

August 16, 2010

Kevin Collins  
Lompico Watershed Conservancy  
P.O. Box 99  
Felton, CA 95018

Re: Temperature data request, methods of data collection, Certification of Quality Assurance and Qualifications

Dear Mr. Collins,

The following information is organized and numbered according to Enclosure 1 of the Data Submittal Requirements from the State Water Resources Control Board.

2e. GIS data files are not included. GPS coordinates of temperature monitoring sites are included with a 2001 map of all sites and a 2009 map of some of the sites.

2g. Temperature data collected by D.W. ALLEY were from 2005 (18 June 2005 – 15 October 2005) and 2006 (22 July 2006 – 4 October 2006). Data collected by the City of Santa Cruz were from 2005 (10 August 2005 – 21 October 2005). It should be noted that temperature data collected by the City of Santa Cruz in 2005 did not begin until August and missed the warmest portion of the summer. Data collected by D.W. ALLEY in 2006 did not begin until the third week in July and missed much of the warm month of July. However, the last week in July 2006 recorded extremely high water temperatures at all 11 sites, surpassing any data collected at those sites for the entire summer of 2005.

2h. The list of submittal contents include,

- 1) Water temperature data recorded at 30-minute intervals at each water temperature monitoring site for D.W. ALLEY and City of Santa Cruz sites contained in excel files for each site corresponding to those on the 2001 watershed map,
- 2) Data tables and graphs of water temperature at 30-minute intervals with 7-day rolling average of mean daily temperature for 2005 D.W. ALLEY sites contained in excel files for each site corresponding to those on the 2001 watershed map,
- 3) Graphs of daily maximum water temperature and 7-day moving average of the daily maximum (7DADM) water temperature for 2005 and 2006 D.W. ALLEY sites and two, 2005 City of Santa Cruz sites, with the EPA recommended summer maximum daily maximum temperature thresholds (impairment criteria) for salmon and trout in terms of the 7-day moving average of the daily maximum (7DADM) water temperature superimposed on each graph for core and non-core rearing areas These maximum temperature thresholds were provided in *The EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards* (2003).
- 4) 2001 D.W. ALLEY map showing all water temperature/ fish sampling sites used for temperature monitoring in the San Lorenzo River watershed.

- 5) 2009 D.W. ALLEY map with more legible labeling of tributaries but showing only some of the temperature monitoring sites in the San Lorenzo River watershed.
- 6) Resume of experience and training of personnel.

#### Literature Cited:

U.S. Environmental Protection Agency. 2003. *EPA Region 10 Guidance for Pacific Northwest State and Tribal Temperature Water Quality Standards*. EPA 910-B-03-002. Region 10 Office of Water, Seattle, WA.

Each excel file represents a specific water temperature monitoring site corresponding to the locations on the 2001 D.W. ALLEY map or on maps provided by the City of Santa Cruz, depending on the data collectors. D.W. ALLEY water temperature monitoring stations corresponded to historical D.W. ALLEY steelhead monitoring stations. Each excel file includes sheets of data tables with calculated values and graphs generated from these calculations.

2i. Data and graphs are submitted electronically.

3a. Data are provided in excel files, spreadsheets and charts (graphs). Pdf files are provided for each graph from the excel files.

3b. The excel files and pdf files are labeled by Stream and Site designation as indicated on the 2001 watershed map.

3c. The date and time of each measurement are included in the excel data tables. A separate file with a table of map coordinates is provided for water temperature monitoring sites. For 2005 there are 18 D.W. ALLEY monitoring sites and 2 City of Santa Cruz monitoring sites. For 2006 there are 11 repeated D.W. ALLEY monitoring sites. Units of measure are included on all tables and graphs. Water temperature on graphs is provided in centigrade.

#### 3e. Quality Assurance Procedures

The objective of the D.W. ALLEY study was to continuously monitor the water temperature in the San Lorenzo River watershed at historical steelhead sampling sites during the summer months when water temperature is highest. Secondly, the purpose was to measure water temperatures to determine if various reaches in the watershed were cool enough to sustain coho salmon in good condition at which time they were re-introduced. Onset HOBO Temp temperature loggers were used to measure water temperature at 30-minute intervals in order to detect and graph the range in water temperatures in biologically meaningful ways and according to EPA standards of water quality.

