

ALEX J. ANDERSON

Associate Engineer, Flow Science Incorporated

Education

M.S. Civil Engineering, Stanford University, 2004

B.S. Civil Engineering, University of Wisconsin-Madison, 2003

Professional Affiliations

American Society of Civil Engineers

Tau Beta Pi

Chi Epsilon

Experience

Since joining Flow Science in 2004, Mr. Anderson has been responsible for the modeling component of several Sacramento-San Joaquin Delta and dilution studies. Mr. Anderson has also performed modeling in support of diffuser design for wastewater and brine discharges.

Mr. Anderson has performed dilution analysis and diffuser design tasks for the construction of a new wastewater diffuser system in the Sacramento River and to evaluate the discharge of reverse osmosis (RO) brines from an existing ocean outfall located in an ecologically sensitive area. His duties included using the EPA dilution model Visual Plumes to analyze diffuser performance, participating in diffuser design discussions, and performing water quality calculations for constituents of concern to support NPDES permitting processes.

Mr. Anderson has implemented the Fischer Delta Model in numerous studies, including a modeling study of the sources of water at various locations in the Delta, work that was used to determine potential changes in water quality in the Delta as a result of new discharges. In addition, Mr. Anderson has used the Fischer Delta Model to simulate the effects of proposed changes in Delta operations. He has also calibrated the Fischer Delta Model to local measurement data and used the resulting calibrated model to simulate water quality under a variety of hydrological conditions.

In addition to the Fischer Delta Model, Mr. Anderson has used the California Department of Water Resources model DSM2 to simulate hydrodynamics and water quality throughout the Delta. His DSM2 results will be used in optimizing the location of a new drinking water intake, balancing construction costs with resulting water quality, and in establishing operating procedures for the new intake.

Mr. Anderson has written Matlab code to analyze the frequency and severity of tidally-driven reverse flows in the Sacramento River at Freeport and to assess resulting water quality impacts from downstream discharges.

Turlock Irrigation District

Timothy J. Ford, Aquatic Biologist

Mr. Ford is an aquatic biologist who has worked with California inland fishes for over 20 years, with particular emphasis on native species, including Chinook salmon. He has worked with species of special concern in streams throughout California. His present position is a joint program with the Modesto Irrigation District focusing on the aquatic resources of the lower Tuolumne River and the San Joaquin River basin. Activities include: 1) planning, coordinating, and conducting the aquatic biology program for Irrigation Districts, 2) implementation of the Don Pedro Project FERC Settlement Agreement, 3) development and implementation of field studies, including agency coordination and consultant direction and supervision, 4) reviewing and advising on river and project operations, 5) compliance with state and federal agencies, 6) preparing and submitting written reports and restoration proposals, and 7) maintaining the Districts' aquatic resource records and files. Mr. Ford is the coordinator for the Tuolumne River Technical Advisory Committee and is a technical representative in the VAMP/San Joaquin River Agreement process.

Education

B.S. University of California, Davis; Wildlife and Fisheries Biology, 1977.

Course work in U.C. Davis Ecology M.S. program, 1977-78

A.A. Modesto Junior College; Biological Science, 1975.

Professional Experience

Mr. Ford has worked on the lower San Joaquin River system for Turlock Irrigation District since 1981. He has been involved in a variety of aquatic biology investigations focusing on fishes of the Tuolumne and San Joaquin Rivers. These have included 1) salmon escapement, spawning, fry/juvenile distribution, survival, outmigration, predation, feeding, growth, 2) instream flow and temperature evaluations, 3) gravel and other habitat studies, and 4) habitat restoration projects. He has overseen consultant activities since 1987.

Prior positions held are:

Fishery Biologist, Don Pedro Recreation Agency, CA
MAR-SEP1981

Biological Technician, Stanislaus National Forest, CA
JUN-SEP1980 – Stream and aquatic surveys

Fisheries Research Assistant, University of California, Davis
MAR1979-MAR1980 – Various field and lab studies

Biological Technician, Tahoe National Forest, CA
JUN-SEP1978 – Stream and aquatic surveys

Seasonal Aide, California Dept. of Fish and Game

NOV1977-MAR1978 – Special status fish species
Biological Technician, Modoc National Forest, CA
JUL-NOV1977 – Field surveys and Modoc sucker status report
Biological Technician, Angeles National Forest, CA
JUN-SEP1975; JUN-SEP1976 – Stream and aquatic surveys

Professional Affiliations/Memberships

American Fisheries Society
Society for Conservation Biology
Western Section of the Wildlife Society

Publications

Mr. Ford has authored several research documents and compliance reports. A list of reports is available on request.

Publications include:

Brown LR, and Ford T. 2002. Effects of flow on the fish communities of a regulated California river: implications for managing native fishes. *River Research and Applications* **18**: 331-342

Ford T, and Brown LR. 2001. Distribution and abundance of Chinook salmon and resident fishes of the lower Tuolumne River, California. In *Contributions to the biology of Central Valley salmonids*, R. Brown (ed.) Fish Bulletin 179. California Department of Fish and Game: Sacramento, California; 253-304.

ERICSON JOHN LIST

President and Principal Consultant, Flow Science Incorporated and *Emeritus* Professor of Environmental Engineering Science, California Institute of Technology, Pasadena, California.

Years of Experience

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Education

Ph.D. Applied Mechanics and Mathematics - California Institute of Technology, 1965

M.E. - University of Auckland, New Zealand, 1962

B.Sc. Mathematics - University of Auckland, New Zealand, 1962

B.E. (First Class) - University of Auckland, New Zealand, 1961

Professional Affiliations

Professional Civil Engineer in the States of California (C 36791), South Carolina (20646) Florida (57786), North Carolina (027270), Nevada (015627), Georgia (028604)

Fellow of American Society of Civil Engineers

Consulting Engineers and Land Surveyors of California

National Science Foundation Award for Special Creativity, 1982

Who's Who in America and Who's Who in Engineering

Key Qualifications

Dr. List was Professor of Environmental Engineering Science at the California Institute of Technology between 1969 and 1997. He joined the faculty at Caltech in 1969 as an Assistant Professor, after spending three years as a lecturer and senior lecturer at the University of Auckland. For the period of 1980-1985, he was Executive Officer of Environmental Engineering Science at Caltech. He also held the position of editor of the *Journal of Hydraulic Engineering*, American Society of Civil Engineers, from 1984 to 1989.

Related Experience

Professor List has consulted with more than 600 industrial organizations, consulting engineers and governmental agencies, including Southern California Edison, Chevron, IBM Corporation, Exxon, Zeneca, City and County of San Francisco, City of Los Angeles, City of Seattle, City of San Diego, City and County of Honolulu, Southern California Metropolitan Water District, Southern Nevada Water Agency, Los Angeles and Orange County Sanitation Districts. He has authored reports in the following areas of work: brine disposal, coastal ocean mixing, ICP-MS tracer analysis, power plant cooling systems, wastewater diffusers, dredge spoil disposal, river dispersion, reservoir modeling, reservoir destratification and mixing, well testing, renovation and failure analysis, pulsation control and waterhammer protection, pipeline failure, groundwater mass balance, pump wetwell design, acoustic resonance in piping systems, particle coagulation and sedimentation, fate and transport of DDT, arsenic, chromium and perchlorate.

