

Geomorphic Processes and Salmonid Habitat in Sulphur and Carneros Creeks, Napa River Watershed, Napa County California



Sarah Pearce ¹

Matt O'Connor ²

Lester McKee ¹

Blaine Jones ³

¹ San Francisco Estuary Institute

² O'Connor Environmental, Inc.

³ Napa County Resource Conservation District



Stewardship Support and Watershed Assessment in the Napa River Watershed

- CALFED funded project led by the Napa County Resource Conservation District (RCD)
- Two tributaries to the Napa River: Sulphur Creek and Carneros Creek
- Channel Geomorphology, Hillslope/tributary sediment budget, Fish and macro-invertebrate assessment, Historical ecology, Flora and fauna assessment, Water budget

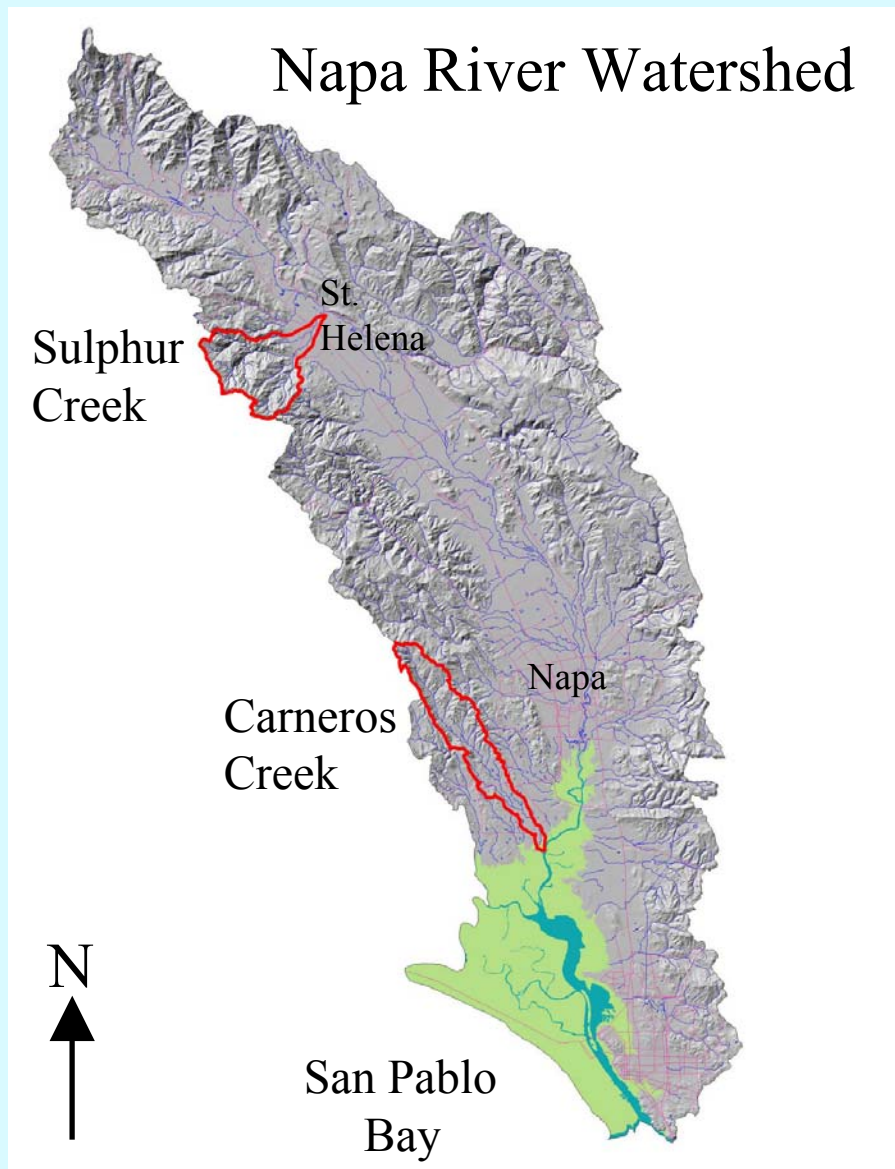


Project Goals

- Use a multidisciplinary science approach to create a watershed management plan for each watershed
- Meet the stewardship group's needs: Basic understanding of watershed form and function, specific management recommendations