The following monitoring site selection criteria were used for D.W. ALLEY sites:

- Installed in the vicinity of historical steelhead monitoring sites that represented reaches throughout the mainstem and major tributaries whose reach boundaries were defined by changes in habitat conditions
- Installed in or near the thalweg when possible
- Installed in locations with good water mixing- riffles and runs in larger channels of the middle and lower mainstem sites (from Boulder Creek confluence, downstream) and pools of tributary sites and upper mainstem sites (upstream of the Boulder Creek confluence)
- Locations were representative of stream reaches and fish sampling sites

Installation/deployment procedures to assure quality control of temperature data collected at D.W. ALLEY sites with temperature data loggers:

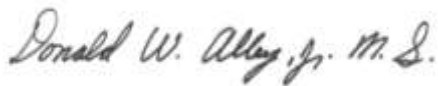
- Battery condition was checked for each data logger before deployment to insure sufficient power for the duration of the measurement period
- Recording frequency was set at 30-minute intervals to record the maximum and minimum daily temperatures, as well as the range of daily fluctuation
- Onset HOBO Temp temperature data loggers were encased in water tight cases and deployed to measure water temperature
- Locations were hidden from potential vandals and human traffic
- Probes were completely submerged during the measurement period and secured near the stream bottom but left floating in the water column due to buoyancy of the air-filled, water-tight capsules.
- Probes were hidden from sight and direct sunlight to prevent artifacts caused by heating from sunlight or tampering
- Location of data logger deployment was described in field notes to re-locate loggers at the end of the measurement period and determine if loggers had been tampered with

Data collection procedures used to assure quality control:

- Performed accuracy check with a calibrated, mercury-filled field thermometer before deployment of data loggers
- Launched data collection at 1800 hr on the day of deployment of data loggers to allow probes to reach ambient water temperature before measurements began (at least 1 hour delay between logger deployment and beginning of data measurements)
- Regularly checked data loggers for movement/damage/tampering/theft during measurement period
- Re-deployed a new data logger at San Lorenzo River Site 10 midway through 2005 measurement period after the original was stolen
- Recorded day that sensors were deployed and retrieved
- Retrieved data from loggers immediately in the field onto a laptop computer after data loggers were retrieved, using Onset BoxCar Pro 4 software
- Excluded any data artifacts that may have occurred between retrieval of data loggers from the water and retrieval of data onto laptop
- Re-deployed the same data loggers at the same locations between years
- Exported data from BoxCar Pro 4 files directly into excel files

- All BoxCar Pro 4 files and excel files associated with D.W. ALLEY data loggers were handled directly by Donald Alley
- All spreadsheets provided City of Santa Cruz excel spreadsheets were sent directly to D.W. ALLEY and were analyzed without alteration of data. Original spreadsheet information contained in the City spreadsheets is included within each new file generated by D.W. ALLEY from City data.
- All excel spreadsheet calculations and graphical representations were performed by and managed Donald Alley with the assistance of Mary Jo Walker, the Santa Cruz County Controller highly experienced with excel spreadsheet operations. All calculations and graphs within excel spreadsheets were accurately prepared to the best of his knowledge.
- Donald Alley, Certified Fisheries Scientist, certifies that the above described Quality Assurance Plan is adequate to provide accurate water temperatures for steelhead bearing reaches of the San Lorenzo River for the time periods involved.
- Donald Alley has measured water quality in a nearby watershed at Soquel Creek Lagoon and upstream (Santa Cruz County) since 1990 and utilized HOBO Temp temperature data loggers there since 1998, with results provided in annual reports to the City of Capitola. He utilized HOBO Temp temperature data loggers to monitor summer water temperatures in San Simeon and Santa Rosa Creeks and lagoons (San Luis Obispo County) during the period, 2001–2006, with annual reports provided to the Cambria Community Services District.
- Resume of experience for Donald Alley is provided below.

Sincerely,



Donald W. Alley  
Certified Fisheries Scientist

**DONALD W. ALLEY**  
**Certified Fisheries Scientist**

Donald Alley began his career more than 25 years ago in aquatic ecology by studying the life history pattern of a little known, but widely distributed freshwater member of the surfperch family, the tule perch. He discovered its territorial and sexual courtship behavior from underwater observations in California streams and lakes. His innovative Master's thesis incorporated original underwater observation techniques (2,000+ hours of underwater observation) to discover the microhabitat selection and spatial segregation of 7 sympatric fish species (including steelhead/rainbow trout, juvenile chinook salmon, Sacramento pikeminnow, Sacramento sucker, hardhead minnow, California roach and tule perch) and associated energy expenditure of the hardhead minnow in Deer Creek, a foothill mountain stream flowing off of Mt. Lassen in the Sierra Nevada range into the central valley of Northern California. He continued his fisheries work in the inland mountains of California for three summers as a field biologist and report writer for Pacific, Gas and Electric as he participated in field data collection on fish population censusing and instream flow studies in 9 major watersheds of the Sierra Nevada and North Coastal Ranges. Don has devoted 25 years to monitoring fish populations and habitat conditions of steelhead and tidewater goby in California coastal watersheds and lagoons, participating in numerous watershed assessments, management and enhancement plans, water feasibility studies, water diversion studies and environmental impact reports. Mr. Alley's fisheries work has taken him to San Luis Obispo, Monterey, Santa Cruz and San Mateo counties along the Central Coast. He provides his clients with technical expertise in CEQA documentation and other regulatory permitting issues. Clients have included coastal cities, counties, water districts, services districts, harbor districts, resource conservation districts and private landowners.