Professor List is co-author of the texts *Mixing in Inland and Coastal Waters* (Academic Press, 1979), *Turbulent Buoyant Jets and Plumes* (Pergamon Press, 1983), and *Handbook of Ground Water Development* (Wiley, 1990). He is the author or co-author of 40 scientific publications. Since its establishment in 1983 by Dr. List, Flow Science Incorporated has successfully completed more than 700 contracts.

SUSAN C. PAULSEN

Vice President and Senior Scientist, Flow Science Incorporated

Years of Experience

14

Education

B.S. – Civil Engineering (with honors), Stanford University, 1990

M.S. – Civil Engineering, California Institute of Technology, 1993

Ph.D. – Environmental Engineering Science, California Institute of Technology, 1997

Professional Affiliations

Registered Professional Engineer in California C66554

Key Qualifications

Dr. Paulsen has been employed at Flow Science since 1997, where she has project responsibility for work involving environmental fate and transport. Dr. Paulsen has particular expertise in the analysis of fate, transport, and water quality in estuarine systems, including the San Francisco Bay-Delta system, where she developed a unique fingerprinting method for the analysis of mixing patterns and the sources of salinity in the Delta. At Flow Science she has been involved in projects combining hydrodynamics, aquatic chemistry, and the environmental fate of various constituents.

Experience

Dr. Paulsen has designed and implemented field studies in reservoir, river, estuarine, and ocean environments using both dye and elemental tracers to evaluate the impact of treated wastewater, thermal, and agricultural discharges on receiving waters and drinking water intakes. Dr. Paulsen has expertise designing and managing modeling studies to evaluate transport and mixing, including the siting and design of diffusers, and she has conducted water quality analyses for storm water runoff, NPDES permitting, irrigation, and wastewater and industrial process water treatment facilities.

Dr. Paulsen recently designed a study utilizing the Fischer Delta Model (FDM), three-dimensional CFD modeling, longitudinal dispersion modeling, and Monte Carlo modeling to evaluate water quality impacts of a major treated wastewater discharge to a tidally-driven river. She has designed and implemented tracer and/or modeling studies for a number of agencies including Contra Costa Water District, CALFED, DWR, and the Sacramento Regional County Sanitation District. Dr. Paulsen has also managed and designed studies to investigate the disposal of brines from salt production and reverse osmosis (RO) facilities, and she has participated in several intensive multi-disciplinary studies of the fate and transport of both organic and inorganic pollutants, including DDT, copper, and selenium, in surface and ground waters and sediments.

Dr. Paulsen has extensive expertise with water quality regulation in California and served as primary author for a comprehensive review of the administrative record of the Los Angeles Basin Plan. She has worked on temperature compliance models, NPDES permitting, permit compliance, master planning and EIR/EIS processes, and TMDL development. Dr. Paulsen has also provided testimony to the California State Water Resources Control Board and Regional Boards in water rights and permitting issues, has spoken extensively on regulatory issues, and currently serves on the State Board's Sediment Quality Objective Advisory Committee.

SUSAN C. PAULSEN

Vice President and Senior Scientist, Flow Science Incorporated
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Phone: (626) 304-1134 Fax: (626) 304-9427

Email: spaulsen@flowscience.com

EDUCATION

- Ph.D., Environmental Engineering Science** 6/97
California Institute of Technology, Pasadena, California
Thesis: A Study of the Mixing in Natural Waters Using ICP-MS and the Elemental Composition of Waters
Advisor: Dr. E. John List
- M.S., Civil Engineering** 6/93
California Institute of Technology, Pasadena, California
- B.S., Civil Engineering** (Environment and Water Studies) with Distinction 12/90
Stanford University, Stanford, California.

PROFESSIONAL AFFILIATIONS

Registered Professional Civil Engineer in California, C66554; American Society of Civil Engineers (ASCE);
National Ground Water Association; American Water Resources Association

PROFESSIONAL EXPERIENCE

Senior Scientist, Flow Science Incorporated; Pasadena, California.

- Provided litigation support for major Superfund-related projects involving analysis of fate and transport of chemical compounds; evaluated sampling programs and possible remedial measures
- Provided technical analysis and testimony in support of NPDES permits, permit appeals, TMDL processes, and water quality regulation
- Conducted analyses relating to water flow, water quality, and mixing patterns and conducted field studies in the San Francisco Bay-Delta estuary
- Designed and implemented modeling and field studies in reservoir, river, estuarine, and ocean environments using both dye and elemental tracers to evaluate the impacts of treated wastewater, agricultural, and industrial discharges on receiving waters and drinking water intakes
- Participated in an intensive study of the mixing of copper in the upper Sacramento River
- Authored a review of the Administrative Record of the Los Angeles Basin Plan
- Provided technical support and policy analysis in the development of sediment quality objectives, storm water policy, TMDL and listing policies, and water quality and water rights issues

Consultant to Flow Science Incorporated; Pasadena, California.

- Analyzed samples collected in the Napa River estuary to determine tidal flushing based upon water signatures; analysis resulted in conversion of 16,000 acres to wetland habitat
- Assisted the development and successful implementation of a plan to add a rare earth tracer to a major drinking water reservoir to determine mixing and residence times
- Assisted the development and implementation of a program to analyze samples and add a tracer to a major California river to determine the impact of acid mine drainage
- Field tested a new method for removal of bacteria-induced iron oxide precipitates in groundwater wells
- Participated in the implementation of a program of tracer addition, field sampling, and analysis to determine tidal mixing and dilution of a wastewater effluent in the San Joaquin Delta

Staff Engineer, Dames & Moore; San Francisco, California.

Conducted hydraulic and hydrologic analyses and assisted design for water development projects; conducted water quality analyses for stormwater runoff, NPDES permitting, irrigation, and wastewater and industrial process water treatment facilities; provided design, cost estimate, and construction management services for remedial measures for reservoirs and a Superfund site.

RESEARCH EXPERIENCE

Ph.D. Thesis research; California Institute of Technology, Pasadena, CA.

The goal of this work was to delineate the distribution of chemical constituents and flow patterns in natural waters to understand and solve specific environmental problems. Conducted extensive sample collection within the San Francisco Bay-Delta System and within the streams and ocean of Oahu, with sample analysis by ICP-MS; established the elemental "signatures" of sources, selected tracers based upon conservative mixing demonstrated by laboratory and field work, and determined temporal and spatial variation of tracers.

Research Engineer, Fraunhofer Institute for Atmospheric Environmental Research; Garmisch-Partenkirchen, Germany (West).

