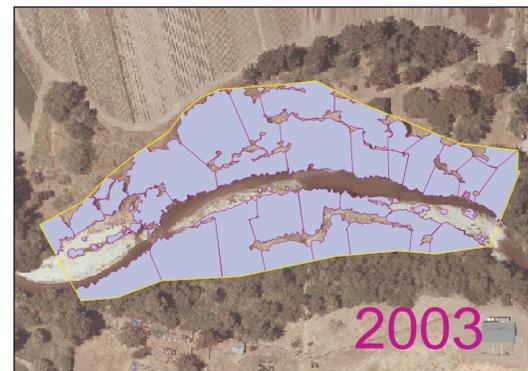


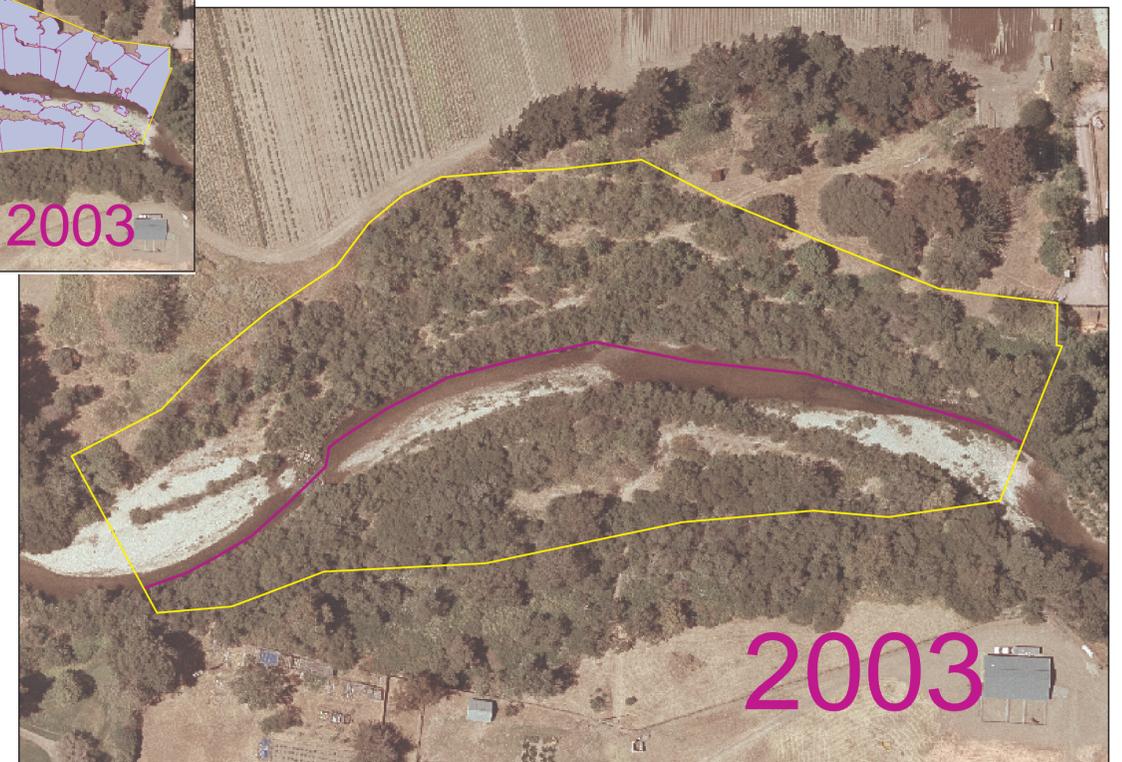
# Monterey Peninsula Water Management District Valley Hills Restoration Project: Quantification of Riparian Vegetative Cover



Before the restoration (above), the site was unstable and had lost most of its riparian vegetation. Analysis using GIS shows a total riparian vegetative area of about 1.44 acres or 26% cover.

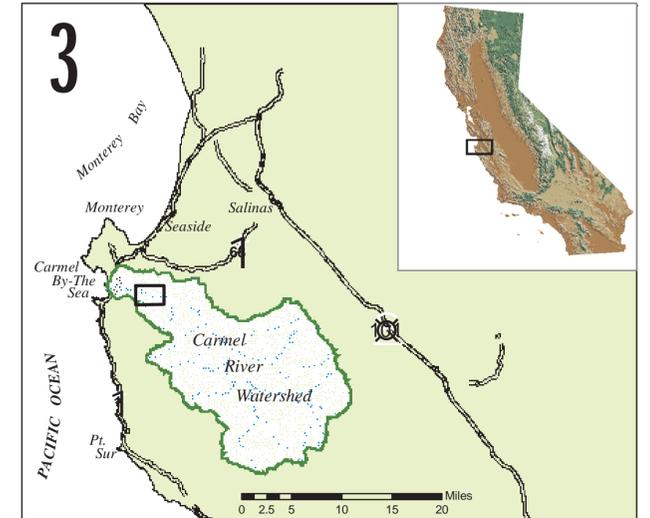


After the restoration (below), riparian vegetation has increased to 4.10 acres or 73% cover. This shows a 185% overall increase in riparian vegetation.



The 36-mile Carmel River drains a 255-square-mile watershed along the Central Coast of California. The river descends through deep, steep-sided canyons before flowing across a relatively flat, 16-mile narrow alluvial valley to the ocean. Construction of two dams, along with agricultural and residential development, have destabilized the alluvial portion of the river. In 1984, the Monterey Peninsula Water Management District (MPWMD) developed the Carmel River Management Plan to address erosion, property loss, and the decline of Carmel River habitat. Primary goals included the protection of aquatic and riparian resources within the alluvial portion, and comprehensive stream restoration using a combination of limited structural protection and native riparian plants. In 1984, restoration of eight miles of river was scheduled to be completed by MPWMD within ten years. In 1992 and 1993, the restoration of the Valley Hills reach (pictured) was completed and has since been irrigated. In order to quantify the increased vegetative cover of this site, this remote sensing project was conducted.

Two aerial photos (left and below right), taken in July 1991 and July 2003, respectively, were spatially corrected (to remove camera lens distortion) and used to track changes in vegetation development. Polygons were digitized (drawn) over areas of green vegetation (see two inset photos below). The results show that in 1991, prior to the restoration effort, 1.44 acres of riparian vegetation existed within the total project area of 5.63 acres (26% cover). Twelve years later, after re-contouring of the site and the planting of cottonwoods, willows, alders, and dogwoods, a total of 4.10 acres of riparian vegetation exist. This is 73% cover, showing a 185% increase in riparian vegetation in this reach.



Area map (above) shows the Carmel River Watershed and the location of the restoration site.

Paul Joseph Watters  
Field Biology Assistant  
Monterey Peninsula Water Management District  
5 Harris Court Building G  
Monterey, CA 93940



- Legend**
- Valley Hills Project Boundary
  - Thalweg 1991
  - Thalweg 2003
  - Existing Riparian Vegetation, 1991
  - Restored Riparian Vegetation, 2003

Projection: California State Plane IV  
Datum: NAD 1983  
June 18, 2004

Scale of Large Photos  
0 45 90 180 270 360 Feet

Scale of Inset Photos  
0 90 180 360 540 720 Feet

4