Early on, Mr. Alley was the primary fisheries field biologist in development of the original Pajaro River Steelhead Management Plan (1984) for the Association of Monterey Bay Area Governments (AMBAG). He collected data on salmonid habitat conditions and migrational barriers in surveying 200+ miles of the Pajaro River system that spans 5 counties before emptying into the Sanctuary. Mr. Alley surveyed steelhead habitat in all perennial habitat of Corralitos, Browns Valley, Green Valley and Casserly Creek sub-basins in 1981 Habitat was assessed and impediments to fish passage were photographed and inventoried for the 1984 AMBAG plan. These data were later used in development of the Santa Cruz County coho and steelhead distribution map.

D.W. ALLEY & Associates (DWA) monitored the steelhead population and habitat conditions in Corralitos Creek and Aptos Creeks in 2006–2009, revisiting sites Mr. Alley originally sampled in 1981 during a county-wide fishery assessment and in 1994. The 1994 sampling was part of his 3-watershed analysis to assess the status of steelhead in Santa Cruz County. The City of Watsonville was a co-sponsor of this analysis in response to the NOAA Fisheries proposal to list steelhead as an endangered species. In 2004, Mr. Alley lead the fish relocation effort at the Corralitos Creek fish ladder associated with replacement of the fish screen for the Watsonville surface water diversion. For the past 6 years, the firm has provided the fisheries portion of assessments for Federal Biological Opinions related to various Santa Cruz County Public Works projects. These projects have included numerous bridge replacements, bridge retro-fittings and stream-side road repairs. During project implementation, Mr. Alley captured and relocated steelhead and other aquatic species. In 2005, Mr. Alley provided the fishery analysis for replacement of the Olsen Road ford with a free-span bridge on West Branch Soquel Creek, satisfying CEQA and federal Biological Opinion requirements.

Since 2000, DWA has provided the fishery component to six watershed assessment and enhancement plans focusing on salmonids in watersheds along the Central California Coast. In San Luis Obispo County, his watershed planning in Santa Rosa Creek near Cambria, California benefitted from his 16 years of fishery monitoring of stream and lagoon habitat. In Santa Cruz County, his fishery experience has focused on 12+ years of monitoring and watershed planning in the larger San Lorenzo River and Soquel Creek drainages and the smaller Arana Gulch, all emptying into the Monterey Bay Marine Sanctuary. Further north in San Mateo County he completed the fishery components to watershed plans for Gazos Creek, one of the last coastal streams south of San Francisco where coho salmon still inhabit, and Pilarcitos Creek, which is subject to extensive municipal and domestic water diversions. In these planning efforts, Don Alley teamed with botanists and geomorphologist/ hydrologists to provide technical reports and formulate plans. Mr. Alley performed instream wood surveys and spawning gravel assessments and mapped erosion sources and fish passage barriers to anadromy. He collected and analyzed water temperature and streamflow data. Multiple years of past fish sampling by D.W. ALLEY & Associates and Dr. Jerry Smith (San Jose State University) were used to assign causal factors for salmonid abundance. Limiting factors to steelhead distribution and abundance were determined, and enhancement projects were identified and prioritized for future state funding. In 2004, the firm completed the Soquel Creek Lagoon Management and Enhancement Plan Update, drawing on 13 years of lagoon monitoring of water quality and annual fish censusing. In 2010, the firm is teaming to complete the Pilarcitos Lagoon Habitat Enhancement Opportunity Study in Half Moon Bay.

DWA has carried out several long term monitoring programs along the Central California Coast, measuring changes in the abundance of juvenile steelhead and tidewater goby and habitat conditions in streams and lagoons. For 19 years, the firm collected data and produced reports on fish populations in the Santa Rosa and San Simeon creek watersheds for the Cambria Community Services District (CCSD) in San Luis Obispo County. Two-year lagoon monitoring reports and annual watershed reports were provided, focusing on water quality and habitat conditions for steelhead and tidewater goby. The firm performed steelhead passage studies on both creeks in 1991 and 1992. In addition, in 1993 the firm performed the biological assessment for the CCSD effluent disposal field improvements and stream restoration project EIR, as well as the fishery component for the CCSD long-term water supply project EIR, Phase 1 feasibility analysis. In 1998, Mr. Alley carried out a California red-legged frog survey following USFWS protocols and monitored a Santa Rosa Creek streambank repair project adjacent to the CCSD water supply facility, providing a monitoring report. In 2003, the firm provided the wildlife and fisheries assessment associated with the CEQA process for the Santa Rosa Creek Trail and Streambank Restoration Project. In 2003-04, the firm carried out a California red-legged frog survey and monitored the Cross Town Trail construction in Cambria. Elsewhere in the County, the firm has worked on the Old Creek fishery below Whale Rock Dam, providing assessment and recommendations to meet CEQA requirements for a new water treatment facility and to comply with provisions of the Endangered Species Act to develop a Habitat Conservation Plan for the steelhead population. Clients have been the City of San Luis Obispo and San Luis Obispo (SLO) County. In 1995, Mr. Alley carried out a Chorro Creek survey at Twin Bridges for tidewater goby (endangered species). In 1996, the firm performed the original assessment of juvenile steelhead habitat and fish densities in Arroyo Grande Creek, with an approach to habitat enhancement downstream of the County's Lopez Dam and reservoir. Instream structures were designed to enhance steelhead rearing habitat on one reach to mitigate the loss of surface flow in another. In 2007, the firm surveyed and