Researched, designed, and fabricated apparatus to sample, record, and analyze effects of pollutants in the ecosystem; designed and fabricated a chamber to control and measure the effects of plant exposure to atmospheric contaminants.

TEACHING EXPERIENCE

Teaching Assistant, California Institute of Technology, Pasadena, California.

Hydrologic Transport Processes. Delivered occasional lectures and conducted review sessions, provided individual instruction, graded problem sets and examinations.
Fluid Mechanics. Prepared materials, designed and conducted laboratory demonstrations, provided individual instruction, and graded problem sets for graduate level course.

Instructor, ASCE High School Outreach Program; San Francisco, California.

Designed and taught a four-day interactive water resources unit to high school students.

Instructor, Technical Communications Program; Stanford University, Stanford, California.

Taught public speaking course oriented toward professional speaking situations; lectured, demonstrated speaking styles, provided individual instruction, evaluated student speeches.

HONORS

Walter L. and Reta Mae Moore Fellowship (California Institute of Technology)

Earle C. Anthony Graduate Fellowship (California Institute of Technology)

Krupp Scholarship in Engineering (Germany)

SELECTED PUBLICATIONS AND PRESENTATIONS

Paulsen, S.C., E.J. List, and P.H. Santschi. Modeling variability in ^{210}Pb and sediment fluxes near the Whites Point Outfalls, Palos Verdes Shelf, California. *Environmental Science & Technology* 33:3077-3085, 1999.

Paulsen, S.C., E.J. List, and P.H. Santschi. Comment on "In situ measurements of chlorinated hydrocarbons off the Palos Verdes Peninsula, California." *Environmental Science & Technology* 33:3927-3928, 1999.

Paulsen, S. C. and E. J. List. A study of transport and mixing in natural waters using ICP-MS:

Water-particle interactions. *Water, Air, and Soil Pollution* 99:149-156, 1997.

Paulsen, S. C. and E. J. List. Tracing discharges in ocean environments using a rare earth tracer.
Presented at the 27th IAHR Congress, August 1997, San Francisco, California.

Paulsen, S. C. and E. J. List. Delineation of estuarine mixing using elemental tracers and numerical modeling. In review.

Paulsen, S.C. A Study of the Mixing of Natural Flows Using ICP-MS and the Elemental Compositions of water. Ph.D. thesis, California Institute of Technology, 1997.

JODY BRAUNER-LANDO, Ph.D., Quantitative Ecologist

Professional Experience

Dr. Jody Brauner-Lando joined S.P. Cramer and Associates, Inc. in 2004 after completing her Ph.D. in Aquatic and Fisheries Science from the University of Washington. Jody's background reflects a mix of technical field experience, outstanding scholastic achievement and fresh training in leading-edge scientific methods and technologies. She has over 8 years of experience working for private sector consultants on the West Coast of the United States and Papua, New Guinea.

Jody's experience includes conducting and managing large-scale ecological risk assessments in accordance with CERCLA, ESA, and NEPA requirements. Jody also developed an age-structured, spatially explicit Chinook salmon habitat model in the Green River, WA. She has investigated the effects of epistemic uncertainties (model, process, observation, parameter and prediction) in wood recruitment, pool formation and fish habitat models in the Pacific Northwest. She has also managed and conducted water, sediment, soil and benthic invertebrate sampling, wetland delineations, riparian vegetation and stream monitoring surveys.

Education

- 2004 Ph.D. Aquatic and Fishery Sciences, University of Washington.
- 2004 M.S. Quantitative Ecology & Resource Management, University of Washington.
- 1998 M.S. Environmental Science and Management/Biogeochemistry, University of California, Santa Barbara.
- 1992 B.S. Ecology, Behavior and Evolution, University of California, San Diego.

Employment History

- Quantitative Ecologist, S.P. Cramer and Associates, Inc., 2004-Present.
- University of Washington, Seattle, WA. 1998 – 2004.
- URS Corporation. Portland, OR and Seattle, WA. 1997- 2003.
- La Cumbre Mutual Water Company, Hope Ranch, CA. 1997.
- PRC EMI/Tetra Tech EMI, San Francisco, CA and Portland, OR. 1992-1996.

BRIAN PYPYER, Senior Consultant and Biometrician

Professional Experience

Brian Pyper recently joined S.P. Cramer & Associates in 2004. Brian has extensive experience developing statistical methods for analyzing fisheries data; examining management implications of patterns of variation and uncertainties in models/data; and formulating appropriate experimental designs and monitoring programs. Brian is completing his dissertation in Fisheries Management at the University of Alaska

Fairbanks. Brian's thesis research has focused on simulation of the utility of state-space (Kalman filter) models and Bayesian decision analysis for tracking productivity changes and selecting escapement goals for Pacific salmon.

Prior to his Ph.D. program, Brian worked with Dr. Randall Peterman at Simon Fraser University conducting research in quantitative fisheries ecology and management. Brian's research focused on examining spatial/temporal variation in survival, size, and age at maturity of salmon species, with emphasis on applying advanced quantitative tools in simulation and empirical analyses. He gained broad experience in the theory and application of standard stock-assessment methods, multivariate statistics, time-series analysis, Bayesian statistics, risk/decision analysis, re-sampling methods, capture-recapture analysis, and experimental design.

At ESSA Technologies Ltd., Brian worked on a team project developing a comprehensive database and set of data-manuals for the Department of Fisheries and Oceans to be used in Treaty Negotiations with First Nations. Brian's experiences as a statistical consultant have also included numerous analyses of tagging experiments, population models, and enhancement projects for salmon and other fish species.

Education

- 2001–Present Ph.D. candidate, Fisheries Management, University of Alaska, Fairbanks.
- 1996 M.S. Natural Resource Management, Simon Fraser University.
- 1991 B.S. Ecology, University of British Columbia.

Employment History

- Senior Consultant & Biometrician, S.P. Cramer & Associates, 2004 – Present.
- Research Assistant for Dr. Randall Peterman, Simon Fraser University, Burnaby, B.C, 1996-2001.
- Statistical Consultant for the Department of Fisheries and Oceans (DFO), Vancouver, B.C, 1995–1997.
- Research Assistant, ESSA Technologies Ltd., Vancouver, B.C, 1995.
- Co-op Student, Salmon Enhancement Program, DFO, Vancouver, B.C, 1994.

MICHELE L. SIMPSON, Fisheries Biologist

Professional Experience

Michele rejoined S.P. Cramer & Associates in 2002 after working as a fisheries biologist for both the U.S. Bureau of Reclamation and NOAA Fisheries. She received her Master's degree in Biology in 1997. She specializes in Endangered Species Act issues regarding salmonid populations in California including effects analyses of projects potentially affecting listed salmonids including reservoir management, unscreened diversions, fish passage barriers/impediments, and habitat restoration.

Michele currently conducts data analyses and report preparation and review of SPC&A monitoring projects within the Central Valley. In addition, she collaborates extensively with state, federal, and local government agency representatives; landowners, and other interested groups regarding fisheries management issues.