Setting













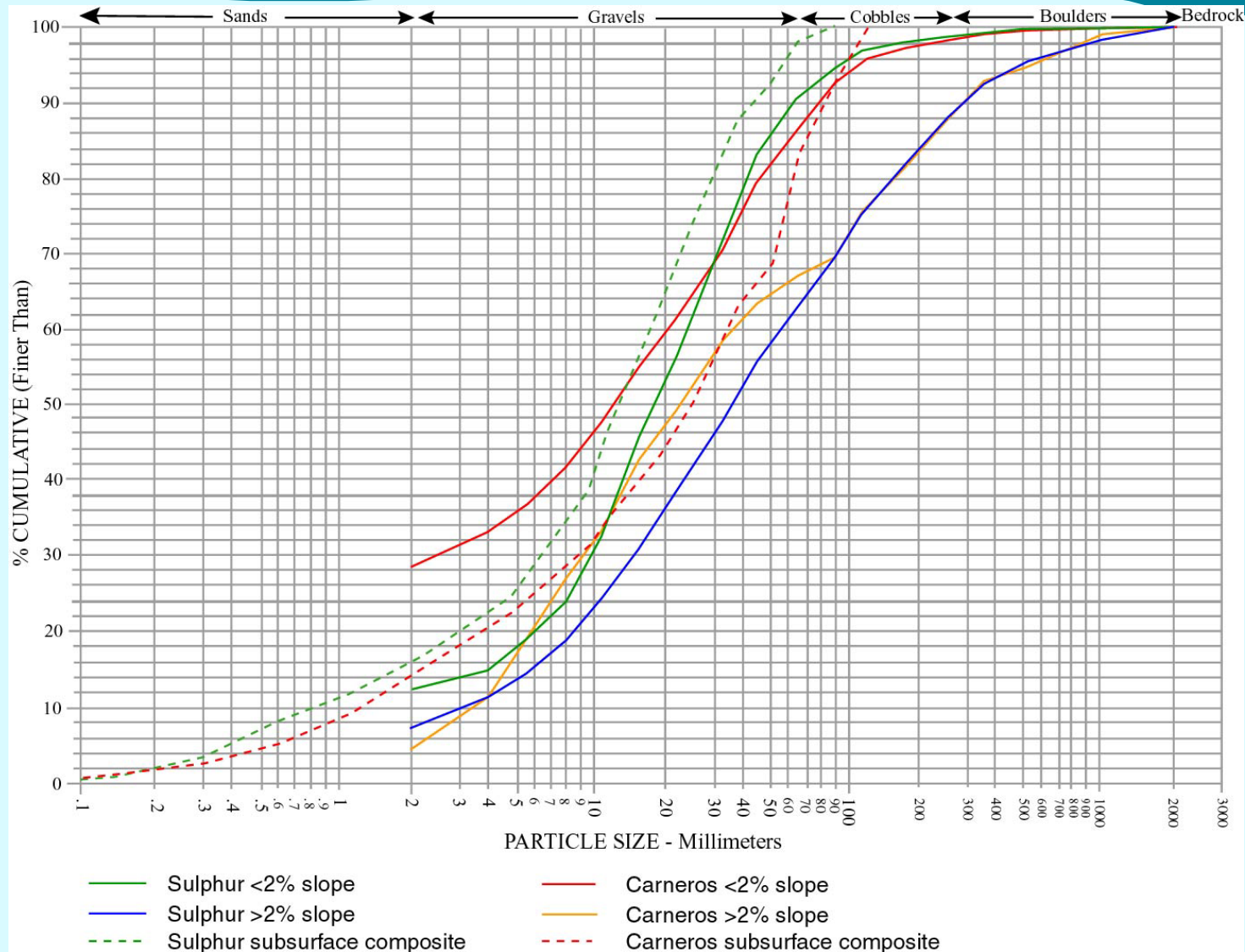








Surface and subsurface sediment grain size





Surface and subsurface sediment grain size

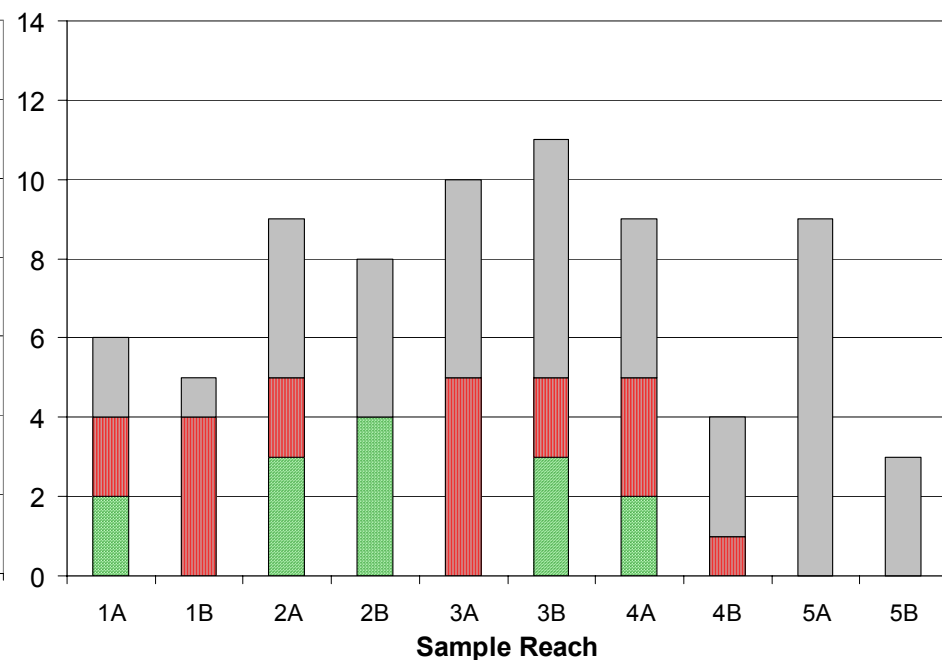
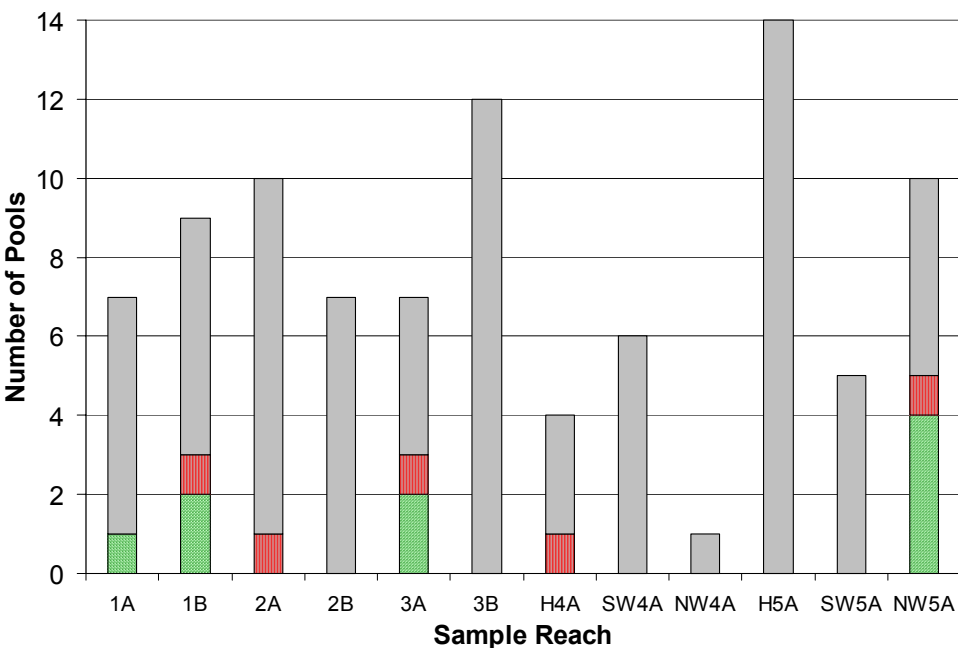
	Sulphur Creek	Carneros Creek	Published Values
Subsurface % < 1mm	11%	8%	< 20%
Subsurface D50 (mm)	13	25	18-76
Subsurface D84 (mm)	33	64	100



Large Woody Debris (LWD)

Sulphur Creek

Carneros Creek



LWD formed



LWD associated



Not associated or formed by LWD



Large Woody Debris (LWD)