sampled San Luis Obispo Creek for steelhead, using a stratified random design to obtain a population estimate. Recommendations for watershed enhancement were provided.

DWA has monitored the steelhead population and habitat in the San Lorenzo River for 15 years, with funding from the City of Santa Cruz, San Lorenzo Valley Water District, Santa Cruz County and NOAA Fisheries over the years. Fishery techniques in habitat typing, electrofishing and underwater censusing were used in as many as 13 mainstem reaches and 20 tributary reaches of 9 major tributaries. In 2004, Mr. Alley co-authored the San Lorenzo Watershed Enhancement Plan for the County of Santa Cruz.

DWA participated in the City of Santa Cruz Water Feasibility Study (1992-93). Mr. Alley performed field reconnaissance of steelhead habitat conditions and fish sampling for environmental constraints analysis on 9 north coast streams. He performed environmental constraints analysis for water development by carrying out instream flow analysis using IFIM techniques in the San Lorenzo River drainage. He determined instream flow requirements of steelhead spawning, rearing and migrational passage, downstream of three proposed locations for water impoundment in the watershed.

DWA has monitored the steelhead population and habitat in Soquel Creek, Santa Cruz County, for the last 13 consecutive years and 1994, providing annual reports to the Soquel Creek Water District and Santa Cruz County. Mr. Alley also assisted in design and performed data collection for a steelhead passage study for the Soquel Creek Water District, using IFIM techniques downstream of a proposed surface water diversion. Mr. Alley provided the fishery component to the Soquel Creek Assessment and Enhancement Plan for the Santa Cruz County Resource Conservation District in 2004.

Mr. Alley has worked for the City of Capitola for 19 years, being project manager of the original Soquel Lagoon Management and Enhancement Plan (1990). D.W. ALLEY & Associates implemented the Coastal Conservancy-funded Plan (1990-1995). The firm completed the 2004 Soquel Lagoon Management and Enhancement Plan Update to satisfy CEQA and NOAA Fisheries requirements in obtaining the Army Corps permit for construction of the sandbar in early summer.

Mr. Alley provided the Monterey Peninsula Management District with technical support and report writing skills for more than a decade. His work contributed to fulfilling CEQA requirements for the proposed New Carmel River Dam. DWA has conducted three instream flow studies for steelhead in rugged, isolated reaches of the Carmel River. The firm analyzed the potential impact of additional water impoundment to the recreational steelhead fishery on the Carmel River. The firm provided a report for Cal-Trans on the fishes and water quality of the Carmel River Lagoon prior to excavation of the South Arm with observations of a controlled sandbar breach. Beginning in 2008, Mr. Alley has assisted the firm, Ecological Studies, in capturing and relocating California red-legged frogs and tadpoles from San Clemente Reservoir during its annual drawdown.

## EDUCATION- DONALD ALLEY

A.A.	Biology and Chemistry, 1971 (Honors)	San Jose City College
B.S.	Wildlife and Fisheries Biology, 1974. (High Honors)	University of California, Davis
M.S.	Ecology, 1977	University of California, Davis
	Postgraduate work in taiga forest ecology, 1977-1978	University of Alaska, Fairbanks
	Postgraduate work in fisheries ecology, 1979-1980	Oregon State Univ., Corvallis
Teaching Credential	Science, K-12 Clear Credential, 1982-83	San Jose State University, San Jose

## CERTIFICATION AND SPECIAL PERMITS- DONALD ALLEY

Certified Fisheries Scientist (#2001), American Fisheries Society, 1990

Certified K-12 California Science Teacher- Clear Credential, 1983

Certified in the U.S. Fish and Wildlife Service Incremental Methodology, 1983, 1988-89

Certified in Open Water and Advanced SCUBA (PADI), 1996-97

*Fish and Wildlife Permit No. 793645* authorizes capture of tidewater goby and survey for California red-legged frog, with authorization to capture and temporarily retain California red-legged frog during electrofishing.

*NOAA (National Marine Fisheries Service) Section 10 Permit No. 1066* formerly authorized capture of coho salmon. Authorization for coho salmon and steelhead has been applied for and is pending.

