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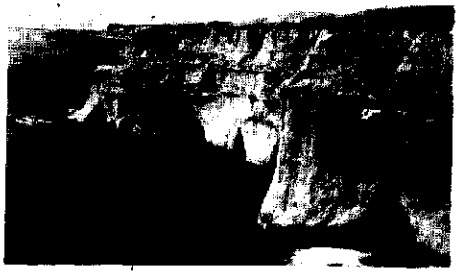
Coastal Advocates
Letter of Inquiry
CALFED Cat. III
S.F. Bay Delta

COASTAL ADVOCATES

~Natural Wonders Need Strong Advocates~



July 25, 1997

Ecosytem Restoration
Projects and Programs, 1997 Category III
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, California 95814

Letter of Inquiry

Coastal Advocates, a non-profit regional conservation project based in Los Gatos, California wishes to submit a formal proposal for funding under the 1997 CALFED Ecosytem Restoration Projects and Programs. Before doing so, we wish to guage the CALFED staff's response to the "general appropriateness of the project concept for Category III funding."[1]

A full proposal would capitalize on three years of Coastal Advocates research into the extent and severity of contamination of major central coastal watersheds by inactive mercury mines. One primary focus for our research and action has been the *Panoche-Silver Creek watershed* which drains through the Panoche pass to the San Joaquin River valley portion of the Bay-Delta. As a consequence of our preliminary investigations of mercury contamination sources in this watershed, Coastal Advocates has prepared and filed a petition for U.S. Environmental Protection Agency action pursuant to CERCLA[2], which petition has been accepted for action.

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[1]CALFED Bay-Delta Program Request for Proposals, at 13, Category III, 1997.

[2]Coastal Advocates April 16, 1996 New Idria Mercury Mine and Mining District: Preliminary Site Evaluation and Request for EPA Action Pursuant to CERCLA.

236 N. Santa Cruz Ave., Suite 241, Los Gatos, Calif. 95030-7261 408-395-9116 ~ Fax: 354-4082 ~ Kathleen Van Velsor, Executive Director
Projects: Ocean Defense Fund, Land Use & Law Project, Wetlands Protection Project, Coast Lectern Series, Trails on the Water Mapping Project.
Coastal Advocates was founded in 1987 to provide research, planning, and advocacy for the protection of coastal resources.

resulting in a July, 1997 Sampling Plan by the SuperFund division of EPA, Region IX, of the New Idria mercury mine and vicinity.

Project Purpose, Compatibility with CALFED priorities, and Goals:

Coastal Advocates has embarked on an parallel effort to document, assess and report on New Idria's downstream water and sediment quality impacts, and to identify opportunities for additional and novel remediation strategies to stimulate aquatic and soils recovery. During a process of initial study, we will participate in CCRMP (citizen-based) efforts at comprehensive watershed resource planning and management. Control of severe acid mine drainage (AMD) and metals contamination of soils and water should diminish environmental effects on priority San Joaquin River fish species, migratory and resident bird species, and on the range of aquatic life still remaining in the watershed's San Carlos Creek, Silver Creek, and Panoche Creek.

Project Goals

We propose to employ an initial grant of CALFED funds to undertake an extensive initial study to determine the feasibility of using both new and tested techniques to assess, control and remediate heavy metals contamination and corresponding acid mine drainage in aquatic areas directly downstream of the New Idria mercury mining district. This feasibility study will identify geotechnical, biological and chemical assessment techniques while identifying a full range of alternatives for stream segment remediation, including *in-situ* remediation techniques developed by the University of California at Berkeley.

A draft and final report by our project team will: a) identify a realistic plan of implementation, b) offer a comprehensive compendium of site assessment and monitoring results, c) provide an analysis of project alternatives and related CEQA and NEPA evaluation, while analyzing local land use plans and federal and state statutes for their applicability, d) provide a schedule of overhead, personnel, and equipment and laboratory costs necessary for project completion, and e) a logistical and variables analysis to define potential roadblocks to success and back-up programs.

Project Timetable and Estimated Cost: The feasibility study is estimated to take two wet weather seasons, from Spring, 1998 through Spring, 2000, and to cost upwards of $350,000.

Project Team Members:

Team leader : *Kathleen Van Velsor*, environmental planner and Mercury Mining Research and Action Project director, Coastal Advocates
Co-team leader : *Christine Kook*, environmental planner and team member, Mercury Mining Research and Action Project, Coastal Advocates.
Student assistants: The team has been invited to solicit student assistance from the *University of California at Santa Cruz.* Coastal Advocates recruits undergraduate and graduate student assistance from S.F. Bay Area, Davis, and Monterey Bay Area universities.
Affiliated environmental and legal professionals: *EIP Associates, San Francisco; Shute, Mihaly and Weinberger, San Francisco, Balance Hydrologics, Berkeley, California (See Statements of Qualifications, attached.)* **Government and non-profit agency coordination and assistance:** Members of these agencies have offered ongoing technical and planning expertise on an informal and formal basis to Coastal Advocates, including the *U.S. Geological Service, the Regional Water Quality Control Board, the U.S. Environmental Protection Agency, the Bureau of Land Management, the California State Dept. of Fish and Game, the Clean Water Network ,the River Network, the Mineral Policy Center.* **University assistance:** Formal assistance from the*University of California at Berkeley*'s acid mine drainage project may be available through a Clean Water Act litigation funding program.

Kathleen Van Velsor

Vista Attachments

Excerpts from the Mining Waste Study Final Report, July 1, 1988, Mining Waste Study Team of the University of California at Berkeley.

In its evaluation of the environmental impacts of mining wastes, authors of the 1988 University of California at Berkeley Mining Waste Study judged the principal threat posed by mining activity (past, present and future) to be "AMD with the heavy metals usually associated with this drainage....The next most serious threats posed by mining wastes we judge to be mercury and cyanide."

Both the acid and the dissolved metals in AMD are detrimental to aquatic life. Downstream areas from the mine point of discharge can extend for ten miles or more, with "more widespread fish kills during periods of high run-off."

Thus, "we regard the deposition of acid and heavy metals (many of which are mobilized by AMD) in water sources as the major pollution problem caused by mining wastes in the state. Some of these metals, notably mercury, pose a threat to human health. However, the principal threat is to the environment (emphasis added). The damage caused in the immediate vicinity of some of the mines is massive. Surface waters for several mines downstream of the mine are almost totally devoid of life. Beyond this point the heavy metals generally are precipitated and deposited in the sediments of the surface water bodies. The effects of these metals on aquatic life are complex and are not well understood. It is recommended that research be undertaken to better assss these problems."

I-007353

New Idria Mercury Mine and Mining District:

PRELIMINARY SITE EVALUATION and Request for EPA Action Pursuant to CERCLA

New Idria Mercury District

Mercury ore deposits occur in the deformed rocks of the Panoche sequence in the heart of the coastal Diablo Range. *The New Idria mercury mining district* is located on the slopes of San Benito Mountain where cinnabar ore bodies exist beneath a reverse fault.

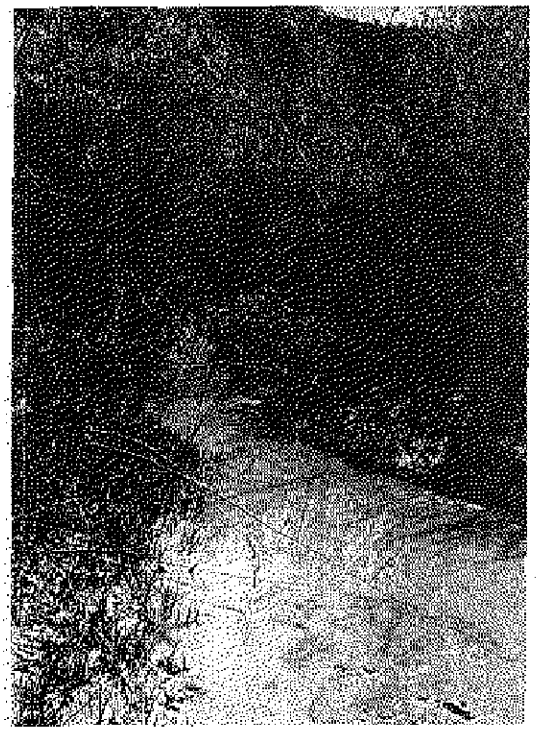
According to California's Division of Mines and Geology (F.F. Davis, 1966) the largest mine in the district -- the New Idria Mine produced over 500,000 flasks of mercury, claiming the largest production in the United States in as late as 1965. The New Idria mine was originally mined during the California gold rush when mercury was used as an amalgam in the gold ore removal process. The convention at the time was to spread the imported and highly valued mercury gleaned from the coastal ranges over the crushed, gold-laden ore of the Sierra Nevadas using large *amalgam tables*. The amalgam of gold ore and mercury was then scraped off by gold workers into *retorts* where the amalgam was heated to high temperatures, leading to the separation of the gold from the ore. The mercury became vaporous, then condensed into its familiar liquid form to be re-used again at the amalgam tables.

The New Idria mining district gave rise to a booming local economy in the early *history of San Benito County when* mercury's value exploded. California quicksilver mines have produced nearly 85 % of the mercury in the United States with the great bulk of this production coming from cinnabar deposits in the Coast Ranges. The production of mercury in these ranges approximated 2.75 million flasks.

Approximately 101,000 metric tons of mercury extracted by mining in California has produced over twenty million metric tons of tailings, according to U.S. EPA researchers (H.W. Martin, et al., 1976). And tailings are only a part of the littered mining landscape -- *overburden* (the material removed to expose the ore vein), *slag heaps* (waste from ore-smelting), and *liquid waste* make very significant contributions to overall mine pollution.

Mountainous waste piles remain at the main New Idria mine after its final abandonment in the early 1970's. San Carlos Creek, which drains from the *mine, creates a downstream portrait of* extreme acid mine drainage where iron hydroxide, sulfides, and iron sulfate precipitate out of the water. Water quality samples taken in 1988 and 1991 indicated the existence of arsenic, beryllium aluminum, iron, manganese and nickel in excess of drinking water action levels. Waters of San Carlos Creek run red during winter and spring months when iron contributes its color to the polluted mine run-off. Monitoring of mine-related water contamination has been sporadic since the New Idria mine's closing in 1972.

Catchbasins, mine heaps, streambed sediments and sediments within the New Idria ore furnace's depositional radius have not been systematically evaluated for their mercury content although mercury adsorbs readily to clay particles.



I-007355

COASTAL ADVOCATES

~Natural Wonders Need Strong Advocates~

April 16, 1996

Felicia Marcus
Regional Administrator
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105

Re. New Idria Mine and Mining District: Preliminary Site Evaluation and Request for EPA Action Pursuant to CERCLA

Dear Ms. Marcus:

Request for EPA Action Pursuant to CERCLA

Staff and attorneys working with Coastal Advocates have recently met with members of your Watershed Protection Branch and Water Management Division and staff of the Central Valley Regional Water Quality Control Board and Bureau of Land Management to determine the status of New Idria mine site investigation and clean-up. It has become evident that no real clean-up actions have been taken to abate historic and ongoing contamination from a major abandoned mercury mine at Idria, California. While waste discharge requirements at this site are technically still in effect, they are outdated and essentially unenforced due to difficulties in locating the parties legally responsible for the site's contamination.

