Figure 1. Map of the lower Calaveras River Basin.
Figure 2. Steelhead and resident rainbow trout life cycle and potential limiting factors in the Calaveras River watershed.

Factors Affecting Upstream Migration
- Physical migration barriers (dams, dewatered reaches, natural falls, culverts, sand bars at mouth of estuary)
- Migration corridor hazards (unscreened diversions, bypasses, poaching, water quality)

Factors Affecting Spawning and Incubation
- Redd dewatering
- Spawning gravel quality (permeability)
- Spawning gravel mobility (redd scour)
- Water quality and temperature

Factors Affecting Fry Rearing
- Proximity of fry rearing habitat to spawning areas
- Water quality and temperature
- Food availability
- Stranding by low flows
- Displacement by high flows

Factors Affecting Estuary and Ocean Rearing
- Loss of estuarine rearing habitat
- Water quality and temperature
- Harvest
- Ocean conditions
- Predation

Factors Affecting Juvenile Rearing
- Availability of oversummering habitat (deep pools, temperature refugia)
- Availability of overwintering habitat (in-channel LWD, interstitial habitat)
- Stranding by low flows
- Displacement by high flows
- Food availability
- Water quality and temperature

Factors Affecting Outmigration
- Predation
- Diversion hazards
Figure 3. Chinook salmon life cycle (fall and spring runs) and potential limiting factors in the Calaveras River watershed.
Figure 4. Locations of habitat patches suitable for salmonid spawning in the Calaveras River between New Hogan Dam and Shelton Road. Smaller gravel patches in the Canyon Reach are unlikely to be used by Chinook salmon.
Figure 5. Location and size class of larger pools in the lower Calaveras River.
Figure 6. Size distribution of *Oncorhynchus mykiss* redds in Jenny Lind, Hogan, and Canyon reaches of the Calaveras River. Area under the curves equals 1.0. No significant differences in redd size were found between reaches when tested using non-parametric test for equality.
Figure 7. Egg survival predicted from gravel permeability measured at three sites (A, B, C) in selected riffles in the New Hogan and Jenny Lind Reaches. Riffle numbers represent individual riffles within each reach.
Figure 8. Hydrographs for the median water year (WY 1999) and water years ranked immediately above (WY 2000) and below (WY 1970) the median during the period of record from 1964 and 2002 below New Hogan Dam.
Figure 9. Mormon Slough hydrographs for water years 1999 and 2000. Data downloaded from CDEC Mormon Slough at Bellota (USACE). Data are preliminary.
Figure 10. Hydrographs for years classified by the Department of Water Resources as “critically dry” (WY 1989) and “wet” (WY 1983).
Figure 11. Chinook salmon development calendar based on water temperatures at New Hogan Dam. The lower calendar displays time from spawning to emergence for a range of spawning dates. The upper calendar displays time needed to reach 80 mm in length based on a range of emergence dates.
Figure 12. Chinook salmon development calendar based on water temperatures at upper portion of the Jenny Lind Reach. The lower calendar displays time from spawning to emergence for a range of spawning dates. The upper calendar displays time needed to reach 80 mm in length based on a range of emergence dates.
Figure 13. Chinook salmon development calendar based on water temperatures at lower portion of the Jenny Lind Reach. The calendar displays time needed to reach 80 mm in length based on a range of emergence dates.
Figure 14. Calaveras River temperatures used to model Chinook salmon development in New Hogan and Jenny Lind (JL) reaches.