Sulphur Creek



Carneros Creek

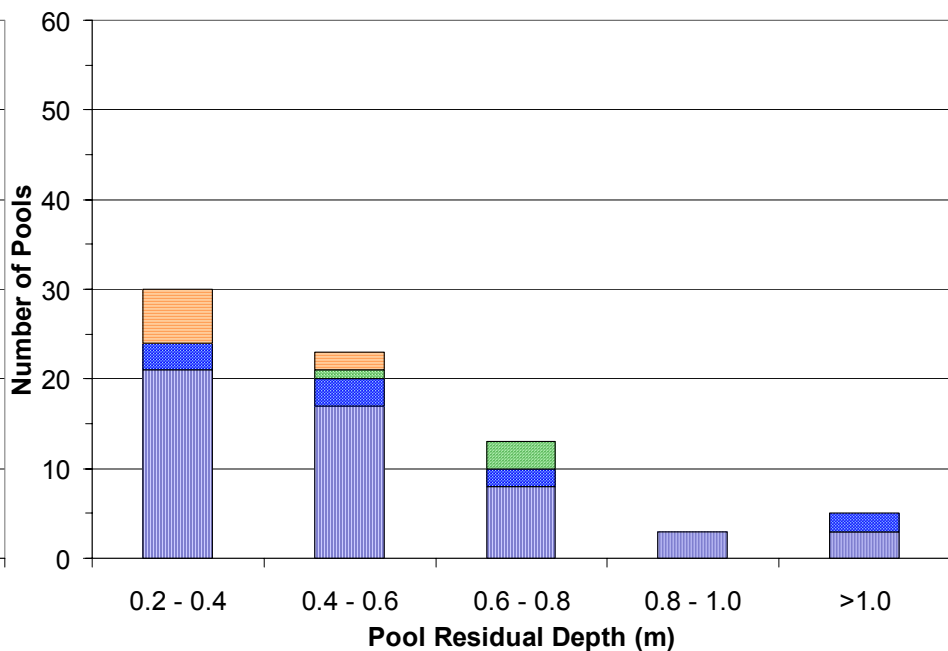
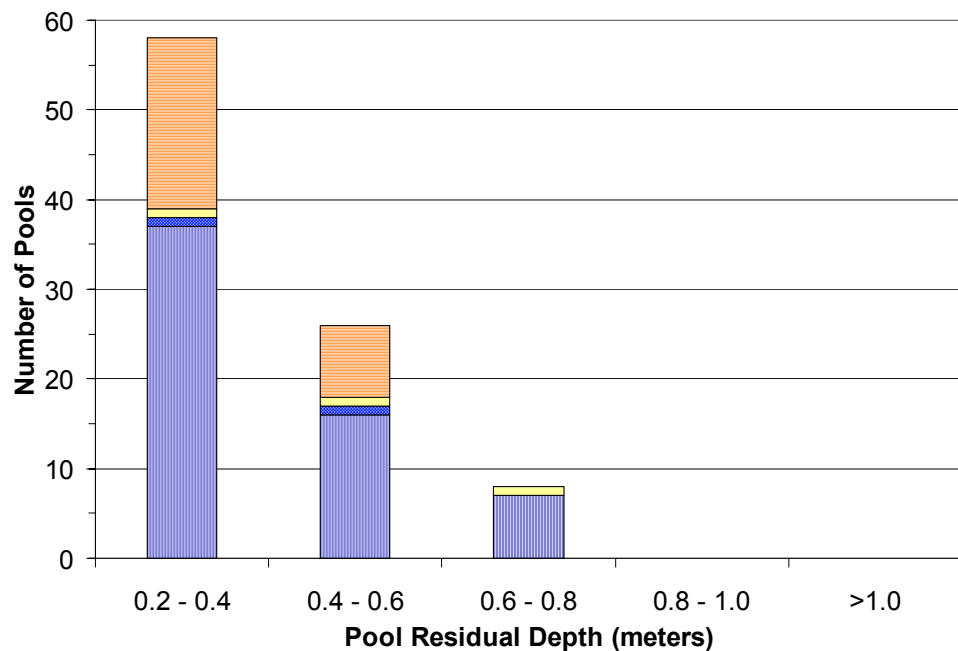