Massive volumes of mining wastes from the New Idria mine and the surrounding mercury mining district directly impact soils and coastal streams in the Panoche/Silver Creek watershed.[1] The extent of soils and watershed contamination from smelting and mining waste accumulation is not known at this time. Preliminary data suggest that waters downstream of the Idria site, including the heavily used Mendota Pool and San Joaquin River, have been

[1] See site photographs, attached.

236 N. Santa Cruz Ave., Suite 241, Los Gatos, Calif. 95030-7261 408-395-9116 ~ Fax: 354-4082 ~ Kathleen Van Velsor, Executive Director

impacted by the mines.[ii] Impacts to receiving waters and sediments are particularly worrisome because the Mendota Pool is a terminus for the Delta/Mendota Canal, a drinking water conveyance to other parts of California. Beneficial uses of these impacted coastal water bodies include: a) agricultural water supply, b) boating, c) fishing, d) swimming, e) human water supply, f) coastal wildlife water supply and habitat.

Coastal Advocates requests that EPA Region IX employ research efforts and remedies available pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the SuperFund Amendments and Reauthorization Act, 42 USC Section 9601 et. seq. to begin a sustained program of assessment, exposure pathways and potential receptors toward the goal of clean-up of potentially widespread water and soils contamination associated with mercury extraction from cinnabar ore at the New Idria Mine, San Benito County. CERCLA provides EPA with flexibility and a broad authority where other tools are less effective.

If mercury and associated minerals mining constituents (including nickel and chromium) remain uncontrolled at this site, human and wildlife exposures will continue unabated, while coastal waterways will continue to suffer from acid mine drainage[iii] and toxin accumulations[iv]. The potential for bioaccumulation and bio-magnification of mercury in fish tissue and cattle flesh and milk needs to be fully investigated for its possible impact to human and wildlife health, both on-site and downstream.

Summary of Investigations and Actions to Date

Coastal Advocates has undertaken preliminary records research, library and field research to better understand the New Idria mercury mining zone and its contribution of persistent organic pollutants to coastal lands and waterways. This preliminary environmental research has raised profound concerns about ongoing and potential air, water, and sediment impacts from mining wastes to the Panoche/Silver Creek watershed (coastal ranges), the Mendota Pool(Central Valley), the San Joaquin River and ultimately the San Francisco Bay/Estuary (see

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[ii] Preliminary EPA water quality data for the Mendota Pool indicate mercury in excess of chronic freshwater toxicity criteria.
[iii] See site photographs, attached.
[iv] Central Valley Regional Water Quality Control Board prelimary assessments of heavy metals in the waters of San Carlos Creek, attached.

I-007357

locator map, attached).

Conditions at this mining area originate with the mining of high-grade cinnabar ore during the Gold Rush when mercury was requisite to the extraction of gold in an amalgam/retort process. In subsequent years, the site was re-mined for residual mercury[v] and abandoned. A portion of the largest mine in the district, the New Idria Mine, is now occupied by a rehabilitation facility for recovering substance abusers. Historic markers encourage visitors to the mining area in the remote Panoche/Silver Creek Valley. The New Idria mine occupies a portion of the eastern slopes of San Benito Mountain, a major feature of the geologically complex New Idria Formation which has been the subject of investigation by EPA for asbestos contamination of air resources and drinking water.[vi] The New Idria Formation is located in the Diablo Range and covers approximately 48 square miles. The area has experienced significant mining and surface mineral exploration, including exploration and mining for cinnabar ore, chromite ore and chrysotile asbestos ore.

There is notably very little sampling data on mercury for either water or soils at the site, and downstream of the New Idria mine. However, both Panoche Creek and San Carlos Creek have been listed as impaired water bodies[vii] pursuant to 1993 water quality assessments. There are sampling values for other constituents, including nickel and arsenic. We understand from members of your staff that sampling of the Mendota Pool may ensue for methylmercury in fish tissue. Some preliminary investigation into related heavy metals and acid mine drainage from one mine drainage point has been accomplished by consultants hired by the owners of surface rights at the New Idria mine. However, recommendations for remediation have languished, reportedly due to cost factors[viii]. Coastal Advocates is in the process of researching ownership relationships for the New Idria mine and will provide this information to the Central Valley Regional Water Quality Control Board and EPA when the results are compiled.

Coastal Advocates, landowners, and agencies concerned with the environmental impacts of the mine in the Panoche/Silver Creek watershed stand to benefit immediately from remedial investigations and feasibility studies

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[v] Staff of the Central Valley Regional Water Quality Control Board recall the collection of mercury from soils adjacent to the old New Idria smelter. Miners in the 1960's cut trenches to collect substantial amounts of residual mercury in soils.
[vi] Atlas Asbestos Mine Record of Decision, July 19, 1989.
[vii] EPA Water Quality Assessment - Water Body Fact Sheet, 10/28/93
[viii] Central Valley Regional Water Quality Control Board record of correspondence.

("RI/FS") to evaluate remdial action alternatives for the mine and mill sites.

The airborne and water-borne effects of mercury are fairly well understood, and we summarize them in the attached Preliminary New Idria Site Evaluation. Mercury is both a mutagen and teratogen, and exposures can lead to cognitive impairments and, in extreme cases, to the infamous Minamata disease[ix]. The most recent scientific analyses characterize mercury as a potent endocrine disrupter.[x]

Mercury mining in California has been and continues to be a significant contributor to the accumulation of mercury in coastal waterways, but we believe the actions we take now can make significant progress toward controlling toxic inputs. Given the enormous environmental risks associated with mercury contamination, we urge you to act expeditiously to correct this languishing problem. We look forward to hearing from you about the Region's interest in a CERCLA assessment of this major mercury mining site. If it would be useful we would be happy to provide a presentation on this matter to your staff.

Sincerely,

/s/

Kathleen Van Velsor-Newton, Executive Director

cc: Steve Rosen and Chris Berka, McCutchen, Doyle, Brown & Enerson
Central Valley Regional Water Quality Control Board

[ix] Neurological impacts and body wasting are illustrated in reproductions of Minamata disease photographs taken in the 1960's. See illustrations, attached.

[x] Fertility on the Brink: The Legacy of the Chemical Age, 1994. A report by the National Wildlife Federation, and Our Stolen Future, 1996.

cc: Steve Rosen and Chris Berka, McCutchen, Enerson , Doyle & Brown
Central Valley Regional Water Quality Control Board

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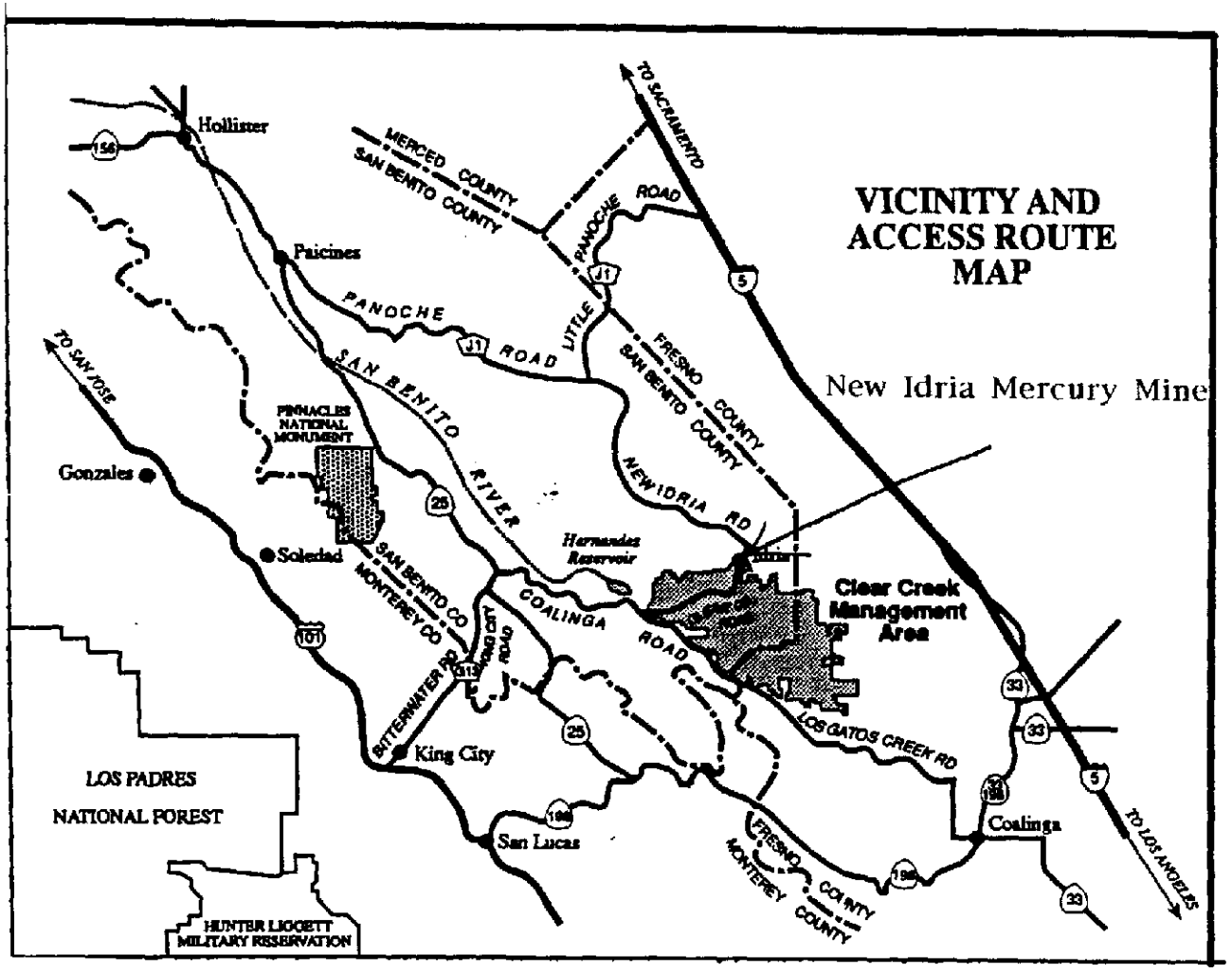