*Calif. Dept. Fish and Game Scientific Collecting Permit ID No. 000035* authorizes capture and release of freshwater fishes, anadromous fishes, invertebrates and amphibians (incidental), including steelhead, coho salmon, tidewater goby, chinook salmon and California red-legged frog.

## EMPLOYMENT HISTORY

1990-present	D.W. ALLEY & Associates	Principal/Aquatic and Fisheries Biologist
1988-1990	Habitat Restoration Group	Aquatic and Fisheries Biologist/ Division Manager
1984-1988	San Jose Unified School District	Science Teacher
1984-1986	Pacific Gas and Electric Company Division of Environmental Research	Fisheries Consultant
1981-1983, 1986-1988	Harvey and Stanley Associates, Inc.	Aquatic and Fisheries Biologist



1979-1980	Oregon State University, Corvallis	Graduate Research Assistant
1977-1978	University of Alaska, Fairbanks	Graduate Research Assistant
1974-1977	University of California, Davis	Graduate Research and Teaching Assistant
1974	The Nature Conservancy, McCloud River Preserve, Shasta County, CA	Fishery Biologist

## SELECTED PROFESSIONAL EXPERIENCE

### San Luis Obispo County

Passage Study for Steelhead in San Simeon Creek, San Luis Obispo County, California. 1991. Conducted for the Cambria Community Services District. Identified critical passage riffles for **steelhead migration**. Three riffles were hydraulically modeled, using the USFWS IFIM. Minimum passage flows were recommended for migration of adults and juveniles past a potential diversion point. The winter water diversion would supply an off-stream storage reservoir for municipal water.

Passage Study for Steelhead in Santa Rosa Creek, San Luis Obispo County, California. 1993. Conducted for the Cambria Community Services District. Identified critical passage riffles for **steelhead migration**. Three riffles were hydraulically modeled, using the USFWS IFIM. Minimum passage flows were recommended for migration of adults and juveniles.

Cambria Aquatic Resources Analysis, San Luis Obispo County, California. 1990-present. Conducted for the Cambria Community Services District. Provided environmental consultation regarding issues related to **steelhead, tidewater goby, California red-legged frog** and other sensitive aquatic species in Santa Rosa and San Simeon Creeks. Lagoons are seined for **tidewater gobies and steelhead** to monitor lagoon populations on an annual basis, and upper watersheds are electrofished and habitat typed to monitor trends in steelhead populations and habitat quality. The aim is to work closely with resource agency personnel to protect natural resources while expanding its water supply and wastewater processing capacity. This is the longest known monitoring program for tidewater goby on the Central Coast.

Cambria Community Services District Long Term Water Supply Project, San Luis Obispo County, California. 1993. Conducted for the Cambria Community Services District. Analyzed potential **fishery impacts** from two water supply alternatives. One involved several potential pipeline routes with multiple watercourse crossings and release into streams supporting **steelhead** and other sensitive species. The other alternative involved off-stream storage obtained by winter water diversion from coastal steelhead streams.

Chorro Creek Tidewater Goby Survey at Twin Bridges, San Luis Obispo County, California. 1995. As part of the environmental review for the Twin Bridges replacement along South Bay Boulevard, seining was performed in lower Chorro Creek to determine the presence/absence of **tidewater goby**. Sacramento pikeminnow was present, but tidewater goby was not.

Assessment of Juvenile Steelhead Habitat and Fish Densities in Arroyo Grande Creek, San Luis Obispo County, California. 1996. Conducted for the San Luis Obispo County Engineering Department. Habitat typed and sampled by electrofishing 13 miles of **coastal steelhead** habitat below Lopez Dam. The purpose was to protect steelhead resources during the retrofitting of Lopez Dam. A second report provided an approach to habitat enhancement to mitigate for potentially dewatered habitat.

Initial Biological Study for the New Cayucos Surface Water Treatment Plan on Old Creek Below Whale Rock Dam, San Luis Obispo County, California. 1994-95. Conducted for the San Luis Obispo County Engineering Department. The purpose was to assess the presence of sensitive plant, fish and wildlife species (**steelhead, California red-legged frog, western pond turtle**) in the lower creek that would be impacted from rerouting of

reservoir water via a pipeline instead of instream flow to the treatment plan. Mitigations were developed to obtain a mitigated negative declaration status for the project.

Wildlife and Fisheries Assessment Associated with the CEQA Process for the Santa Rosa Creek Trail and Streambank Restoration Project. 2003. Conducted habitat assessment for Robert Bein, William Frost & Associates to assess potential impacts of construction on sensitive species, including **steelhead, tidewater goby, California red-legged frog and western pond turtle**. Mitigations were devised related to construction timing and relocation of animals from the work area.

Cambria Cross-Town Trail Bio-Monitoring. 2003-2004. Services provided to the Cambria Community Services District. D.W. ALLEY & Associates performed a **California red-legged frog** eye-shine survey along Santa Rosa Creek (**steelhead** present) using USFWS protocols and monitored trail construction along the riparian corridor with construction of a walk-bridge over the Creek as required by the USFWS and NOAA Fisheries.