Education

- 1997 M.S. Biology and Independent Research, California State University, Chico.
- 1992 B.S. Biology, California State University, Sacramento.

Employment History

- Fisheries Biologist, S.P. Cramer and Associates, Inc., 2002-Present.
- Fisheries Biologist, U.S. Bureau of Reclamation. 2000-2002.
- Fisheries Biologist, National Marine Fisheries Service. 1998-2000.
- Molecular Ecology GAANN Fellow, Worcester Polytechnic Institute. 1996-1998.
- Fisheries Technician, Hanson Environmental, Inc. 1995.
- Fisheries Technician, S.P. Cramer & Associates, Inc. 1992-1994.

ANDREA N. FULLER, Fisheries Biologist

Professional Experience

Andrea Fuller joined S.P. Cramer & Associates in 1995 assisting in the coordination of field research activities on the Stanislaus River and other tributaries to the San Joaquin River which has required considerable networking and coordination with state, federal and local government personnel, private consultants, landowners and recreational groups. Andrea has extensive field experience including deploying and monitoring rotary screw traps, mobile and fixed station radio tracking, net sampling, electrofishing, experimental release marking techniques in the San Joaquin River Basin. Andrea regularly participates in several technical groups including the Stanislaus River Fish Group, VAMP biology technical team, and the Interagency Ecological Program Salmon Escapement Project Work Team. Andrea's recent experience includes development of technical reports for Stanislaus and Tuolumne River salmonid outmigrant monitoring efforts, and assistance with the development of the "Summary of Fisheries Research in the Lower Stanislaus River".

Education

- Biological Science, California State University, Stanislaus.
- Modesto Junior College: Undergraduate general education, with emphasis in biological and environmental sciences.

Employment History

- Fisheries Biologist, S.P. Cramer & Associates, 2000-Present.
- Fisheries Technician, S.P. Cramer & Associates, 1995-2000.

DANIEL B. STEINER
CONSULTING ENGINEER

RESUME

Mr. Steiner is a registered Civil Engineer with 28 years of experience in water resources planning, development and management, including operations planning for multipurpose water systems which have water and power supply, flood control, recreation, fishery and wildlife enhancement and water quality objectives. He also provides analyses of water rights, contractual and court decreed entitlements, and project operation requirements to develop water availability assessments. He has significant experience working within interdisciplinary teams in the formulation and execution of operation plans for major multi-purpose water projects.

PROFESSIONAL HISTORY

Self-employed: Daniel B. Steiner, Consulting Engineer
Bookman-Edmonston Engineering, Inc., 1991-1993
Resource Management International, Inc., 1983 to 1991
U.S. Bureau of Reclamation, 1977 to 1983

REGISTRATION AND EDUCATION

Registered Civil Engineer, California
B.S., Civil Engineering, University of California, Davis, 1977

REPRESENTATIVE EXPERIENCE

Assisted with the development of a hydrologic database for the San Joaquin Valley for implementation into the CALSIM II State-wide simulation model. The effort included research and development of a long-term hydrologic record of streamflows, depletions and accretions. The effort also developed the depiction of current water project operations throughout the Valley. The operations include considerations for water supply, power generation, flood control, water quality and fisheries. The result of the effort is being used within on-going State-wide water modeling and planning.

Assisted with the formulation and documentation of hydro-generation system operation analyses for the Upper American River Project of the Sacramento Municipal Utility District. Assistance included the preparation of model documentation and the presentation of analyses results during public workshops.

Assisted with the formulation and analysis of opportunities to exchange water from the State Water Project into the Kings River Water Association service area for water originating from the Kings River. The exchange has an objective to improve the quality of water delivered to Southern California. Other aspects of the project included flood control, and water supply for environmental enhancement purposes. Assistance included the formulation and development of a model to simulate the operation of the exchange, assuming existing conveyance systems and proposed new storage and conveyance systems.

Directed and performed the hydrologic analyses for the development of water supply alternatives for use in the restoration of habitat in the San Joaquin River. The analyses included the formulation of water supply and management alternatives and the development of models for their evaluation. The scope of the analyses incorporated water conveyance and storage opportunities within the San Joaquin Valley, with an objective to develop water for the restoration of the San Joaquin River below Friant Dam while maintaining diversions to the Friant Division of the Central Valley Project.

Assisted with the development of a system operation planning model for the Marin Municipal Water District. This effort included direct interaction with District staff and its Board of Directors in formulating a model that could simulate the operations of the existing system, and proposed changes to that system in terms of contracted purchases and a potential desalination plant. The current operational criteria and objectives of the system were incorporated into the model to provide a simulation of operations over various hydrologic sequences. Modified criteria were developed to simulate potential operations with changes in assumptions for the availability of water supply resources.

Assisting with the annual transfer of water from members of the San Joaquin River Exchange Contractors Water Authority to various Central Valley Project water users within the San Joaquin Valley. During this process assistance was provided with the development of the hydrologic analysis for the program's Environmental Assessment and Initial Study. Also assisted with the development of an EIR/EIS for the transfers. Assistance was provided for the development of monitoring and reporting protocols to document the transfers. Currently providing an on-going evaluation and reporting function on behalf of the Authority.

Assisted the South San Joaquin Irrigation District in developing a water sales arrangement with several municipal water entities within the San Joaquin Valley. The project involves the development of a surface water treatment plant to deliver water that has previously been used for irrigation purposes. The assistance included performing analyses of Stanislaus River operations considering the proposed project, and has involved working with the Bureau of Reclamation in identifying potential hydrologic impacts.

Participated in the California State Water Resources Control Board hearing process regarding the implementation of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. On behalf of the City and County of San Francisco and other major water right holders in the San Joaquin Valley, provided analyses and testimony regarding alternative methods of implementing the Water Quality Control Plan. The analyses included the determination of anticipated water supply impacts to various water right holders under different theories of responsibility. Parallel to the Bay-Delta hearing process, participated in the scoping and development of the environmental documentation of an implementation plan by the State Board, including the development of comments to the State Board's Environmental Impact Statement.

Concurrent with the implementation process of the 1995 Water Quality Control Plan, participated in the development of an implementation plan for the San Joaquin River portion of the Water Quality Control Plan. Assistance included technical analyses that supported the negotiation and development of the San Joaquin River Agreement, which incorporates a plan for improving fishery and water quality conditions in the San Joaquin River. Those analyses evaluated viable water project operation alternatives for the Stanislaus, Tuolumne, Merced and San Joaquin rivers. Subsequently developed and performed the hydrologic analyses that were incorporated into the environmental documentation for the agreement.

Participated in the technical and regulatory forums leading up to the issuance of State Water Resources Control Board Orders for the interim implementation of the 1995 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary. On behalf of the City and County of San Francisco, provided technical review, analyses and testimony regarding the technical basis of proposed water quality and biological standards and their potential effects to water supplies. Participation in this effort included working within numerous technical and policy groups which were comprised of water supply, public agency and environmental interests. Represented the City during the negotiation of the water quality standards and principles included in the December 15, 1994 "Principles for Agreement on Bay-Delta Standards Between the State of California and the Federal Government."