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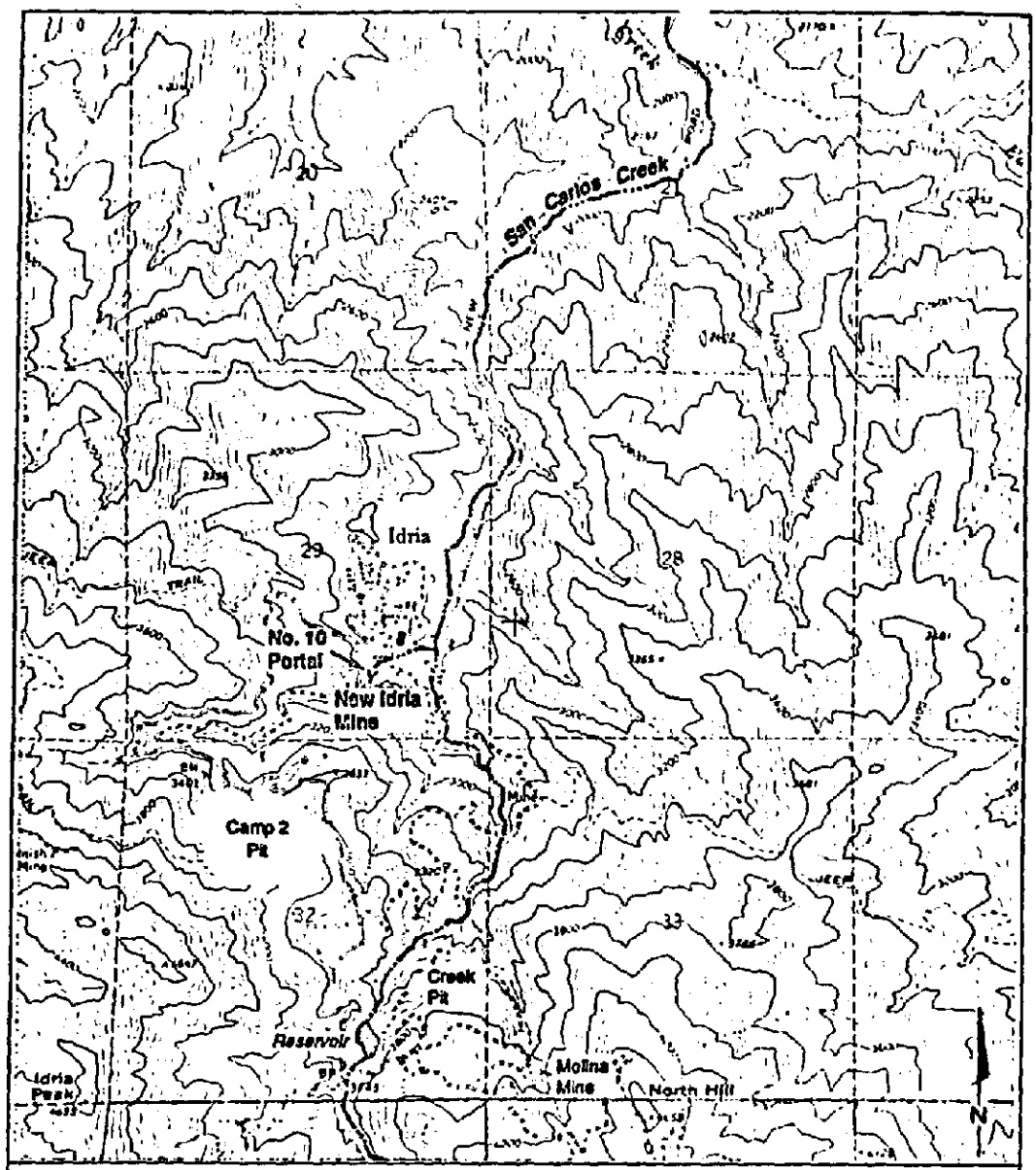

18706-001-043	New Idria Associates	VICINITY MAP
Dames & Moore	NEW IDRIA MINE San Benito County, California	

PLATE 1

Mercury mine waste heaps with deep, wash-down furrows at New Idria. Drainage pipe and stream are visible at right right corner. 3/30/94. Coastal Advocates photograph.

I-007363

WHERE THE WATERS RUN RED

A Coastal Advocates investigation of mercury mining operations in the Central Coast region of California 1993-1995

Project Director: Kathleen Van Velsor
Project Fellow: Chris Kook
Photography: Kathleen Van Velsor and Chris Kook

MERCURY MINING DISTRICTS:
Central Coast Region of California

- Oakville District -- Mount Diablo range, East Bay
- Almaden District -- South San Francisco Bay
- Idria District -- San Benito Mountain
- Clear Creek District -- San Benito Mountain
- Buena Vista/Klau mines -- Lake Nacimiento, San Luis Obispo
- Phoenix District -- Diablo Range, east of Alameden (Mt.Hamilton)
- Stayton District -- south of Phoenix District
- Santa Barbara reservoir
- Cachuma District -- east of Santa Inez

Mercury Toxicology

- Occupational and Other Human Health Problems due to Inorganic Mercury are well Documented
  - fingerprint photographers, dentists, barbers, hospital technicians
- 1976 - USEPA banned Mercury Containing Bactericides, Fungicides, Turf and seed treatments
- Biomagnification Occurs as Mercury Moves Through Food Chain & High Levels in Fish tissue Appear
- Minamata Bay tragedy in Japan
  - 46 died from consumption of contaminated fish
    - » 50% adults
    - » 33% children
    - » 13% infants exposed in utero
- Global Poisonings Due to Wheat and Seeds Treated with Mercury Fungicide
- Teratogenic Effects Alarming

Coastal Advocates

I-007366

Mercury in the Environment: Highlights From the Research Community

- Presence of Chloride and Ferric Iron increases the Rate of Hg^{2+} Release from HgS
  - Ferric Iron Occurs in Acid Drainage Waters From Mining Areas
- Algal Blooms and an Abundance of Organic Matter Increase CH^3Hg^+ Uptake
- High Concentrations of Soluble Salts Create a Negative Effect on Mercury Methylation
- The Binding Rate of Methyl Mercury to Tissue is Faster than the Rate of Methyl Mercury Excretion from Tissue
  - Conclusion: Bioaccumulation results in Toxicity to Susceptible Organisms

Coastal Advocates

I-007367

Mercury in the Environment: Highlights From the Research Community

- Concentration of Hg^0 as high as 20 ng/m^3 measured in the atmosphere over Hg Deposits
  - Normal = 1 - 10 ng/ m-3
- Methyl mercury volatile
  - Complexes with
    - » Thiol Groups of Protein-derived Organics
    - » Adsorbed to Clay Mineral particles
- Aerated Microbasin of Wabigoon River
  - CH^3Hg^+ Release of 60 ng/m^2day^1
- Hg Mining Wastes in California Reported to Contain 125 - 4,500 mg/kg (SWRCB, 1991)
- Methyl and Dimethyl Hg Diffuse Through Water
  - Highly Soluble in Lipids
    - » Absorption into Aquatic Organisms Facilitated

Coastal Advocates

I-007368

Environmental Estrogens or Endocrine Disrupters

- Hormone - Imitating Chemicals are Bioaccumulating in Animal and Human Tissue. Some of the Most Important Include:
  - DDT, PCB, Dioxin, Lead & Mercury
- Mimic Naturally Occurring Hormones Secreted by the Endocrine System
- Problems Observed in Wildlife
  - Reproductive effects in Harbor Seals, Snapping Turtles, Double - Crested Cormorants
  - Immune Suppression among Beluga Whales, Common and Forster's Terns, Various Gulls
  - Gender Distinctions Blurred
  - Rudimentary Sexual Organs in Alligators & Gulls
  - Metabolism and Growth Impaired

Coastal Advocates

I-007369

Consensus Statement
Given by 21 Prominent Scientists at the Chemically-Induced Alterations in Sexual and Functional Development Work Shop

- **We are Certain of the Following:**
  - Environmental Estrogens Disrupt the Endocrine Systems of Humans and Animals
  - Wildlife Populations are Already Affected
    - » Decreased Hatching
    - » Gross Deformities
    - » Demasculinization and Feminization of Male Fish, Birds and Mammals
    - » Defeminization and Masculinization of Female Fish, Birds and Mammals
- Laboratory Studies Corroborate the Abnormal Sexual Development
- Humans have been Affected by Compounds
  - Effects are Estrogenic
    - » Genital Tract Abnormalities
    - » Abnormal Pregnancies
    - » Reduced Fertility
    - » Clear Cell Carcinomas

Coastal Advocates

I-007370

FEDERAL AND STATE STANDARDS AND GUIDELINES FOR MERCURY

Agency	Description	Value	Reference
NIOSH	Recommended Exposure Limit for Occupational Exposure to Mercury Vapor Time Weighted Average (TWA)	0.05 mg/m^3	ACG±H 1990
EPA ODW	Maximum Contaminant Level Goal (MCLG) Mercury (inorganic)	0.002 mg/L	USEPA 1991a
	Maximum Contaminant Level (MCL) Mercury (inorganic)	0.002 mg/L	
EPA OWRS	Ambient Water Quality Criteria to Protect Human Health Mercury Ingestion of water and aquatic organisms Ingestion of aquatic organisms only	 144 ng/L 146 ng/L	USEPA 1980
EPA	Carcinogenic classification Oral Reference Dose (RfD) Mercury: inorganic only Methylmercury	Group D $3x10^{-4}$ mg/kg/day $3x10^{-4}$ mg/kg/day	HEAST 1990 USEPA 1991a
	Inhalation Reference Concentration (RfC) Mercury, inorganic only	$3x10^{-4}$ mg/m^3	USEPA 1991a
	Inhalation Reference Dose (RfD) Mercury, inorganic only	$9x10^{-5}$ mg/kg/day	
CADHS	Chronic Acceptable Exposure Level Oral Inhalation	$2x10^{-3}$ mg/kg/day $2x10^{-1}$ $\mu g/m^3$	CAPCOA 1991

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I-007371

COASTAL ADVOCATES

~Natural Wonders Need Strong Advocates~

July 3, 1997

MEETING NOTICE

You are cordially invited to attend an invitation-only **mercury discussion group** sponsored by Coastal Advocates at the Law Offices of Berman, DeValerio, Pease and Tabacco in downtown San Francisco in July.

Date	:	**Monday, July 21, 1997**
Time	:	**11:30 a.m. to 2:30 p.m.**
Location	:	**Berman, DeValerio, Pease and Tabacco, 425 California Street, Suite 2025, San Francisco**

Refreshments provided. The discussion group agenda will cover the following topics:

- New Idria SuperFund site assessment update and CERCLA emergency response procedures -- Matt Mitguard, SuperFund Division, U.S. EPA, Region IX
- United Anglers' Clean Water Act litigation -- Attorney Alan Beaven
- Brief update on the status of the Buena Vista/Klau, Hearst Corporation, and Cambria mercury mining clean-up and abatement efforts -- Kathleen Van Velsor for Coastal Advocates
- Brief CERCLA case study summary -- Matt Charney, Coastal Advocates summer law intern (U.C. Davis)
- U.S. Geological Survey, Menlo Park -- Jim Rytuba
- Ron Churchhill, State Div. of Mines and Geology

If you are unable to attend, we hope that you will designate another representative from your agency who is familiar with the New Idria site or mercury mining in general. The list of participants and invitees includes representatives from Coastal Advocates, the Central Valley and Central Coast Regional Water Quality Control Boards, the Water Division of EPA Region IX, the Panoche/Silver Creek Watershed CCRMP, the Calif. Dept. of Fish and Game, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, the McCutchen, Doyle & Enersen law firm, the University of California at Santa Cruz, the University of California at Berkeley, the Bureau of Land Management, the U.S.Geological Survey, the Division of Mines and Geology, and Dames and Moore (civil engineers).

We look forward to hearing from you, and having your participation at this important discussion group.

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Projects: Ocean Defense Fund, Land Use & Law Project, Wetlands Protection Project, Coast Lectern Series, Trails on the Water Mapping Project.
Coastal Advocates was founded in 1987 to provide research, planning, and advocacy for the protection of coastal resources.