San Luis Obispo Creek Steelhead Sampling. 2007. Services provided to the Land Conservancy of San Luis Obispo County. Conducted habitat typing of the mainstem and watered tributaries to locate 69 stratified random sites that were sampled for juvenile **steelhead** by electrofishing and measured for habitat conditions. Passage problems were identified. Data will be used to obtain a steelhead population estimate and identify reaches with the highest densities of juveniles to help direct restoration efforts.

### San Mateo County

Gazos Creek Watershed Enhancement Plan. 2003. Provided the fishery portion of the plan to the Coastal Watershed Council with funding from the Coastal Conservancy. It involved a stream survey with habitat assessment for **steelhead and coho salmon** and identification of fish passage and erosion problems. Management of large wood was an issue. Enhancement projects were provided.

Pilarcitos Creek Watershed Enhancement Plan. 2008. Provided the fishery portion of the plan to Philip Williams Associates under contract with the San Mateo County Resource Conservation District. Previously unsampled tributaries were sampled for **steelhead/ resident rainbow trout**, and former passage enhancements were re-evaluated to assess their success and recommend improvements. Limiting factors were identified and fishery enhancement projects were prioritized.

### Santa Cruz County

Pajaro River Steelhead Habitat Management Plan, Monterey, San Benito, Santa Clara, and Santa Cruz counties, California. 1981-84. Conducted for Association of Monterey Bay Area Governments. Conducted a major study of the **steelhead fishery** of the Pajaro River system. Assessed steelhead spawning and rearing conditions in more than 20 tributary creeks. Documented and mapped habitat problems related to water diversion, low flows, grading, channelization, poor gravel recruitment, bank erosion, sedimentation from upland erosion, and passage problems at dams and road crossings. Evaluated and photographed steelhead migration barriers. The fish ladders on Corralitos and Browns Valley creeks were identified as steelhead passage impediments in 1981. They were ultimately repaired, and concrete grade control weirs were constructed downstream to lessen the jump into fish ladder approach pools.

Soquel Creek Lagoon Management and Enhancement Plan, Santa Cruz County, California. 1990-present. Managed the development and implementation of the Lagoon Management and Enhancement Plan for the City of Capitola. Management issues included potential impacts to **steelhead and tidewater goby** from sandbar construction and breaching, water quality, algal blooms and sources of fecal coliform pollution. An education program was developed.

Arana Gulch Integrated Resource Management and Enhancement Plan. 2001. Conducted stream survey and **steelhead** sampling to evaluate habitat quality and make enhancement recommendations for the fishery portion of the plan.

Soquel Creek Steelhead Assessment and Enhancement Plan, Santa Cruz County, California. 2004. Conducted for the Santa Cruz County Resource Conservation District and Santa Cruz County Environmental Planning Department. Assessed fishery habitat conditions and trends in the juvenile **steelhead** population size from their past monitoring, assessed impacts from water diversion, passage impediments and stream sedimentation. Provided enhancement recommendations, enhancement goals and prioritized enhancement projects.

San Lorenzo River Steelhead Enhancement Plan, Santa Cruz County, California. 2004. Conducted for the Santa Cruz County Environmental Planning Department. Assessed fishery habitat conditions and trends in the juvenile **steelhead** population size from their past monitoring, assessed impacts from water management, passage impediments and stream sedimentation. Provided management recommendations, enhancement goals and prioritized enhancement projects for salmonids.

Soquel Creek Lagoon Management Plan Update, Santa Cruz County, California. 2004. Prepared for the City of Capitola. Updated existing management plan to include latest water quality and **steelhead** and **tidewater goby** monitoring findings, riparian conditions, lagoon management techniques and recommendations. The purpose was to satisfy CEQA regulatory requirements.

Fishery Sampling and Monitoring of Neary Lagoon, Santa Cruz County, California. 1998-2001. Conducted monthly monitoring of water quality in the slough and sampled fishes in the slough and feeder stream for the City of Santa Cruz. Made recommendations related to periodic tule removal and sediment excavation to minimize fishery impacts and enhance aquatic habitat.

Fish Sampling and Water Quality Monitoring of Soquel Creek Lagoon, Santa Cruz County, California. 1990-present. Client is the City of Capitola. Annually monitored sandbar construction, relocated fish, performed bi-monthly water quality measurements, annually sampled juvenile **steelhead** and **tidewater goby** (gobies disappeared in 1998) populations to estimate size and annually prepared lagoon monitoring reports to satisfy regulatory agency requirements.

San Lorenzo River Steelhead Monitoring, Santa Cruz County, California. 1994-present. Conducted for the City of Santa Cruz, the County of Santa Cruz, the San Lorenzo Valley Water District and National Marine Fisheries Service. Monitoring encompassed habitat typing of 15 miles of stream with as many as 30 fish sampling sites in 13 mainstem reaches and 20 tributary reaches in 60 miles of **steelhead** habitat. Electrofishing and snorkeling were used in the mainstem, and electrofishing was used exclusively in the tributaries. Produced annual reports for dissemination to regulatory agencies.