Participating as a representative of the San Joaquin River Group Authority within the CalFed Operations Coordination Group. This activity concerns the discussion and coordination of water operations within the Bay-Delta watershed to enhance water supply and ecological benefits, and accomplishing the principles set forth in the December 15, 1994, Principles for Agreement, the objectives of the 1995 Water Quality Control Plan, and various Endangered Species Act requirements. Currently providing on-going assistance with the implementation of the San Joaquin River Agreement, and the monitoring and reporting the agreement's affect on Central Valley Project and State Water Project operations.

Assisted with the preparation and update of the Urban Water Management Plan report for the City and County of San Francisco. This report to the California legislature includes identification of the City's water supplies and demands, conservation efforts and a plan of operation during drought. In support of this report, directed the development of an end-use water demand forecast model that incorporates factors that represent water conservation programs.

Provided peer review on a proposed groundwater aquifer storage and recovery project in Sacramento County. On behalf of Sacramento County, the project proponent's water demand and water supply concept were reviewed. The water supply concept involved the storage of surface water in a groundwater basin to meet within-year and year-to-year demands, and the intensive management and use of reclaimed water. Assistance was provided to the County with the development of project operation requirements and mitigation measures.

Assisted the Klamath Water Users Association evaluate the potential impact of a proposed operation plan for the Klamath River Project upon water deliveries to its members. The analysis identified conflicts between water deliveries and proposed project operations for Endangered Species Act requirements.

Responsible for the development and performance of technical analyses to determine the yield of the water supply of the City and County of San Francisco. These analyses include evaluation of surface water hydrology and contractual, legislated and water rights entitlements, and the development of operational criteria for a water supply system that provides water to over 2.3 million people. Recent investigations include opportunities to enhance dry-year water supply reliability with the development of reservoir and groundwater storage in the Bay Area, and the exercise of water purchase opportunities.

Participated in the negotiation of a settlement agreement concerning water diversions within the Tuolumne River basin and the mitigation of impacts to the lower Tuolumne River. As the result of a Federal Energy Regulatory Commission evaluation of the New Don Pedro Project, an agreement was reached among water users, resource agencies and environmental and recreation interests for instream flows and non-flow programs for the lower Tuolumne River. Participated as a representative of the City and County of San Francisco in this forum which included the negotiation of an agreement to mitigate potential water supply impacts to the City.

Participated in the review of the Programmatic Environmental Impact Statement and implementation plan for the Central Valley Project Improvement Act. On behalf of the City and County of San Francisco, in collaboration with other urban water agencies, provided technical review of the alternatives being considered for evaluation and implementation. Reviews and comments were provided regarding development of the Anadromous Fish Restoration Program, water transfers and dedicated use of Central Valley Project water supplies for fish and wildlife purposes.

Participated in the Sacramento Area Water Forum process which developed an area-wide water plan that will provide a safe, reliable, and environmentally sound water supply to meet the needs of the Sacramento area community. On behalf of the City of Sacramento, and as a consultant to the Forum's staff, provided assistance with the development of alternative solutions for the allocation and management of Sacramento area water supplies among consumptive uses and environmental purposes. Provided assistance with the development of a flow management plan for the American River.

Responsible for the formulation and development of the water demand and supply analysis to support the combined EIS/EIR for the implementation of Public Law 101-514 which provides for a Central Valley Project water supply contract to the Sacramento County Water Agency and the San Juan Water District. Responsible for the development of the analysis which evaluated water delivery alternatives associated with the water supply contracts, including the formulation of hydrologic and operational assumptions for surface water diversions from alternative sites along the American and Sacramento rivers.

Responsible for the development of a statement of need and purpose for an expansion of the City of Sacramento's water supply system. Also developed the analysis of alternatives to be included in the investigation supporting the EIR for the expansion project. The alternatives included alternative diversion locations for the City's water rights and entitlements, and alternative management of the diversions through conjunctive use opportunities.

Responsible for the development of a water system master plan for the City of Patterson, California, including the evaluation of infrastructure required to integrate groundwater and surface water supply sources. Strategies to acquire a surface water supply were also investigated as part of the planning process.

Researched the water rights affecting the availability of water, and provided an assessment of the conformance of water use to those rights for the Wild Horse Sanctuary, Shasta County, California.

Responsible for the development of a water management investigation for Sacramento County, including testimony to the State Water Resources Control Board and the State Superior Court regarding competing uses of water from the American River, California. Alternative operations procedures were developed to accommodate the competing demands of water supply, power generation, flood control, fish and wildlife, and recreation. Extensive interaction was required with biological consultants during the formulation of the alternative operation procedures.

Analyzed hydrologic and hydraulic conditions that led to flooding events in Sacramento, El Dorado, Placer, Napa and Yolo Counties. Evaluations included the review of drainage design plans and hydro-meteorological data, and computer modeling of hydrologic and hydraulic phenomena. Stream channels and urban drainage systems were analyzed.

Developed operation simulation models for projects incorporating water and hydroelectric attributes at both existing and proposed facilities. The models facilitated the review of alternative project features and operational variations. Over 25 hydroelectric projects throughout the western United States were evaluated with those models, including run of river projects and reservoir systems.

Directed the operation of Central Valley Project facilities in California, including Trinity, Shasta, Folsom, New Melones, Millerton and San Luis Reservoirs and associated water conveyance facilities. These operations required the satisfaction of water quality objectives for the Sacramento-San Joaquin Delta and flood control requirements for project facilities.

Developed and performed forecasts of Central Valley Project operations. These forecasts included the estimation of stream runoff and diversion demands, and were applied on a daily and annual basis.

Coordinated daily Central Valley Project operations with State Water Project operations in accordance with the Coordinated Operations Agreement which is a State-Federal agreement that specifies the availability of water to each project and responsibility for meeting water quality objectives.

Developed and presented testimony before the California State Water Resources Control Board regarding water availability from the Central Valley Project.

DAGMAR RUTH SUNDERMEYER

aquatic ecology
ESA compliance and consultation
fish biology
habitat assessments
habitat mapping
NEPA compliance

EDUCATION

San Jose State University, M.S. Conservation Biology, 1999
University of Connecticut, B.A. Communications, Psychology Minor, 1973
University of California, Davis, Extension class, Special Status Amphibians and Reptiles of Northern California, Summer 2004
University of California, Irvine, Extension class in Environmental Planning, Fall 1992

PROFESSIONAL HISTORY

ENTRIX, Inc., Project Scientist, 1999 to date
San Jose State University, graduate student, MS Organismal Biology, Conservation and Ecology, 1993 to 1999
Hopkins Marine Station, laboratory assistant to Dr. Jennifer Nielsen, 1996 to 1998
San Jose State University, laboratory assistant to Dr. Chris Brinegar, 1995 to 1996
Freelance writer/editor, 1991 to 1994
Connecticut Public Television, Producer/Director, 1976 to 1991

REPRESENTATIVE EXPERIENCE

Ms. Sundermeyer has produced Federal ESA Section 7 biological assessments and NEPA environmental assessments for endangered and threatened fish species in California and Nevada. She has developed ESA Section 7 biological assessments for estuary management programs in California. She has coordinated with federal and state agencies on a number of projects, some of which involved recovery planning for salmonids. She has conducted literature reviews for, evaluated, and incorporated genetic research into, ESA Section 7 consultation documents.