Pools

Sulphur Creek

Carneros Creek



Step pool



Dammed pool



Lateral scour pool



Plunge pool

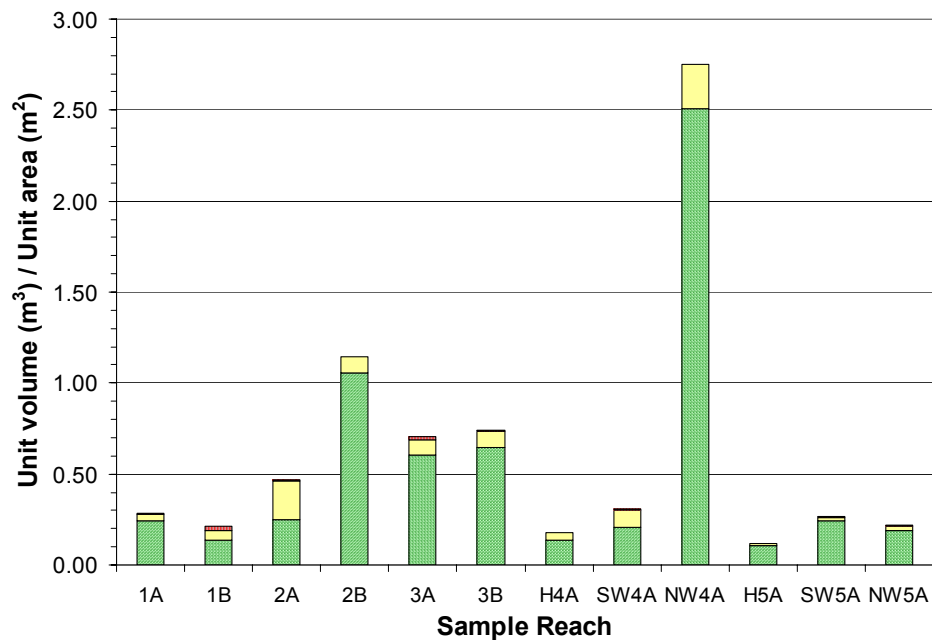


Main channel/bedrock pool

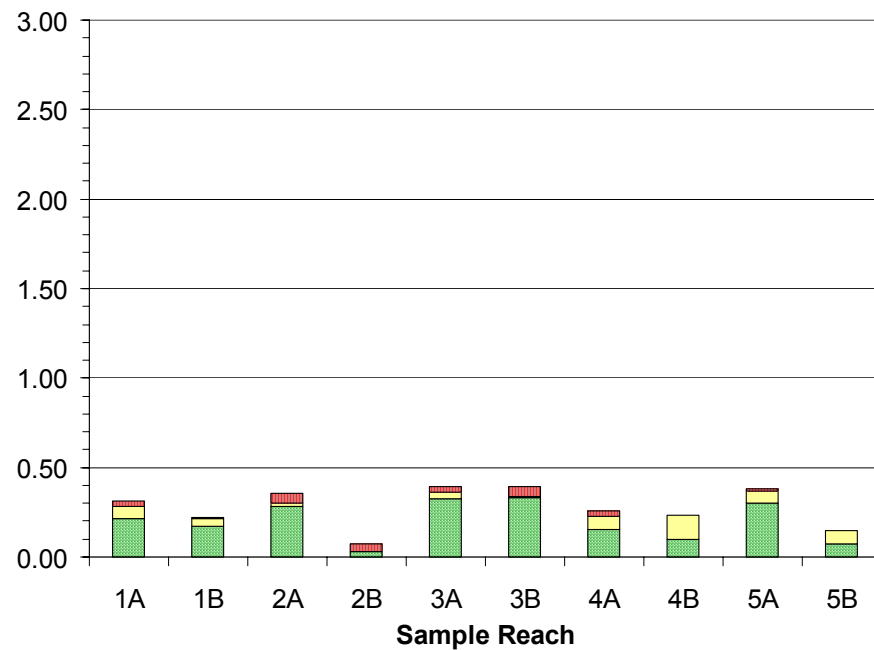


Sediment deposits

Sulphur Creek



Carneros Creek



Pool deposits



Bars

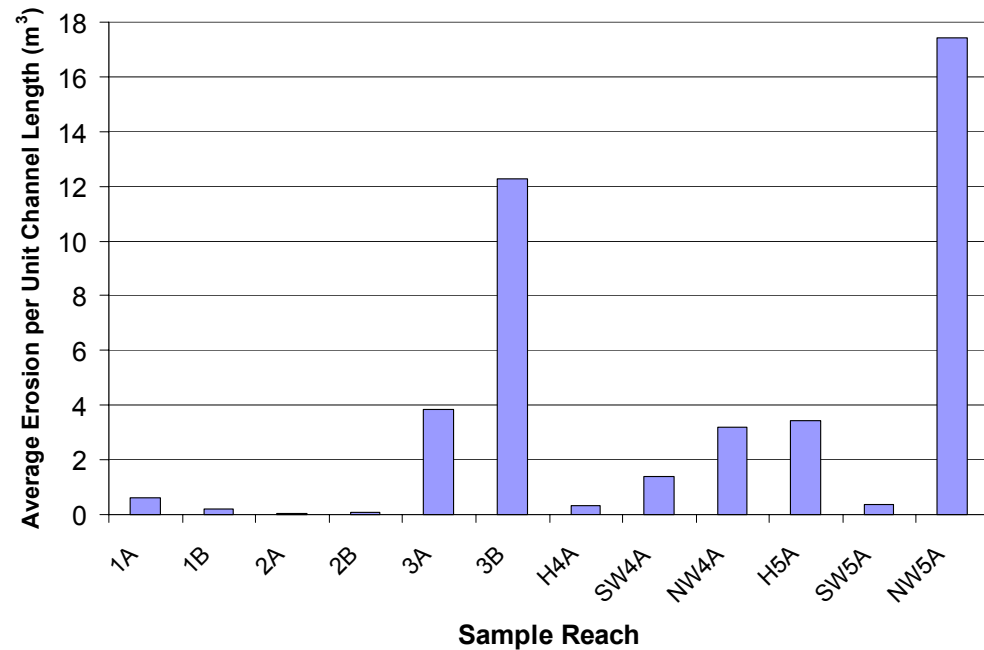


Active channel

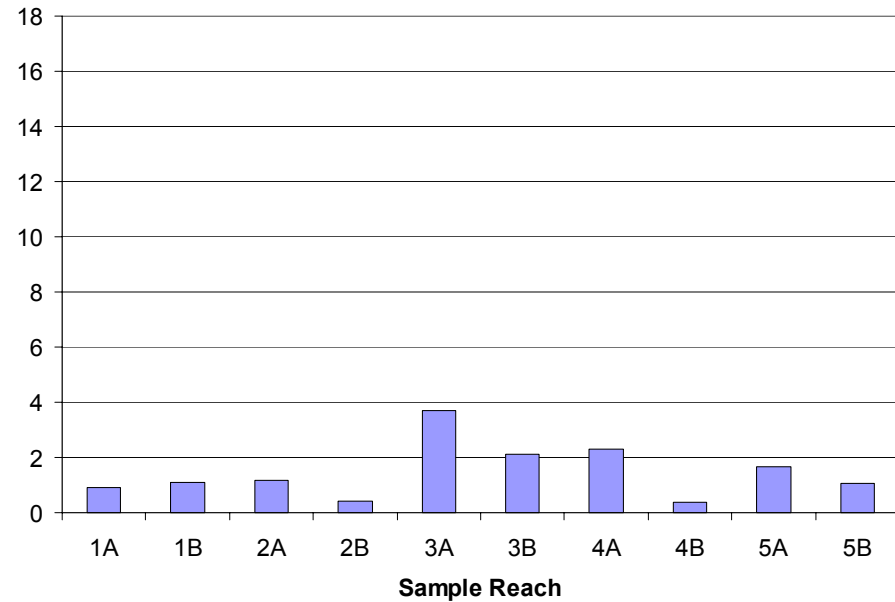


Bank erosion

Sulphur Creek



Carneros Creek





Bank erosion

Sulphur Creek



Carneros Creek





Riparian Vegetation





Management implications

- Sulphur Creek: A high natural sediment load related to hillslope processes (landslides), pool habitat (formation and cover) that would improve with more in-channel LWD, and lower reaches that are affected by St. Helena.

Best salmonid spawning and rearing habitat in the canyon and upland reaches

- Carneros Creek: Middle reaches with the highest bank erosion and fine pool deposits, pool formation and cover linked with in-channel LWD, low summertime discharge.

Best salmonid spawning and rearing habitat in the middle reaches



Stewardship Needs and CALFED objectives

- Sulphur and Carneros Creek Stewardship Group Needs: Identify the quality and quantity of salmonid habitat, characterize important watershed processes, collect data on channel form and function, make recommendations for management and restoration of the watershed
- CALFED Objectives: Facilitate coordination and collaboration between stewardship groups, government agencies and other organizations. Use a defensible scientific approach to define watershed needs and priorities for restoration that are socio-economically acceptable. Improve the understanding of the connection between watershed processes and land management.