Soquel Creek Steelhead Monitoring and Passage Study, Santa Cruz County, California. 1994, 1997-present. Conducted for the Soquel Creek Water District and the County of Santa Cruz. Monitored **steelhead** population and habitat conditions at electrofished sampling sites in 14 reaches, providing annual reports. Performed a steelhead passage study using U.S. Fish and Wildlife Service Instream Flow Incremental Methodology (IFIM) techniques.

City of Santa Cruz Water Supply Alternative Feasibility Study, Santa Cruz County, California. 1992-1993. Conducted for the City of Santa Cruz. Explored the feasibility of water projects in nine small coastal watersheds. Performed field reconnaissance, fish sampling by electrofishing, and USFWS IFIM modeling for steelhead habitat. Described existing **steelhead** habitat conditions, potential impacts and fatal flaws, potential mitigations to make projects feasible and future analysis required to satisfy CEQA requirements.

San Lorenzo River and Lagoon Enhancement Plan: Fisheries Aspects, Santa Cruz, California. 1987-88. Conducted for City of Santa Cruz and the California Coastal Conservancy. Trapped down-migrating **steelhead** and **coho salmon** smolts and young-of-the-year in the river and seined steelhead and silver salmon from the lagoon. The purpose was to determine the timing of out-migration and the level of lagoon use by steelhead and salmon. Water

quality was monitored. A plan was developed for managing the coastal sandbar, which satisfies aquatic habitat needs of salmonids in the lagoon and the need for prevention of flooding of dwellings adjacent to the levees.

**Steelhead Assessment, Old Olympia Quarry Well Field EIR, Santa Cruz County, California. 1989.** Conducted for the San Lorenzo Valley Water District. Surveyed habitat conditions and sampled steelhead populations in Bean and Zayante Creeks. Evaluated barriers to fish migration, substrate conditions, sediment sources, the historical flow record, and habitat quality. Assessed impacts of a proposed increase in groundwater pumping using an empirical model developed from previous work on Santa Cruz County steelhead populations, based on estimates of streamflow reductions provided by a hydrologist. Mitigation measures were recommended.

**Santa Cruz County Water Management Plan, Santa Cruz County, California. 1982.** Conducted for Santa Cruz County Planning Department. **Steelhead** habitat and densities were assessed in 21 streams. The relative habitat values of each stream were compared in order to develop a water management plan that would minimize impacts to steelhead in the county.

**Fishery Consultation and Fish Relocation Services for Bridge and Road Projects, Santa Cruz County, California. 2001-present.** Conducted for County of Santa Cruz Public Works Department. Contracted to satisfy permit requirements related to avoidance or minimization of impacts to fish (primarily **steelhead**) for several bridge and road-repair projects. These include bridges at Soquel Avenue, Happy Valley Road, Green Valley Road and Browns Valley Road and several road repairs adjacent to streams. Electrofishing was used to capture fish.

**Fishery Assessment and Recommendations for Bridge Retrofits, Santa Cruz County, California. 1998-2004.** Conducted for County of Santa Cruz Public Works Department. Performed the fishery portion of biological assessments for three bridge retrofits on Zayante Creek, one on Kings Creek and one over the San Lorenzo River at Bear Creek Road. Developed mitigation measures for potential project impacts to fisheries resources (primarily **steelhead**) to satisfy CEQA and federal Section 7 consultations resulting from Biological Opinions.

**Highway 1 Bridge Replacements. 2006.** Donald Alley monitored and guided cofferdam construction on Carbonera and Branciforte creeks. Then he relocated juvenile **steelhead** from the isolated project areas using electrofishing.

## **Monterey County**

**Baseline Fish Sampling, Water Quality Monitoring and Observation of Lagoon Conditions Before Sandbar Breaching at Carmel River Lagoon, 1996, Prior to Excavation of the South Arm. 1997.** Prepared for Smith & Reynolds, Erosion Control, Inc. Water quality was monitored through the summer, juvenile **steelhead** were marked and recaptured by seining for the first ever lagoon population estimate, aquatic fish species composition was determined, water surface elevation and lagoon conditions were monitored immediately prior to and after lagoon breaching in December 1996.

**Instream Flow Analysis of Steelhead Spawning Habitat in the Proposed Inundation Zone of the New Los Padres Dam, Monterey County, California. 1995.** Conducted for the Monterey Peninsula Water Management District. Modeled nine **steelhead spawning** transects on the Carmel River to determine the relation between streamflow and the amount of steelhead spawning habitat using IFIM. This work helped to supply technical information for the EIR associated with enlargement of Los Padres Reservoir. The calculated loss of habitat would be mitigated by spawning enhancement downstream.