She has conducted biological sampling and mitigation monitoring. She is familiar with a wide variety of fish sampling techniques, including electrofishing, beach seining, snorkeling, trapping, radio telemetry, and the use of various instruments to measure flow and water quality. She has participated in snorkel surveys for habitat suitability verification for IFM studies and mollusk surveys in the Sierras. She has led habitat-typing surveys for salmonids. She has conducted US Fish and Wildlife protocol surveys for California red-legged frog, and also has conducted surveys for foothill yellow-legged frog and western pond turtle.

As a producer/director for Connecticut Public Television, she produced documentaries on various marine topics, including estuary management (Long Island Sound), fishing gear conflict, ocean dumping, and lobsters. For her M.S. thesis at San Jose State University, she conducted a microsatellite DNA investigation on steelhead population structure in the Pajaro River in California.

DAGMAR RUTH SUNDERMEYER

RELEVANT EXPERIENCE

ESA SECTION 7 CONSULTATION, RUSSIAN RIVER, SONOMA AND MENDOCINO COUNTIES, CALIFORNIA

A Section 7 consultation is being conducted to evaluate Sonoma County Water Agency and USACE project operations effects on coho salmon, steelhead, and Chinook salmon in the Russian River. Project operations evaluated include flood control, water management, estuary management, channel maintenance, restoration and conservation actions, and hatchery operations. Ms. Sundermeyer is the assistant project manager, and one of several report authors for documents produced for this consultation, some of which evaluated management of the Russian River Estuary. Interim reports that evaluated the effects of baseline operations were presented to resource agencies and the public. Ms. Sundermeyer has coordinated with state and federal agency biologists to develop alternative project operations. To evaluate hatchery operations, Ms. Sundermeyer worked with subconsultant FishPro, Inc. and coordinated with the California Department of Fish and Game to produce a benefit/risk analysis, a monitoring and evaluation plan, and Hatchery and Genetic Management Plans (HGMPs) for steelhead and coho salmon.

SALINAS RIVER AND CARMEL RIVER ESA SECTION 7 CONSULTATION, MONTEREY, CA

Ms. Sundermeyer was one of the authors of biological assessments that evaluated the effects of artificial sandbar breaching programs on steelhead habitat in the Carmel and Salinas river basins. She also assisted the Monterey County Water Resources Agency with a Section 7 consultation for the Salinas Valley Water Project.

DERBY DAM ESA SECTION 7 CONSULTATION AND NEPA ENVIRONMENTAL ASSESSMENT, NEVADA

Ms. Sundermeyer wrote a biological assessment for the Bureau of Reclamation to assess the effects of a fish passage project in the Truckee River on Federal ESA listed species cui-ui and Lahontan cutthroat trout. She also evaluated project effects on aquatic resources for a NEPA environmental assessment.

WALKER LAKE, NEVADA

Ms. Sundermeyer has developed conservation recommendations and biology reports for the Walker River Irrigation District related to the ecology of Walker Lake, Nevada. Work has focused on TDS levels and their effects on Lahontan cutthroat trout and tui-chub.

STATE ROUTE 4 GAP CLOSURE PROJECT MONITORING, CONTRA COSTA, CA

Ms. Sundermeyer participated in construction monitoring for widening and realigning a portion of State Route 4 in western Contra Costa County. A mitigation and monitoring program was developed to reduce significant impacts to biological resources from this project. Ms. Sundermeyer has led surveys for California red-legged frogs and western pond turtles in recent years of the mitigation monitoring program and reported findings.

FERC HYDROELECTRIC RELICENSING

A multiyear series of studies was conducted to support a FERC alternative licensing process for the Southern California Edison (SCE) Big Creek hydroelectric project. Ms. Sundermeyer participated in several components of this effort. She wrote technical study reports that evaluated fish habitat, water temperature, fish populations, passage barriers, effects on anadromous fish species in the San Joaquin River, and mollusk species with cultural significance. She also is developing a Native Aquatic Species Management Plan for the Big Creek 4 Project

DAGMAR RUTH SUNDERMEYER

area on the San Joaquin River, which will be used as part of an adaptive management program for native transition zone species such as hardhead, foothill yellow-legged frog and Western pond turtle.

ENRIX, Inc. assessed the effects of Pacific Gas and Electric's (PG&E) Kilarc-Cow hydroelectric projects on fish and wildlife species in Shasta County California. Ms. Sundermeyer led surveys in project-affected reaches for foothill yellow-legged frogs, conducted a habitat assessment for California red-legged frog, and reported findings.

HABITAT MAPPING, SANTA CLARA COUNTY, CA

ENRIX, Inc. conducted habitat mapping for the Santa Clara Valley Water District to characterize salmonid habitat in project-affected streams. Ms. Sundermeyer participated in the field effort and was one of the report authors. Ms. Sundermeyer also conducted habitat mapping surveys for the U.S. Army Corps of Engineers in Llagas Creek, Morgan Hill, CA and reported results.

PROFESSIONAL HISTORY

ENRIX, Inc., Project Scientist/Aquatic Biologist, 2002 to date
ENRIX, Inc., Senior Staff Scientist, 1999 to 2001
Hopkins Marine Station, Laboratory Assistant, 1996-1998
San Jose State University Biology Dept., Laboratory Technician, 1995-1996
Freelance Writer, Editor 1991 to 1994
Connecticut Public Television, Producer/Director, 1976 to 1991

THOMAS L. TAYLOR

fishery biology
aquatic ecology
habitat assessment
resource management
restoration of aquatic systems

EDUCATION

University of California at Davis: M.S. Aquatic Ecology, 1978
California State University at Fresno: B.A. Biology, 1970

CERTIFICATIONS

Certified Fisheries Scientist, American Fisheries Society No. 1911

PROFESSIONAL HISTORY

ENTRIX, Inc., Senior Aquatic Biologist, 1997 to date
Trihey & Associates, Inc., Senior Aquatic Biologist, 1992 to 1997
California Department of Parks and Recreation, Aquatic Biologist, 1982 to 1992
California Department of Fish and Game, Fishery Biologist, 1978 to 1982

REPRESENTATIVE EXPERIENCE

Mr. Taylor has over 25 years experience in fisheries and water resources. His experience includes assessments of water resource projects, fisheries biology, river and wetland restoration, endangered species consultations, and the preparation of expert witness testimony. He has conducted impact assessments, restoration monitoring, watershed assessments and CEQA and NEPA documentation. Mr. Taylor has worked in the Delta throughout his career on fisheries issues as it relates to management of the water in California. He has conducted a variety of work for a broad spectrum of water purveyors around the San Francisco Bay and in the Central Valley. Mr. Taylor has conducted multiple consultations on endangered species including the effects of reservoirs, development projects and ongoing management activities under section 7.