INVENTORY OF RESOURCES
IN THE
PANOCHE/SILVER CREEK WATERSHED

by

Karen Fullen
Student Trainee Biologist
USDA-Soil Conservation Service
Fresno, California

Submitted to:
US Environmental Protection Agency
San Francisco, California

In fulfillment of
Interagency Agreement Number DW12955170-01-0

May 1994

ACKNOWLEDGEMENTS

Many individuals working for several different agencies contributed to this report. I would especially like to thank the staffs of the Hollister Resource Area office of the Bureau of Land Management for information on ownership, sensitive species, and grazing allotment management; the Fresno and San Benito County offices of the Agricultural Stabilization and Conservation Service for access to aerial photos and ownership information; the Region 4 and Natural Heritage Division offices of the Department of Fish and Game for information on sensitive species and riparian habitats; the San Joaquin Valley Endangered Species Recovery Planning Program, for information on sensitive species; and the University of California Cooperative Extension Service, for information on range management.

Within Soil Conservation Service, deserving of special thanks are: Kerry Arroues and staff in the Hanford Soil Survey Office for soils information; Frank Menezes and staff in the Fresno Field Office for assistance in gathering and compiling resource data; Emily Schwalen, Davis State Office, for assistance in mapping and assessing riparian zone condition; Jeff Hansen, Fresno Area Office, for assisting with the collection of range condition information; and Bruce Eisenman, Hollister Field Office, for providing aerial photos, soil survey maps, and National Wetlands Inventory maps of San Benito County.

Extra special thanks to Tom Share, Davis State Office, for preparation of the maps in this report.

INTRODUCTION

The Panoche/Silver Creek watershed is located in western Fresno and southeastern San Benito counties (Figure 1). The watershed boundary northeast of Interstate 5 follows the approximate boundaries of the 100 year floodplain. This portion is referred to as the lower watershed, while the portion west of Interstate 5 is known as the upper watershed. Both portions together cover an area of approximately 291,500 acres; with wide variations in precipitation, topography, soils, and natural vegetation (USDA, 1976b).

The major land use in the upper watershed is rangeland, comprising nearly two-thirds of the area. Both sheep and cattle are grazed. About 30 percent of the area is used for wildlife habitat. The remaining land is used for both dryland and irrigated agriculture, especially in the Panoche Valley and on the terraces adjacent to Interstate 5 (Boyle, 1991).

About 31 percent (66,945 acres) of the upper watershed is public land managed by the Bureau of Land Management (Boyle, 1991). They manage for multiple uses including grazing, recreation, mining, and the protection of sensitive resources. Of the total amount of public land, 54,810 acres are in grazing allotments (Leathers, 1993).

Mining operations in the upper watershed include the Vallecitos Oil Fields, and a gravel quarry located near the Interstate 5/Panoche Road junction. Several abandoned mercury mines are located in the upper watershed as well (Boyle, 1991).

Irrigated cropland is the predominant land use in the lower watershed. Important crops include cotton, tomatoes, almonds, and grapes. The city of Mendota is the only significant urban land use in the watershed (USDA, 1976b).

Recreation uses such as fishing, camping, picnicking, and hunting waterfowl and game birds occur in the lower watershed near the San Joaquin River and Fresno Slough, as well as at public access areas of the California Aqueduct. In the upper watershed, the primary recreational use is hunting for upland game birds, deer, and wild pigs. Other activities include hiking, picnicking, and wildlife viewing (USDA, 1976b).

This watershed has a long history of resource problems, primarily associated with flooding and sedimentation impacts in and near the city of Mendota. More recently, this watershed was identified as a primary source of salts, selenium, and other trace elements which contaminate soils and ground water in the agricultural areas of the watershed (Presser, et. al., 1990). Since run-off from the watershed during flood events reaches the San Joaquin River and Mendota Wildlife Area via the Firebaugh Canal Company water delivery system and the Mendota Pool, degradation of surface water quality has also become a concern.

The purpose of this report is to provide information on soils; range productivity, condition, and management; cropland management; riparian zone condition; and sensitive species in the watershed. It is hoped that this

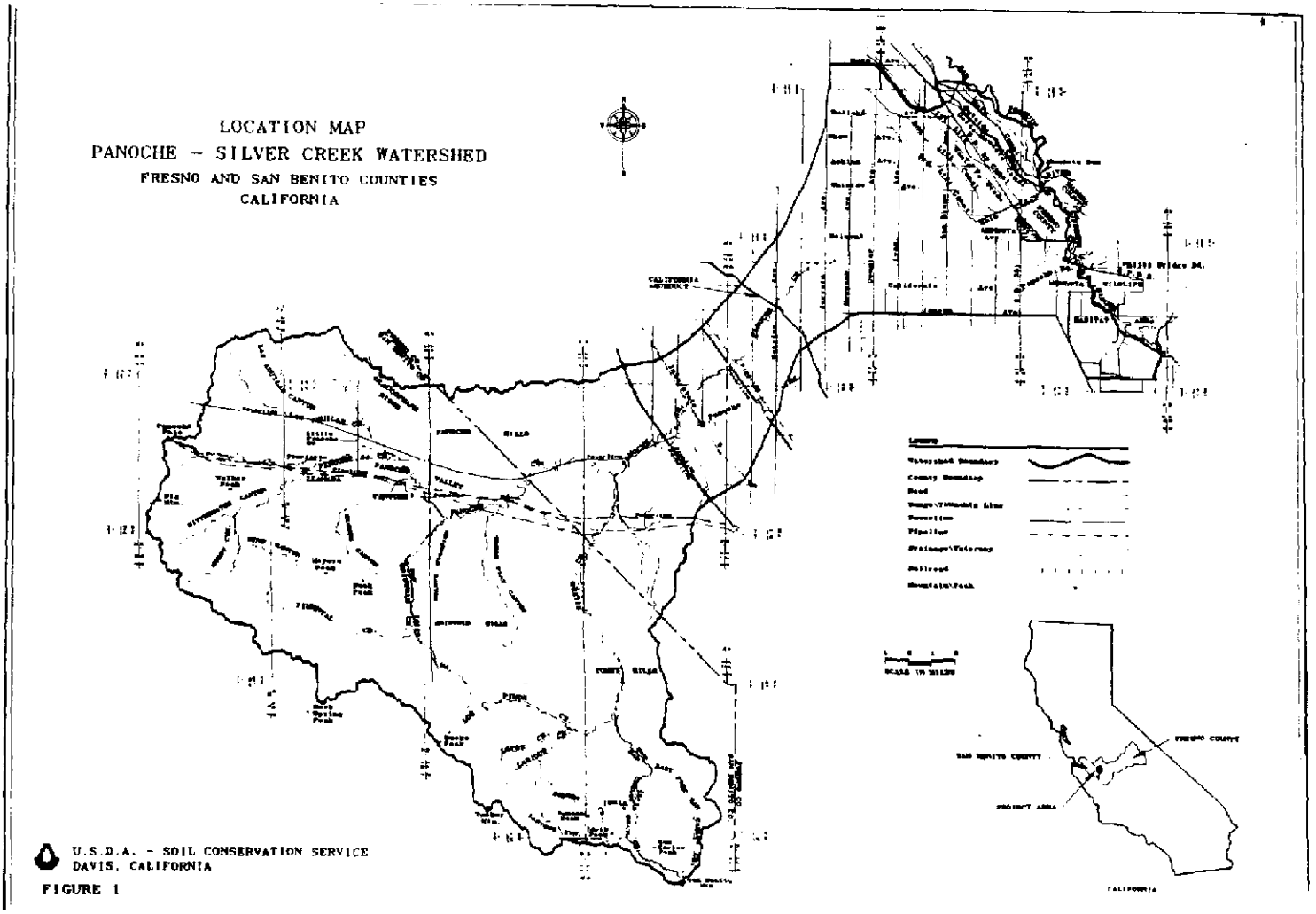


FIGURE 1

I-007376

information will be helpful in making land use and management decisions, and in planning watershed enhancement projects.

SOILS

Seleniferous soils information has been compiled for the Western Fresno County Soil Survey currently in progress. Preliminary data from that survey shows seven map units in the Fresno County portion of the Panoche/Silver Creek watershed which have a component that is high in selenium. Most of the map units in the upper watershed consist of complexes and associations of two or three soil or geologic material components. Individual components within these complexes and associations are too intricately intermingled to map separately at the mapping scale used in the soil survey; therefore, each seleniferous component cannot be delineated individually (Arroues, 1993).

On the general soils map (Figure 2), map units 680, 717, and 737 have been included in Soil Association 8, Badland-Torriorthents. Kerry Arroues, Supervisory Soil Scientist in charge of this survey, estimates that this association contributes 80% of the total selenium load reaching Panoche and Silver Creeks and the valley from the soils in Fresno County. Association 9a, Xerorthents-Exclose-Grazer, which includes map units 720, 722, 723, and 739; contributes the remaining 20%.

Seleniferous soils information for the San Benito County portion of the watershed is not available at this time. However, in comparing soil maps of this area with a USGS map showing the locations of the Moreno and Kreyenhagen formations, it appears that there could be a connection between the Badland map unit (BaG) and the Moreno formation and between the Sedimentary Rock Land map unit (SeG) and the Kreyenhagen formation (Presser, et. al., 1990 and USDA, 1969). These map units are found primarily in Soil Associations 9b and 11 on the general soils map.

This possible correlation would need to be confirmed through field sampling and laboratory analysis. The USGS investigation of selenium sources in this watershed included only four samples of soil and geologic material from San Benito County, all of which were taken in close proximity to each other in the Tumey Hills (Presser, et. al., 1990). This limited sampling cannot confirm the possibility of the above mentioned connection.

Soil Association 9b, Kettleman-Nacimiento-Linne, is however approximately the same as Association 9a; so it is reasonable to conclude that a similar relatively small amount of selenium is contributed from these San Benito County soils. The distinction between these two associations was made to avoid confusion when using this report in conjunction with the two different soil surveys covering the watershed. The different names reflect the changes in soil survey techniques and philosophies that have occurred in the last few decades, rather than any major differences between the associations.