**Carmel River Sport Fishery Analysis, Monterey County, California. 1993.** Conducted for the Monterey Peninsula Water Management District. Collected all historical information and sampling data related to managing the **steelhead sport fishery** on the Carmel River collected by resources agencies. Documented changes in fishing regulations and fish stocking records were. Likely future fishing regulations were combined with anticipated adult steelhead run sizes after the construction of the New Los Padres Reservoir, and the impacts of the anticipated release schedule from the new dam on the future steelhead sport fishery were assessed.

**Instream Flow Analysis of Steelhead Spawning Habitat Below San Clemente Dam, Monterey County, California. 1991.** Conducted for the Monterey Peninsula Water Management District. Modeled ten spawning



transects on the Carmel River to determine the relation between streamflow and the amount of **steelhead spawning habitat**. The USFWS IFIM was used. This work helped to supply technical information for the EIR associated with enlargement of Los Padres Reservoir.

Instream Flow Analysis of Steelhead Spawning and Rearing Habitat between San Clemente and Los Padres Reservoirs, Monterey County, California. 1990. Conducted for the Monterey Peninsula Water Management District. Performed the U.S. Fish and Wildlife Service (USFWS) Instream Flow Incremental Methodology (IFIM) to hydraulically model three reaches of the Carmel River over a range of streamflows, using 36 transects. The amount of **steelhead habitat for all life stages** was simulated as a function of streamflow. A passage study was included to insure adult migration over a critical riffle between reservoirs. This work helped to supply technical information for the EIR associated with enlargement of Los Padres Reservoir and establishing instream releases from that dam.

### Santa Clara and Tehama Counties

Adobe Creek Restoration Plan, Santa Clara County, California. 1988. Conducted for Trust of Hidden Villa, City of Los Altos, Town of Los Altos Hills, and the California Department of Water Resources Urban Stream Program. Surveyed an urban stream to 1) assess **steelhead** habitat characteristics, 2) locate and evaluate streambank erosion, 3) locate and evaluate barriers to fish passage, 4) determine fish species composition and distributions, 5) provide solutions to fish passage problems in order to enhance fishery habitat, 6) suggest beneficial water management techniques for habitat restoration, and 7) suggest re-introduction of native fish species in appropriate reaches.

Anderson Reservoir Recreation Plan and Coyote Lake Recreation Plan, Santa Clara County, California. 1986-87. Conducted for Santa Clara County Parks and Recreation Department. Evaluated past management practices and limnological studies at these heavily used recreation facilities. Made recommendations regarding 1) fishing regulations (season and boundaries), 2) species composition and chronology of fish stocking activities, 3) locations and methods of enhancement for spawning grounds, 4) desired water surface elevations at key times of the year to maximize fish production and recreational value, and 5) locations and methods of improved fishing access for hikers.

Spreader Dam Monitoring for Fishery Resources, Santa Clara County, California. 1989. Conducted for the Santa Clara Valley Water District. Project manager in the design and implementation of a five-year monitoring program to determine the amount of aquatic **salmonid** habitat added or lost by the operation of the many percolation ponds in the Santa Clara Valley. Water quality was measured and fish populations were inventoried in the vicinity of spreader dams. Conditions for steelhead and salmon passage were monitored, and fish ladders were constructed where necessary.

Instream Flow Analysis of Passage Requirements for Chinook Salmon, Tehama County, California. 1996. Conducted for the U.S. Bureau of Reclamation. Hydraulically modeled three critical passage riffles identified in lower Mill Creek to estimate the minimum bypass flow for spring- and fall-run chinook salmon in the reach below three diversion dams. Fishery analysis followed the USFWS instream flow methods.

Sand Hill Road Bridge Replacement. 2004. Donald Alley provided construction worker education, monitored construction of the cofferdams and diversion pipes, followed by relocation of juvenile **steelhead** from the isolated project area by electrofishing. The bridge spanned San Francisquito Creek..

### **EDUCATIONAL VIDEOS**

*Knowing Our Coastal Redwoods*, Raindancer Environmental Media.

*Safe Passage Home*, Raindancer Environmental Media.

## PROFESSIONAL MEMBERSHIPS

American Fisheries Society  
Ecological Society of America  
Society of Wetland Scientists

## PUBLICATIONS

- Alley, D. W., C. Van Dyck and D. Hylton. 1974. Behavioral, dietary and growth studies of the Russian River and Clear Lake subspecies of Tule Perch (*Hysterocarpus traskii*). Cal/Neva Transactions of the American Fisheries Society.
- Alley, D. W., D. H. Dettman, H. W. Li, and P. R. Moyle. 1977. Habitats of native fishes in the Sacramento River basin. University of California, Davis Institute of Ecology Publication 15: 87-93.
- Alley, D. W. 1977. Significance of microhabitat selection of fishes in a Sierran foothill stream. Cal/Neva Transactions of the American Fishery Society.