Project Management

Mr. Taylor managed over 21 subcontractors in the development and implementation of restoration plans for Rush Creek. Restoration planning included frequent communication with a restoration technical committee including members from resource agencies and non-governmental organizations. The planning team included other consultants, academics and resource agency representatives. Much of the work was developed and carried out under challenges from some of the participants in the process. Disagreements were resolved through hearings before a Superior Court judge. The restoration approach was based on an evaluation of historical conditions and compared to pre-restoration conditions of the stream flow regime, riparian vegetation and channel morphology by stream reach. Planning and design work typically proceeded on several fronts simultaneously for different reaches or restoration segments.

Mr. Taylor managed a survey of the aquatic resources of six Bay-Area reservoirs for the City and County of San Francisco. The surveys were designed to collect information on fish species distributions, fish populations, water quality, reservoir sediments and the collection of tissue samples for genetic analyses. Tributary streams were also included in the sampling program. The project included field sampling, data collection and analysis and the preparation of reports.

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Mr. Taylor managed a habitat mapping effort for the Santa Clara Valley Water District documenting habitat conditions in over 80 miles of stream channel within the District's jurisdiction. The project included the training and logistical management of 5 habitat-typing crews as well as managing multiple sub-consultants. The scope of work was developed in cooperation with representatives from regulatory agencies, non-governmental organizations and academia, as well as managers from the Santa Clara Valley Water District and their consultant. In spite of a tight schedule and budget, the project was completed successfully.

Mr. Taylor managed a multi-year habitat-based monitoring program for coho salmon and steelhead in Lagunitas Creek. The monitoring was designed to evaluate how summer stream flow conditions and aquatic habitat influenced populations of the juvenile coho salmon (federally threatened Central California Coast Coho ESU) and steelhead (federally threatened Central California Coastal ESU). The sampling program was designed to provide data that was compatible with a long-term data set spanning over 20 years to provide for evaluation of time trends in population changes. Annual monitoring reports were produced describing the status of coho salmon and steelhead in the study area and comparing levels to historic population estimates.

Central Valley and Bay-Delta Experience

Mr. Taylor prepared EA's for the reissuance of Long-Term Water Contracts through the Bureau of Reclamation for the Friant and Cross Valley Canal Units of the Central Valley Project. The EA examined changes to the water use relative to existing contracts, and any changes in water use that may have resulted from re-operation from the sources at Millerton Lake and the Delta. The EA examined the consequences for the San Joaquin River downstream of Friant Dam and affects on the Delta resulting from any change in storage and delivery timing resulting from increased water rates.

Mr. Taylor has provided professional services to the City and County of San Francisco for biological support on their interests in the Bay-Delta Process and as a member of the San Joaquin River Group Authority. Mr. Taylor was an active participant on developing and providing peer review for the Vernalis Adaptive Management Plan. He participated on interagency meetings to address the study design and interacted with agencies to determine the best methods to use hatchery salmon in the study. Mr. Taylor participated in the development of the Newman-Rice model, and assisted in the compilation of some of the data sets used in early version of the model. He participated in numerous workshops at the request of the client, and prepared documents and issues papers on topics ranging from fish hatcheries to fish outmigration studies. Mr. Taylor is also an integral team member of biologists working to develop and implement monitoring of the effectiveness of the 1995 Water Quality Control Plan. He is also participating on this group to respond to issues during the third triennial review of the 1995 WQCP.

Mr. Taylor prepared detailed testimony for a confidential client dealing with water rights and fishery issues in the Delta as part of the Bay-Delta Hearings. Mr. Taylor worked closely with attorneys and other fisheries and hydrologic technical experts to develop testimony, often under very short or often changing deadlines.

Mr. Taylor worked for attorneys representing the Sacramento Valley Water Users to develop testimony addressing the effects on fisheries from water transfers from the Sacramento Basin to the areas south of the Delta. He prepared testimony that examined the effect of water transfers across the Delta on Delta smelt using biological data and hydrodynamic models including DSM2 and the Particle Tracking Model (PTM) to assess individual channel flow characteristics in regard to flow direction and magnitude. These attributes were then evaluated in terms of life stage and location of Delta smelt.

Mr. Taylor participated on one of the first CalFed Integration Panels to determine the allocation of funding for projects submitted for the Category III funding cycle in the summer of 1997. The Integration Panel was provided with technical reviews of all qualifying proposals from the Technical Review Panels. Funding allocations were based upon the merit of the technical review, the importance of the primary stressors and species addressed by the proposal and the geographic region identified in the Request for Proposals. The Integration Panel also considered projects being funded under the Central Valley Project Improvement Act in allocating funds for Category III project proposals. The Integration Panel's recommendations were approved by CalFed management and the Secretary of

THOMAS L. TAYLOR

Resources Agency and resulted in approximately 100 million dollars allocated to projects that were designed to benefit aquatic resources in the Central Valley and Bay-Delta areas.

Endangered Species Coordination and Consultations

Mr. Taylor has conducted multiple consultations for ESA compliance on listed species. He has evaluated several proposed dam management schemes for potential impacts to listed steelhead populations. He has prepared Biological Assessments on coastal stream projects with anadromous fish and on inland river systems.

Mr. Taylor assisted the East Bay Municipal Utilities District (EBMUD) in Section 7 Endangered Species consultations with the National Marine Fisheries Service and U.S. Fish and Wildlife Service for proposed water diversions from the American River downstream of Folsom Dam. He assisted in the preparation of Biological Assessments for steelhead, winter-run Chinook salmon, delta smelt, and Sacramento splittail. The Biological Assessments analyzed the potential effects of two different diversion strategies on water temperature regimes, instream habitat, and the opportunity for entrainment at diversion facilities for each fish species. The analysis included direct project effects as well as cumulative effects with other water diversions in the Sacramento River and the Sacramento-San Joaquin River Delta.

Mr. Taylor played a key role as the Central California Coastal Coordinator for ACWA's response to the proposed listing of steelhead in California. He organized experts knowledgeable about steelhead resources along the Central Coast, oversaw an intensive examination of resource agency file materials and reviewed planting records for streams of interest to water agencies. Mr. Taylor's efforts represented the combined interest of water agencies located along the central coast. The materials were compiled, reviewed and analyzed into a report to be included with similar reports from the entire California coast.

Fish Passage and Dam Seismic Safety

Mr. Taylor prepared an EA for the installation of a fish passage facility at Derby Dam on the Truckee River for the Bureau of Reclamation. The dam presently had no fish passage facilities for cui-ui sucker and Lahontan cutthroat trout, both listed species. Fish passage at the dam allows fish to move upstream to make use of historic spawning habitat presently not accessible to the two fish. The EA evaluated various options of fish passage and examined the consequences of listed species spawning upstream as it related to upstream water users. The water diversion at Derby Dam also required screening to avoid entraining the spawn of those fish that passed the dam.