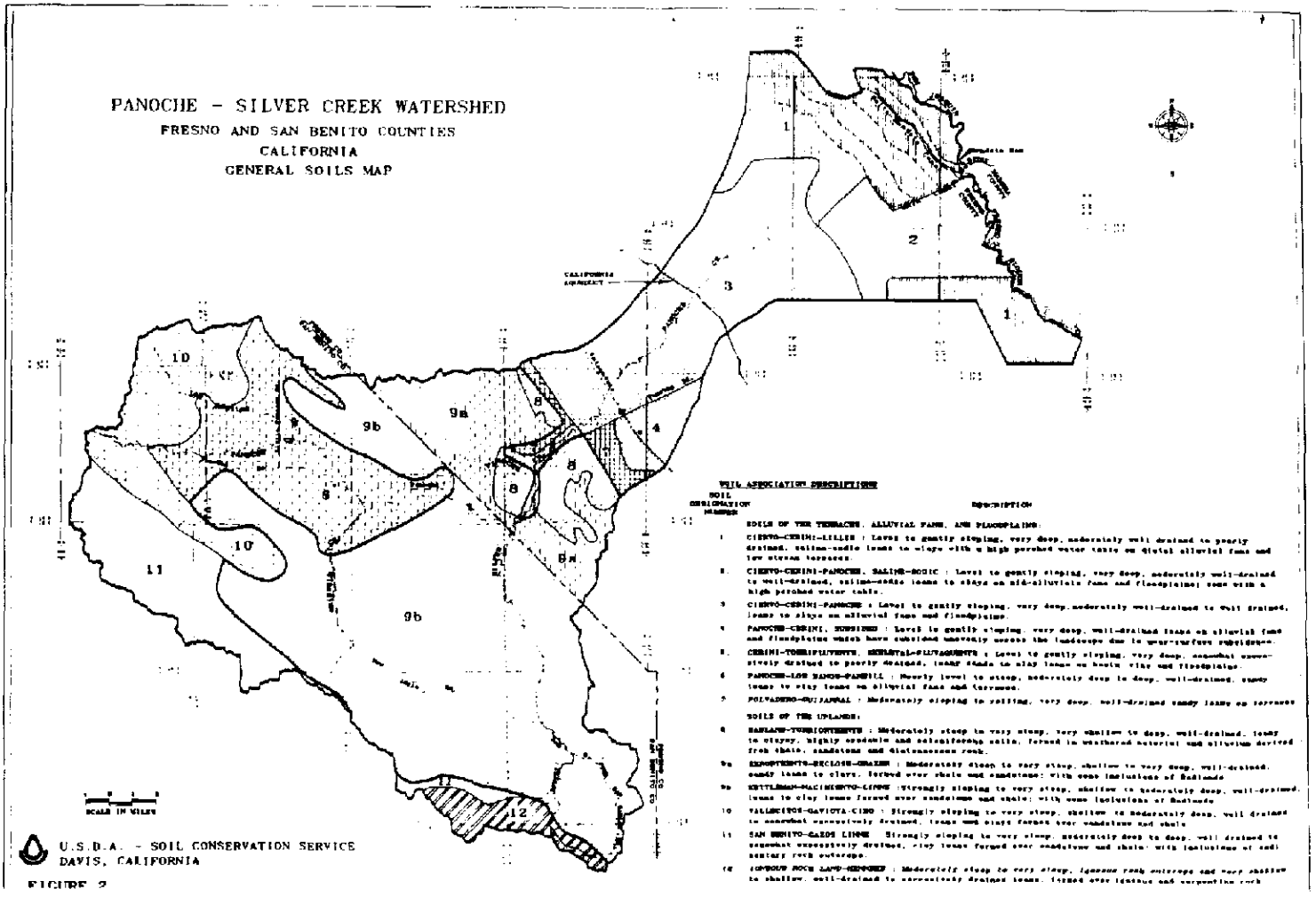


FIGURE 2

I-007378

According to Arroues, a complete update of just the Panoche/Silver Creek watershed portion of the San Benito County Soil Survey would take two soil scientists approximately one year to accomplish. Testing for seleniferous areas only could be accomplished in a few months, assuming cooperation from landowners. However, the vast majority of selenium appears to originate from the Badland-Torriorthents association, a relatively small portion of the watershed when compared to the 9a, 9b, and 11 associations, from which the small remainder of selenium comes. In addition, the seleniferous formations near the top of the watershed are generally very well vegetated; in contrast to the largely barren areas in the Badland-Torriorthents association. Therefore, it would probably be more cost-effective to concentrate upon limiting the transport of selenium from the Badland-Torriorthents association, than to expend resources to further study other comparatively small sources of the element.

A listing of seleniferous map units and an explanation of terms used in the soil association descriptions on the general soils map are found in Table 1.

RANGE PRODUCTIVITY

Due to the mapping of soils in the coast range portion of the Western Fresno survey in complexes and associations, forage productivity figures have been calculated for each map unit based on a weighted average of the production (in an average rainfall year) of each of the named components of the unit. Figures were rounded to the nearest 100 pounds per acre. For soil series in San Benito County, the average productivity figure from the corresponding range site description was used. Each map unit or soil series has then been placed in a category based on the suitability of the unit for livestock production. These categories and their map units/series are listed in Table 2.

In addition to the above, there are several map units which are Class VIII soils, and have not been rated for range site productivity. Soils and landforms in Class VIII have such severe limitations that their use for commercial plant production, including livestock forage, is precluded (Klingebiel and Montgomery, 1973). Class VIII map units in the Panoche/Silver Creek watershed are also listed in Table 2.

For calculating a weighted average production figure for the Western Fresno map units, the productivity of Class VIII soils and landforms, when included as a named component of a map unit, was assumed to be zero. In Fresno County, these map units occur extensively in Soil Associations 5 and 8; and are the major reason for their placement in the Severely Limited Production category. Class VIII components of map units are also found in the 9a association.

In San Benito County, Class VIII map units are found primarily in Associations 9b and 12; and sporadically in Association 11. Large areas of Class VIII map units are concentrated in the San Benito Mountain area and

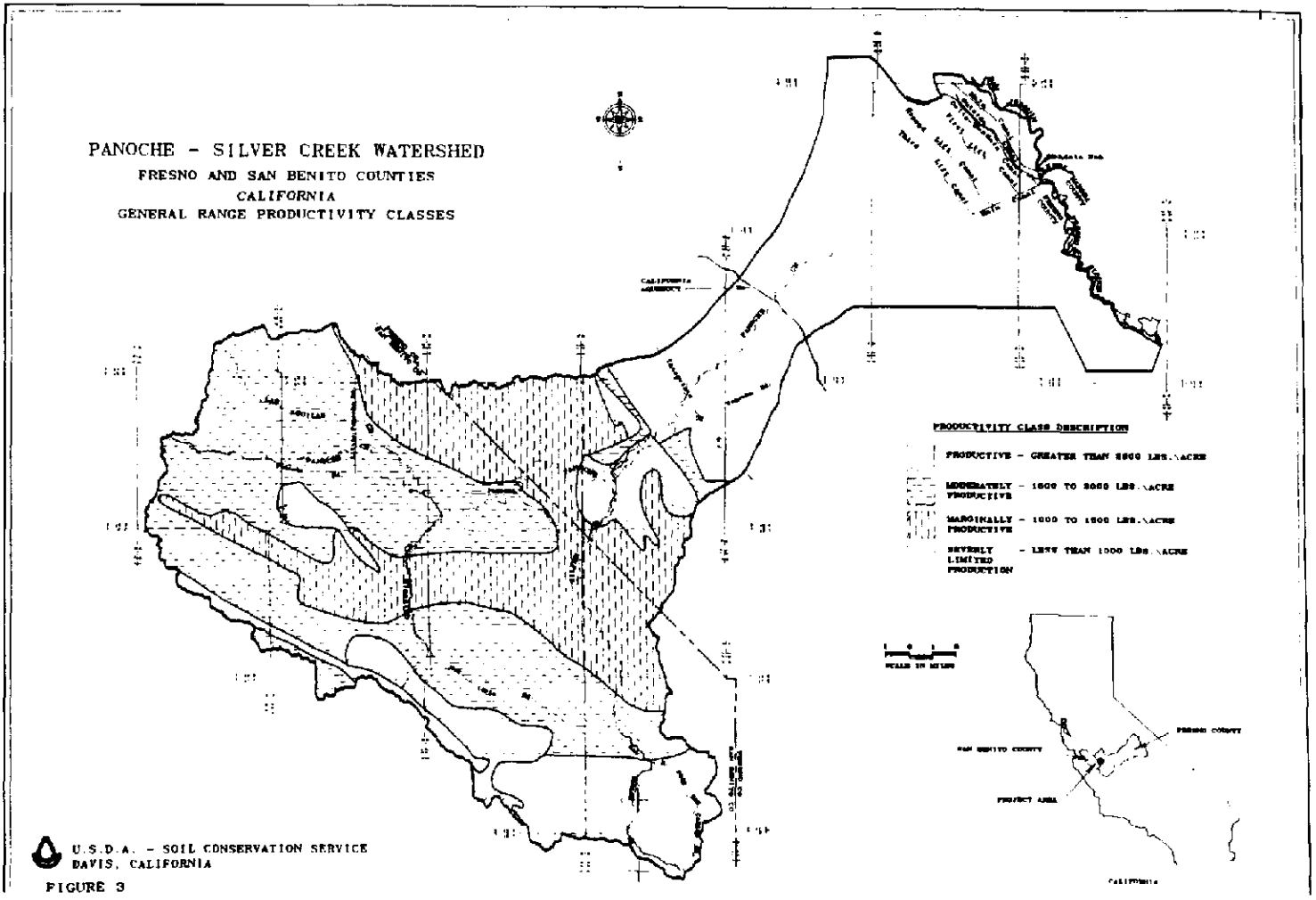


FIGURE 3

I-007380

the Griswold and Tumey Hills, which lowers the overall productivity of these areas for livestock forage.

Of particular concern with regard to low productivity is the 680 map unit which makes up the majority of Soil Association 8, and is the most seleniferous component of that association. This map unit produces only about 300 pounds per acre in an average rainfall year.

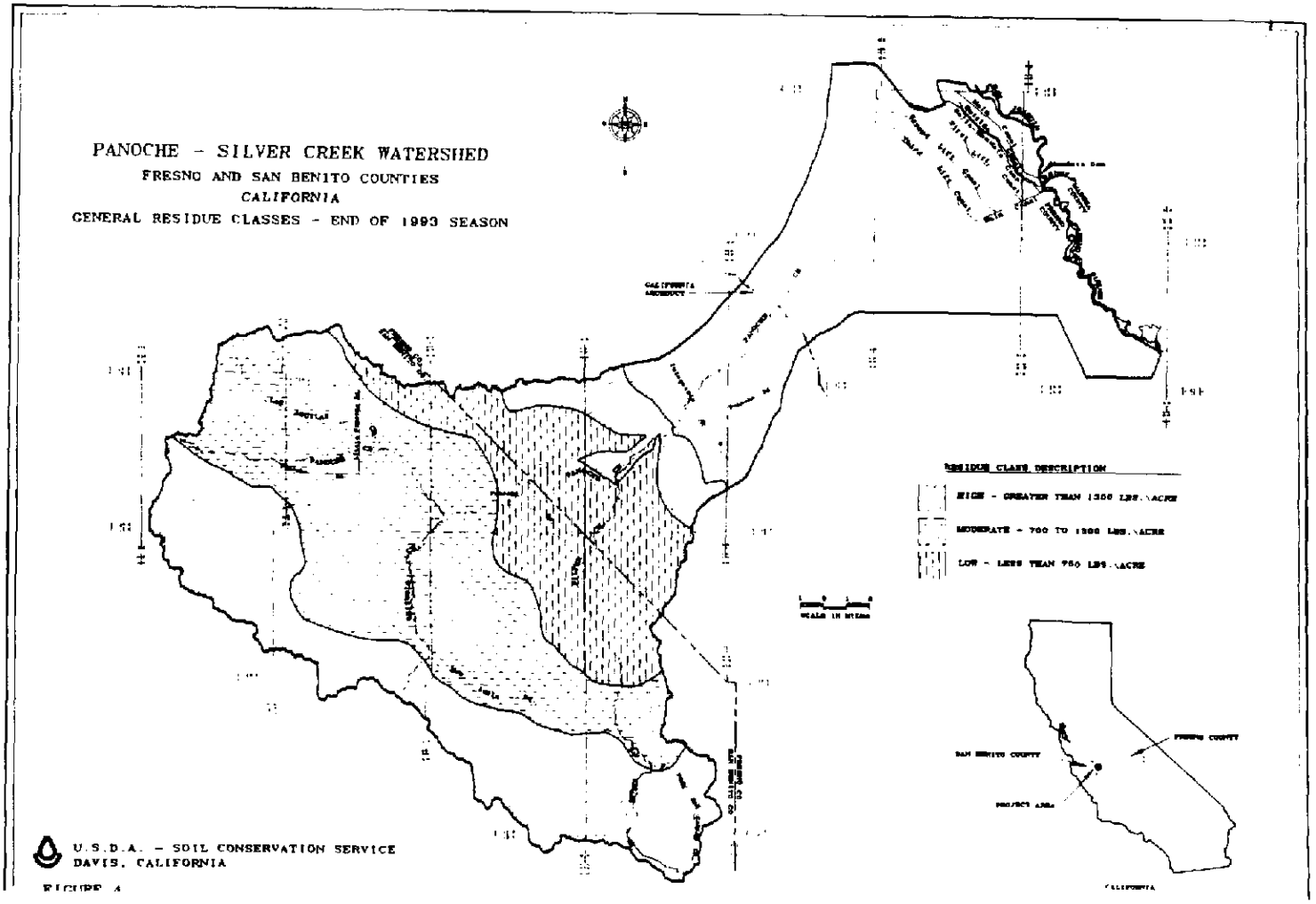
It should be noted here that the generalizations made on the range productivity map (Figure 3) do not accurately reflect the fact that areas of near zero production are often intermingled with areas of very high production. Thus, it would be extremely difficult and expensive to exclude livestock from the low production areas, while fully utilizing the high production areas.

