

## A Bay Area Watersheds Science Approach

Laurel M. Collins, Joshua N. Collins, Rainer Hoenicke, and Robin Grossinger  
San Francisco Estuary Institute  
<http://www.sfei.org>

The Bay Area Watershed Science Approach (WSA) is being developed through the San Francisco Estuary Institute (SFEI) for local watershed health assessments throughout the San Francisco Bay Area. SFEI has been working with local agencies and watershed interest groups on WSA projects in Huichica Creek (Napa County), Nathanson Creek (Sonoma County), Novato and Miller Creeks (Marin County), Permanente Creek (Santa Clara County), San Lorenzo Creek (Alameda County), and Wildcat Creek (Contra Costa County). Through the WSA, local watershed residents and managers help develop detailed pictures of past and present conditions for sediment sources, water supplies, wildlife habitat, and land use. These pictures are essential to understand local watersheds and to plan for their future.

The WSA focuses on the interactions between climate, people, water supplies, and sediment supplies as the fundamental controls on watershed form and function. Historical documents, maps, images, original tree ring analysis, and existing archeology are used to create maps that depict the watershed during the periods of early European contact and local peak agriculture. These maps of historical condition are combined with modern aerial photography in a Geographic Information System that permits quantitative analyses of changes in landscape and land use. These analyses of historical change are combined with intensive field studies of existing conditions of the hillslopes, terraces, stream banks, and the stream bed to help explain any major changes in sediment and water supply, and to what extent people have caused these changes.

The WSA can provide baseline watershed assessments to help design stream restoration projects, develop and test Best Management Plans (BMP's), calibrate and validate simulation models of watershed processes, explain watershed form and function to local watershed residents, select sampling stations for water quality or ecology, set science-based goals for watershed health, compare one watershed with another, and design programs for monitoring progress or regress relative to the local watershed goals. The WSA is designed to provide basic, empirical information to help protect the beneficial uses of Bay Area watersheds.

Examples of the findings of WSA projects include the relative contributions of terrigenous and estuarine sediments to shoaling in a flood control channel, the relative importance of hillslope and bank erosion to terrigenous sediment supply, the effects of land use and impoundment on channel incision and aggradation, the nature of channel response to drought and deluge, and the effects of local tectonics on channel behavior.