Mr. Taylor prepared a fisheries analysis for an EIS/EIR for Daguerre Point Dam on the Lower Yuba River to evaluate alternative on three different alternatives to improve fish passage for fall and spring run Chinook salmon and steelhead in this Central Valley river. The project was funded through the Planning and Local Assistance Branch of the Department of Water Resources for the Daguerre Point Dam that is jointly operated by DWR and the Army Corps of Engineers.

Mr. Taylor has helped to develop and evaluate options to address the seismic safety and address fish passage at San Clemente Dam on the Carmel River. The 1921 thin-arch concrete dam has been identified by the Division of Safety of Dams, Department of Water Resources to be seismically unsafe. Mr. Taylor has assisted the California American Water Company, owner of the dam in developing interim operations to comply with the DSOD order to lower the reservoir while protecting the listed steelhead in the Carmel River. Mr. Taylor worked closely with DSOD, NOAA Fisheries, the Army Corps of Engineers, the California Department of Fish and Game and California-American Water Company in developing draw down criteria and in monitoring and reporting on the draw down activities. Mr. Taylor will also be preparing the fisheries analysis for the EIS/EIR to address seismic safety at San Clemente Dam. Alternatives include strengthening the existing dam, removing the dam or lower the crest elevation of the dam.

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Expert Witness Testimony

Mr. Taylor prepared detailed testimony on the habitat use of native delta fishes and how population changes are associated with water development in the Sacramento-San Joaquin Delta. His testimony reviewed the change in distribution and abundance of the different life stages of Delta smelt and related changes to altered hydraulic conditions in the Delta. Mr. Taylor made use of hydrologic models to develop this testimony for clients in the Central Valley. This material was prepared in response to a water rights challenge before the State Water Resources Control Board.

Mr. Taylor development expert witness testimony on the abundance and growth of juvenile steelhead and coho salmon in response to stream flow conditions, turbidity and temperature in a coastal stream. This information was developed in anticipation of the client's filing a petition for reconsideration before the State Water Resources Control Board.

Mr. Taylor provided expert witness testimony regarding the cost of monitoring fish populations, aquatic habitat conditions and riparian vegetation during the interim restoration of Rush and Lee Vining Creeks during hearings before the El Dorado County Superior Court.

PROFESSIONAL TRAINING

1994 "California Wetlands", CLE International
1991 Stream Classification and Restoration, AFS
1991 Stream Classification and Restoration, Dave Rosgen, short course, TRPA
1989 Natural Resource Negotiations, AFS
1989 Time Management, Franklin Institute, AFS
1988 CEQA Update, State of California
1988 Aerial Photography for Resource Managers, UCSB, AFS
1988 Environmental Ethics and Resource Management, Phil Pister, AFS
1987 Wetlands Delineation and Assessment, Terry Huffman, AFS
1986 Hydrology for Biologists, Dr. J. Orsborne, AFS
1986 Project Management, State of California

AFFILIATIONS

American Fisheries Society, Cal-Neva Chapter
 President of Cal-Neva Chapter, 1993
 President-Elect of Cal-Neva Chapter, 1992
 Program Chair for Cal-Neva Chapter Annual Meeting, 1986
 Treasurer, Cal-Neva Chapter, 1982-83
Pacific Fisheries Biologists
Society of Wetland Scientists

DAVID A. VOGEL
Senior Fisheries Scientist
Natural Resource Scientists, Inc.
P.O. Box 1210
Red Bluff, CA 96080
dvogel@resourcescientists.com

Education

M.S., 1979, Natural Resources (Fisheries), University of Michigan
B.S., 1974, Biology, Bowling Green State University

Employment History

- 1973 – 1976 **U.S. Fish and Wildlife Service**; Fisheries Technician; various appointments working on Missouri River reservoir research.
- 1977 – 1978 **National Marine Fisheries Service**; Federal Observer on commercial tuna seining vessels; collected oceanographic data and Marine Mammal Protection Act compliance documentation in the eastern tropical Pacific Ocean.
- 1978 - 1979 **U.S. Fish and Wildlife Service**; Fisheries Biologist; conducted salmon and steelhead population studies and habitat evaluations in Washington state.
- 1979 - 1981 **U.S. Fish and Wildlife Service**; Fisheries Biologist; responsible for fishery management of the 2.2 million-acre Wind River Indian Reservation in Wyoming. Department of Justice expert witness for the Big Horn water rights adjudication.
- 1981 - 1990 **U.S. Fish and Wildlife Service**; Project Leader; designed and conducted salmon and steelhead research projects in northern California, developed measures and programs to restore fish populations and habitat. Graduate of the National Fish and Wildlife Foundation's Upper Level Management Development Program.
- 1990 - 1992 **CH2MHill**; Senior Scientist; worked on a wide variety of aquatic resource issues associated with land and water development.
- 1992 - Present **Natural Resource Scientists, Inc.**; Senior Scientist; working on the resolution of aquatic resource issues associated with water development.

Experience

Dave Vogel has 30 years of experience as a fishery scientist and has worked on Central Valley fishery resource issues for 24 years. He previously worked for the U.S. Government in the U.S. Fish and Wildlife Service's (USFWS) Fishery Research Division and the Fishery Resources Division. He has served as a Principal Investigator and Project Leader on dozens of fishery research projects in the Central Valley and Delta. During the 1980s he was the Project Leader for the USFWS Sacramento Valley Fishery Resource Office. As the USFWS's Principal Scientific Investigator, he designed and implemented dozens of studies on Chinook salmon and steelhead trout in the Sacramento River and its tributaries. He was in charge of anadromous

salmonid fish passage research at Red Bluff Diversion Dam for nearly a decade. He has designed and conducted numerous projects to determine salmonid habitat criteria and population limiting factors and has developed and implemented innovative measures to increase fish populations. He was the principal author of a life history guide for the four runs of Chinook salmon to improve interagency coordination and communication concerning fishery and water resource management. He also assessed techniques to estimate the annual run sizes of the endangered winter Chinook salmon to recommend improved methodologies to enhance population restoration. He was the principal fishery biologist in charge of developing the long-term Biological Assessment for the Central Valley Project. Mr. Vogel also developed the framework for the first winter-run Chinook salmon restoration program and served on the original Winter-run Chinook Salmon Recovery Team. He was a member of the California Salmon Smolt Quality Committee and served as chairman of the Sacramento River Steelhead Trout Technical Committee for eight years. Mr. Vogel has designed and performed field projects in the Delta studying the migratory behavior and movements of juvenile salmon as related to Delta hydrodynamics since 1996. He is currently conducting research projects on anadromous salmonids in the Central Valley on behalf of state and federal agencies and water districts.