RANGE CONDITION

An assessment of range condition based on residual dry matter was made during the summer months of 1993, primarily through ocular estimates, verified by a very limited number of clippings. The map (Figure 4) shows classes of residue as High (>1300 lbs.), Moderate (700-1200 lbs.), and Low (<700 lbs.). Due to the size of the watershed and the time involved, broad generalizations were made in mapping the residue. Relatively small areas of residue (or lack of it) that varied from the surrounding area were not mapped separately.

Residue classes were chosen based on Soil Conservation Service specifications for Proper Grazing Use on Annual Rangelands, which address erosion control as well as sustained forage production. The specifications call for a minimum of 700 to 1000 pounds per acre on sites with slopes of less than 30 percent, and between 1000 and 1200 pounds per acres on sites with slopes greater than 30 percent (USDA-SCS, 1976a). Using these criteria, some areas mapped as Low or Moderate fall into these categories because of the natural low productivity of the sites, rather than from overuse by livestock. Comparison of the residue, production, and soils maps should help determine areas where better livestock distribution and/or lower stocking rates might improve range conditions.

In assessing productivity and conditions of the range in this watershed, it should be remembered that the amount, timing, and distribution of rainfall plays a much larger role than management practices in determining the plant community and production from year to year (USDA-SCS, unpublished). It should also be noted that 1993 was an above average rainfall year, following a six-year drought.



I-007382

RANGE MANAGEMENT PRACTICES

There are 21 Bureau of Land Management grazing allotments in the upper watershed under 17 different operators (Figure 5). The majority (twelve) are cow/calf operations. Of the remaining operations, four are stocker, three are sheep, one a combination sheep/stocker, and one horse (Boyle, 1991). Much of the privately owned land not within a grazing allotment is under ownership of one of the allotment lessees.

The type of operation generally corresponds with the quality of the range site. Sheep usually graze steep, rocky areas more uniformly than cattle; and stockers graze steep areas better than cows with calves (USDA-SCS, 1976a). Operators in the watershed seem to be taking advantage of these qualities in their choice of livestock for their allotment. No correlation was found between type of operation and range condition.

Complete data on fencing and watering facilities locations are available only for the Silver Creek allotment. This allotment has been the focus of most of BLM's range improvement projects in this watershed (Cotterill, 1993).

The stockwater facility locations map (Figure 6) was compiled from the Boyle Engineering Corp. report, BLM maps, and National Wetlands Inventory maps.

Generally speaking, land under the control of the same operator is fenced and cross fenced as a unit, without regard to the location of public lands within the unit (Cotterill, 1993). Watering facilities are often located near riparian areas, but since they are usually gravity-fed systems, the lowest point on the landscape may be the only feasible location. The same is true of corral and road locations (McDougald, 1993). Topography therefore limits the amount of distribution that can be accomplished with watering facilities alone.

Salt blocks and supplemental feeding locations were often observed adjacent to watering facilities. This practice has the potential to increase the already heavy use that occurs near water. For maximum livestock distribution, salt and supplemental feed should be located away from water locations, in an otherwise under-utilized area (USDA-SCS, 1976a). A project by California State University, Fresno at the San Joaquin Experimental Range had great success in reducing the impact of cattle in riparian areas, simply by moving supplemental feeding locations away from water sources into areas of high residual dry matter (Frost, et. al., 1990).

A terracing effect from numerous crisscrossing trails was observed on a number of steep slopes in the watershed, particularly in the Silver Creek drainage. While the trails would seem to indicate heavy use by livestock, they may also be attributable to wildlife. In any case, the terraces created actually slow run-off and seem to have no detrimental effect on productivity (Hansen, 1993 and Nelson, 1993).

Two riparian areas were observed in the upper watershed where management practices might make a significant difference in conditions (See

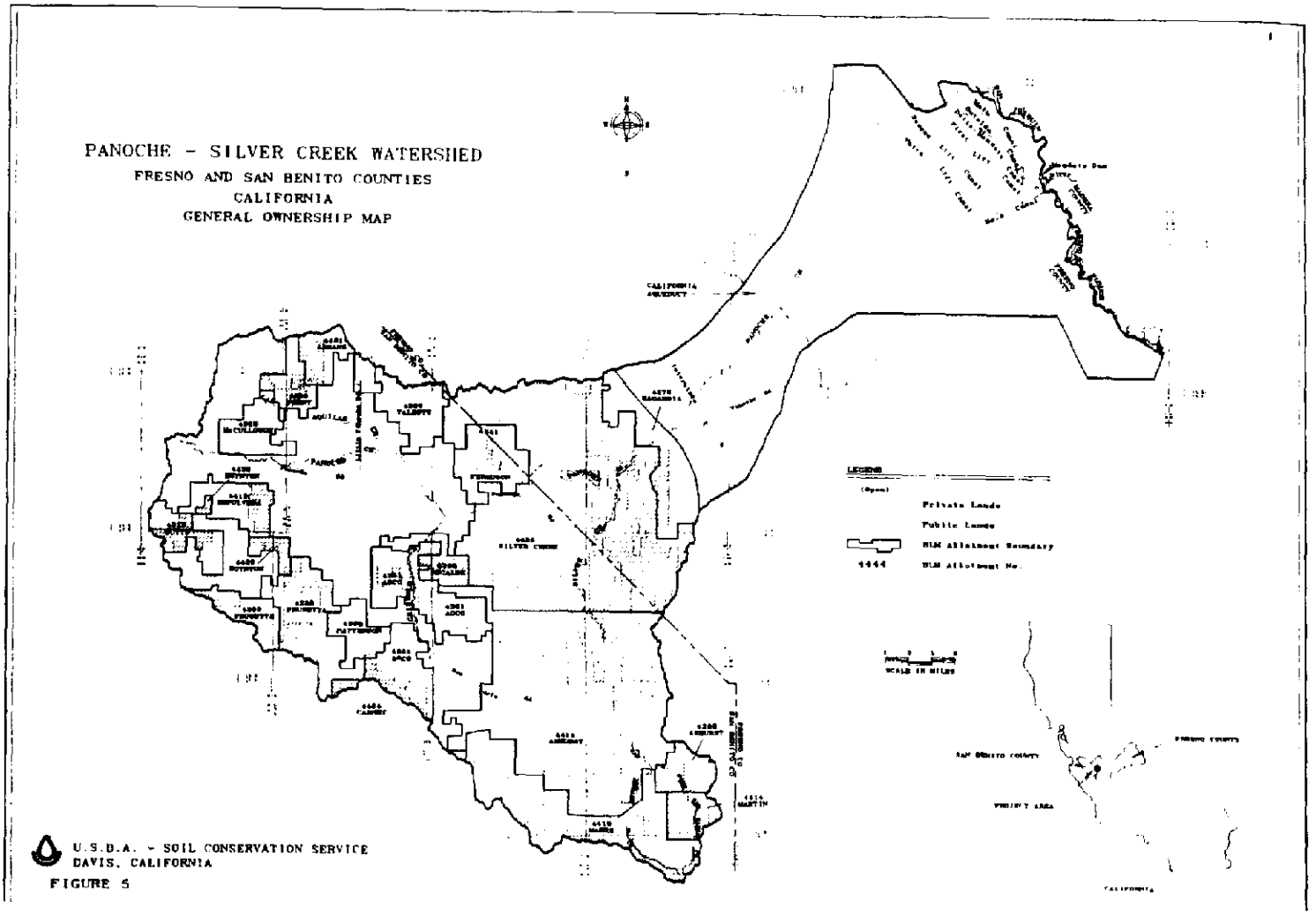


FIGURE 5

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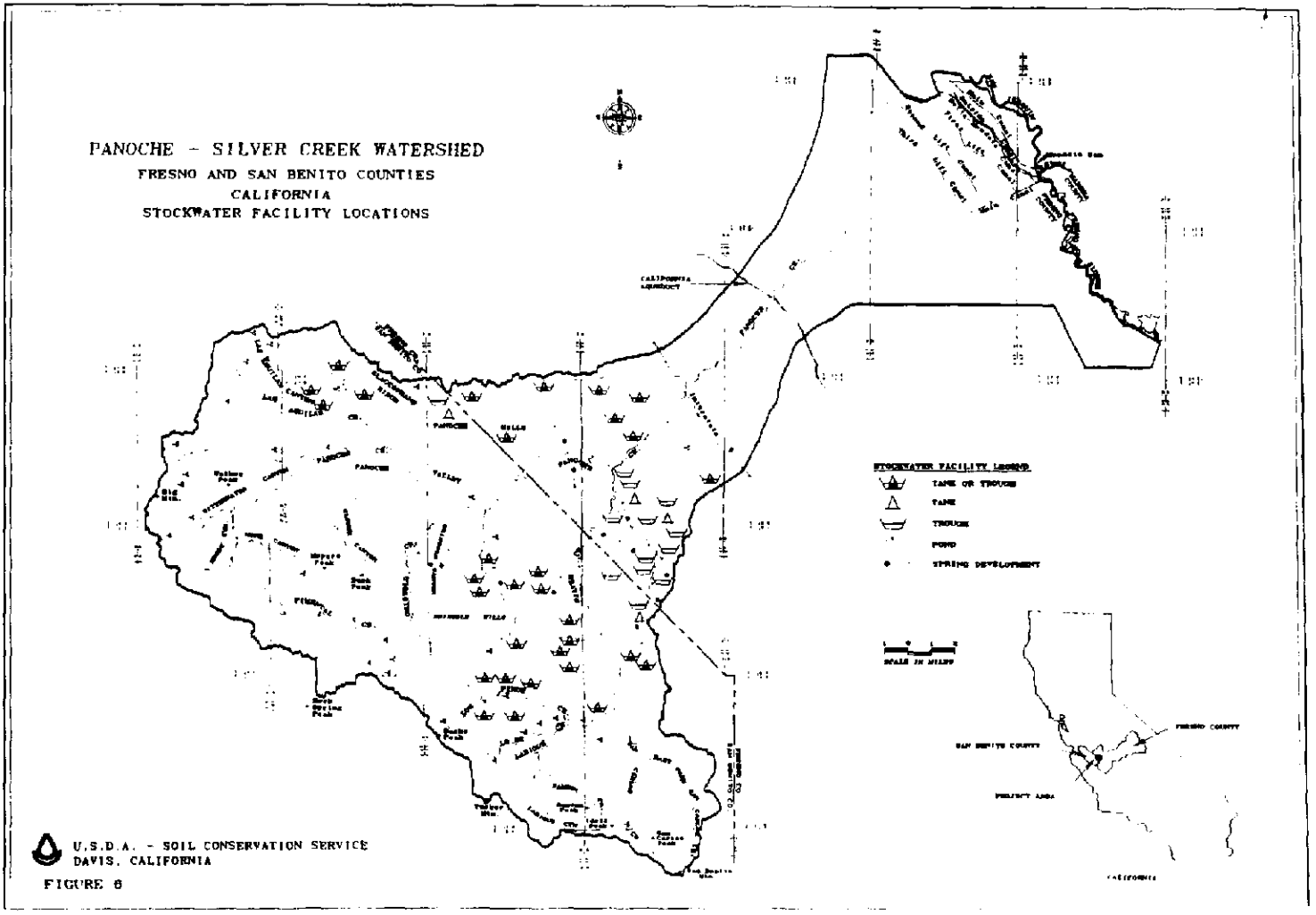

FIGURE 6

I-007385

RIPARIAN ZONE CONDITION

An assessment of riparian zone condition was made using aerial photographs, National Wetlands Inventory maps, and Central Valley Riparian Mapping Project maps. Most riparian areas were also field checked. Condition was rated and mapped based on the amount, type, and diversity of vegetation; the adjacent land use; and the state of the stream channel and its hydrology (Figure 7). Condition classes were derived from assigning points for each of these factors, then averaging the total points as shown in Table 3.

In general, riparian conditions in the upper watershed are good to excellent in the oak woodland and chaparral plant communities. In the grassland areas, conditions are variable. The most severely impacted areas are Vallecitos, Los Pinos, Lopez, and Larious Creeks in the Vallecitos Valley, Silver Creek between its confluence with Panoche Creek and the Fresno County line, and Panoche Creek between the confluence area and Interstate 5. Impacts to the Vallecitos Valley creeks and Silver Creek appear to result from a combination of heavy livestock use and poor soils. Impacts to Panoche Creek are the result of an in-stream gravel mining operation as well as numerous roads and off-road vehicle trails in and through the channel. In these areas, loss of vegetation has resulted in unstable banks which are actively eroding.

Significant impacts are also present in the Panoche and San Joaquin Valleys, partially due to cultivation adjacent to the riparian zones and the channelization of the streams for flood control or other reasons. Perhaps more significantly, the deep alluvial soils in these areas are prone to downcutting. The downcutting has resulted in near vertical banks and lowering of the water table. Rodent burrows in the banks contribute to the sediment load. Re-vegetation alone would probably not be successful or sufficient in these areas. Some type of engineered streambank protection will be necessary.

The invasion of exotic species in the streams of the watershed has also degraded the quality of the habitat. Exotics tend to out-compete native species by creating conditions that favor their own reproduction at the expense of other species, forming a monoculture (Van Cleve, et. al., 1989). Exotic species of concern in the Panoche/Silver Creek area are tamarisk (*Tamarix pentandra*), giant reed (*Arundo donax*), and tree tobacco (*Nicotiana glauca*). Patches of tamarisk were observed in the San Carlos-Silver Creek drainage, and in the channel of the lower watershed. A heavy infestation (monoculture) of tamarisk is found at the confluence of Panoche and Silver Creeks. Giant reed and tree tobacco are found intermittently in the lower watershed. Control of these exotics by cutting the stems and applying herbicide to the cut area could increase the diversity of vegetation and improve wildlife habitat in these areas, as well as preventing the problem from spreading further. A control program may need to be followed for several seasons and accompanied by planting of native species to be successful.

Still another degradation problem in some areas is the use of riparian zones for garbage dumps. This problem is especially severe in the channel of

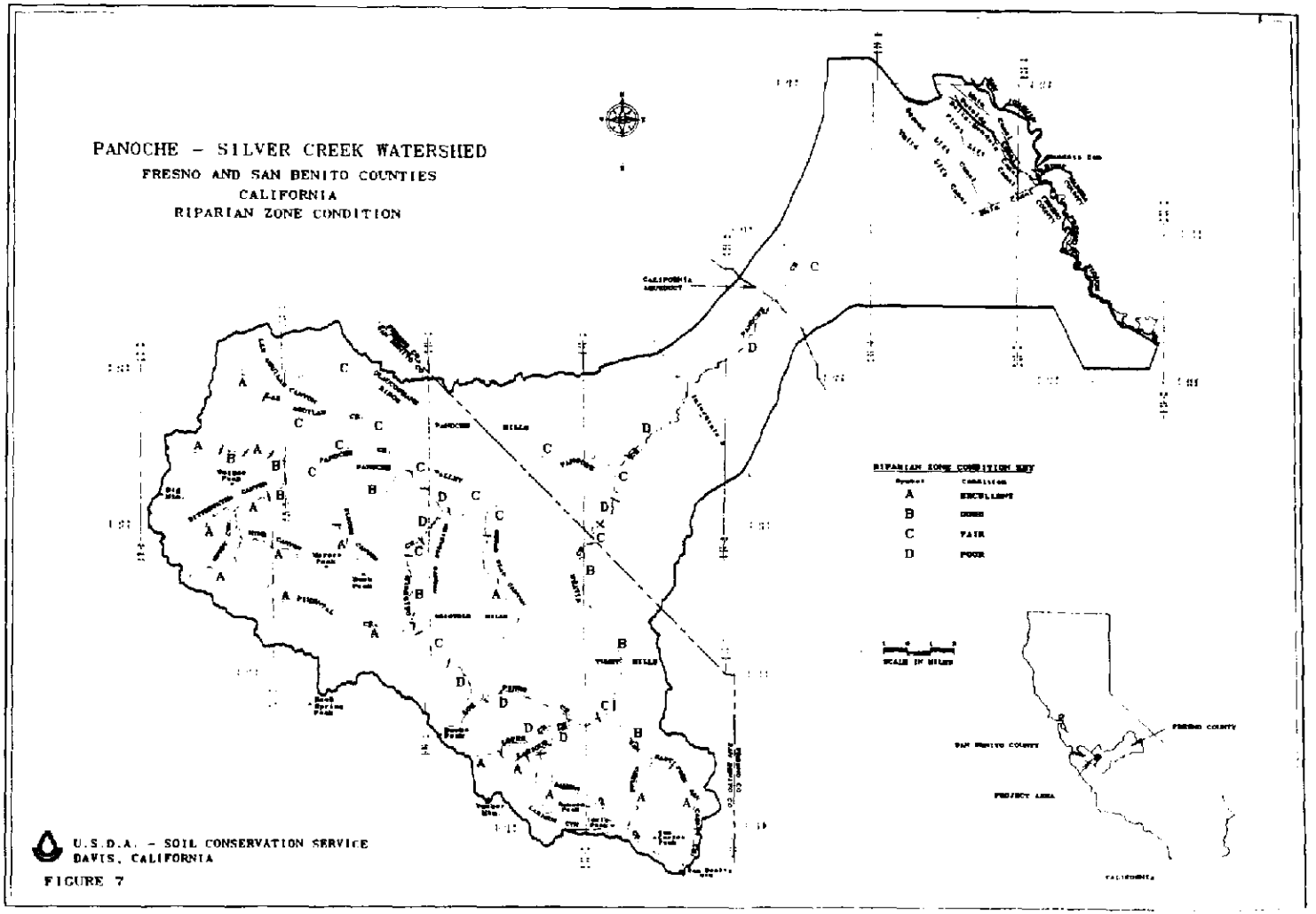

FIGURE 7

I-007387

Panoche Creek northeast of the California Aqueduct. There is also an area near the confluence of Panoche and Griswold creeks where old cars and farm equipment have been dumped, perhaps as a form of streambank stabilization, but the result is an eyesore. A demonstration project in this zone could clean up the junk in conjunction with the installation of more visually pleasing streambank protection measures. In the lower watershed, an entity needs to be found or created with responsibility for cleaning and maintaining the channel.

The channel in the lower watershed is densely vegetated downstream of the California Aqueduct. While this may exacerbate flooding problems by decreasing the amount of water the channel can carry, it also traps sediment and provides the only year-round habitat for wildlife in the predominantly intensively cultivated surrounding area.

SENSITIVE SPECIES

Five threatened or endangered animal species occur in the watershed. Four are found primarily in the upper watershed: the San Joaquin kit fox, the giant kangaroo rat, the blunt-nosed leopard lizard (all federally endangered) and the San Joaquin antelope squirrel (state listed as threatened) (USDI-BLM, 1987; State of California Resources Agency, 1993). All these species originally inhabited the west side of the San Joaquin Valley, but are very rarely found there now, due to the conversion of the land to agricultural use (State of California Resources Agency, 1980). The bulk of the populations in the Panoche/Silver Creek watershed are found in the Panoche, Tumey, and Griswold Hills, and the Panoche Valley (State of California Resources Agency, 1992). These species are all highly adapted to extremely arid conditions; none of them are dependent upon riparian areas.

These species are, however, dependent upon each other. In particular, the giant kangaroo rat may be a "keystone" species; in other words, the condition and abundance of the rat's population may influence the condition and abundance of the population of the three associated species. Giant kangaroo rats and San Joaquin antelope squirrels are food sources for the San Joaquin kit fox. The squirrel and the blunt-nosed leopard lizard live in the burrow systems of the rats (USDI-BLM, 1987).

Season-long grazing and a concentration of large numbers of livestock in a small area, such as in sheep camps and around salt and water locations, may adversely impact these species, as may the use of rodenticides (USDI-BLM, 1987). Burrowing rodents generally benefit from grazing, however. The removal of vegetation allows them to see predators approaching, so they have time to take cover underground (Davis and Hamilton, 1993). Also, as with range productivity, wildlife populations are dependent more on annual rainfall patterns than any other variable (Williams, 1992).

The Bureau of Land Management currently manages public lands near the confluence of Panoche and Silver creeks and in the Tumey Hills for threatened and endangered species. Planned actions to achieve their

objective to protect, maintain, and improve habitat for the four animal species focus on maintaining a 200 foot buffer zone around rat colonies and kit fox dens. In addition, they are working to eliminate predator trapping and rodent poisoning on public land and are continuing to try to acquire more land in this area, especially within the Silver Creek allotment, through exchanges (USDI-BLM, 1987).

The fifth protected species is the giant garter snake; state listed as threatened and federally proposed as endangered (State of California Resources Agency, 1993). It occurs in the watershed near the city of Mendota and the Fresno Slough. It is one of the most aquatic of garter snakes, usually found in areas of permanent freshwater, but it will also use temporary water such as irrigation canals and flooded fields (State of California Resources Agency, 1980).

Since this species is associated with wetland habitat, it is of primary concern for potential adverse impacts from selenium. It has also been suggested that snakes are well suited for use as biological indicators of environmental pollution, because they are largely sedentary and have a limited home range (Bauerle, et. al. 1975; Stafford, et. al. 1976).

A study done by the California Department of Fish and Game in agroforestry plantations located near evaporation ponds in the San Joaquin Valley found no adverse impacts from selenium to reptiles, however concerns were raised over the potential negative impacts caused by bioaccumulation of selenium since snakes are completely carnivorous. Snakes collected from Kesterson National Wildlife Refuge after dead and deformed birds were found there did exhibit elevated levels of selenium (California Dept. of Fish & Game, 1993).

Sensitive plant species also occur in the watershed, and are usually associated with the Moreno formation. This formation is also the location of a "significant and irreplaceable" paleontological resource (USDI-BLM, 1987).

Legally protected plant species in the watershed are San Joaquin wooly-threads, federally listed as endangered; and Hoover's wooly-star and San Benito evening primrose, both federally listed as threatened. The San Joaquin wooly-threads and the Hoover's wooly star occur in the upper watershed in approximately the same locations as the four protected animal species. The San Benito evening primrose occurs in the extreme southeastern portion of the watershed in the Bureau of Land Management's San Benito Mountain Natural Area.

Adverse impacts to sensitive plant species can occur through long-term, severe surface disturbing activities such as camping, vehicle use, and trampling by humans and livestock. Some grazing, however, helps to maintain the successional stage at which these herbaceous species thrive. Here again, the annual rainfall pattern plays the major role in determining the population of these species from year to year (USDI-BLM, 1993a).

In addition to these legally protected species, a number of candidates for listing occur in the watershed. A complete listing of sensitive species and their status is found in Table 4.

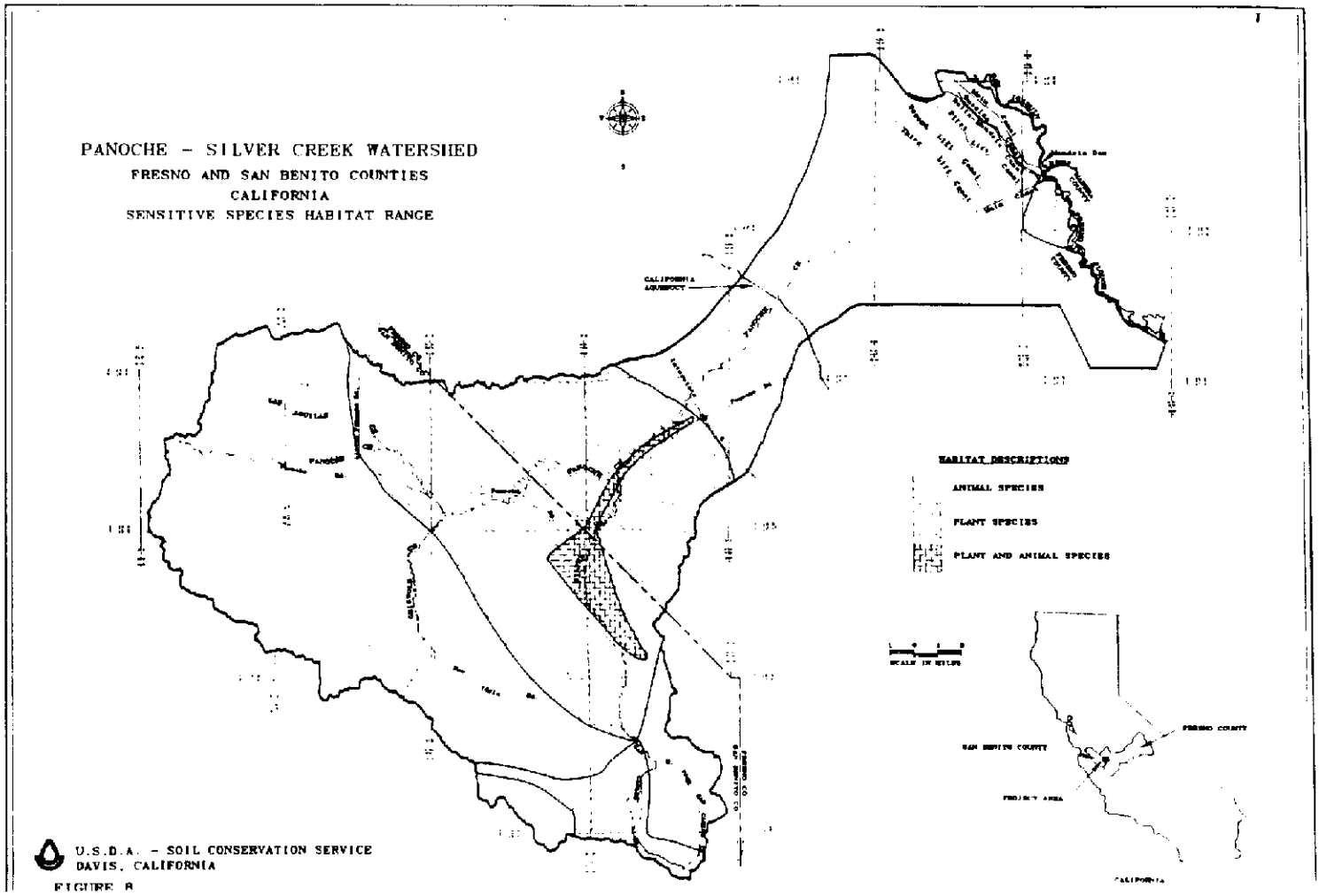

FIGURE 8

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The habitat range map (Figure 8) was compiled from information from the California Department of Fish and Game, the Bureau of Land Management, and the San Joaquin Valley Endangered Species Recovery Planning Program. While these agencies maps show exact locations of actual sightings of sensitive species, the habitat range map attempts to connect these locations to show general areas where these species are most likely to occur.

CONCLUSION

This inventory has revealed several areas of the watershed where improving resource conditions might help alleviate water quantity and quality concerns. Improvements can take the form of management practices, vegetation restoration, and structural practices.

In the category of management practices, grazing strategies for seleniferous soils and riparian zones could be developed. This improvement would seem to be most needed in the area covered by Soil Association 8; however, because this area has very low vegetation potential, reducing or even eliminating grazing in this area may have very little impact. Areas in Associations 9a, 9b, and 6 which had low residue levels and/or poor riparian zone conditions, but better productivity, may show more significant improvements from changes in management practices.

Vegetation restoration would have the greatest impact in the riparian zones graded "D". Management practices could be combined with planting of trees, eradication of exotics, and structures in these areas. Of particular concern for selenium transport are the portions of Silver and Panoche Creeks near their confluence graded "D" and adjacent to Soil Association 8.

Because water tables have dropped and banks are unstable, structural practices will be necessary to control erosion in downcut riparian zones, such as the Panoche/Griswold confluence area and Panoche Creek between Interstate 5 and the California Aqueduct. Once structures are in place, vegetation restoration could be considered.

The naturally low productivity of soils in Association 8 may limit successful vegetation restoration through seeding or management practices, therefore structures to trap sediment may also be necessary along or in the streams in this area.

TABLE 1.

SELENIFEROUS SOILS

Soil Association Number and Name	Seleniferous Component(s) (Soil Series or Geologic Material)	Estimated Contribution to Total Se Load
8. Badland-Torriorthents	Badland	80%
9a. Xerorthents-Exclose-Grazer	Badland; Xerorthents, scarp; Rock Outcrop	20%
9b. Kettleman-Nacimiento-Linne	Badland? Sedimentary Rock Land?	?
11. San Benito-Gazos-Linne	Sedimentary Rock Land?	?

SOIL ASSOCIATION DESCRIPTIVE TERMS

Slope		Textural Classes	
Description	Percent	Description	Class
Nearly level	0-2	Loamy sand	Coarse
Gently sloping	2-5		
Moderately sloping	5-9	Sandy loam	Moderately coarse
Strongly sloping	9-15		
Rolling	9-15	Loam	Medium
Moderately steep	15-30		
Steep	30-50	Clay loam	Moderately fine
Very steep	> 50		
		Clay	Fine

Depth Classes		Drainage
Description	Inches	Poorly
Very deep	> 60	Somewhat poorly
Deep	40-60	Moderately well
Moderately deep	20-40	Well
Shallow	10-20	Somewhat excessively
Very shallow	< 10	Excessively

TABLE 2.

RANGE PRODUCTIVITY BY SOIL MAP UNIT

PRODUCTIVE > 2000 lbs.	MODERATELY SUITED 1500-2000	MARGINALLY SUITED 1000-1500	SEVERLY LIMITED < 1000 lbs./acre
748	405	710	590
Climara	406	717	680
Landslides	408	718	746
Linne	451	719	960
Nacimiento	587	720	Henneke
Rincon	588	722	Montara
Salinas	715	737	
Sorrento	723	739	
Yolo	745	749	
	752	750	
	Gazos	Docas	
	Gaviota	Kettleman	
	Gullied	Los Banos	
	Pleasanton	Panhill	
	San Benito	Panoche	
	Santa Lucia	Shedd	
	Vallecitos	Soper	

CLASS VIII--No productivity rating assigned

950
Badland
Igneous rock land
Mine pits and dumps
Riverwash
Sedimentary rock land

TABLE 3.

RIPARIAN ZONE CONDITION

PTS.	VEGETATION Cover	VEGETATION Diversity	ADJACENT LAND USE	CHANNEL/ HYDROLOGY
1	Bare	--	Instream Roads/Mining	Highly Disturbed
2	Sparse	Invasive Exotics	Agriculture/ modified channel	Deeply cut; Steep, eroding banks
3	Medium	Poor	Agriculture/ non-modified channel	Constrained; Engineered
4	Dense	Fair	Grazing	Braided
5	Very Thick	Good	Wildland/ Reserve	Meandering

Points were assigned in each category for every reach of stream, added together, then averaged to place the reach in a condition category as shown below:

Points	Condition	Map Symbol
4.5-5.0	Excellent	A
3.5-4.4	Good	B
2.5-3.4	Fair	C
1.5-2.4	Poor	D
1.0-1.4	Very poor	F

TABLE 4.

SENSITIVE SPECIES

SPECIES Common name (*Scientific name*)	STATUS Federal/State
ANIMALS	
Blunt-nosed leopard lizard (*Gambelia silus*)	FE/SE
Giant kangaroo rat (*Dipodomys ingens*)	FE/SE
San Joaquin kit fox (*Vulpes macrotis mutica*)	FE/ST
Giant garter snake (*Thamnophis couchii gigas*)	FPE/ST
San Joaquin antelope squirrel (*Ammospermophilus nelsoni*)	C2/ST
San Joaquin dune beetle (*Coelus gracilis*)	C1/--
Golden eagle (*Aguila chrysaetos*)	C2/SSC
Western pond turtle (*Clemmys marmorata*)	C2/SSC
San Joaquin pocket mouse (*Perognathus inornatus*)	C2/--
PLANTS	
San Joaquin wooly-threads (*Lembertia congdonii*)	FE/--
San Benito evening primrose (*Camissonia benetensis*)	FT/--
Hoover's wooly-star (*Eriastrum hooveri*)	FT/--
Green fiddleneck (*Amsinckia furcata*)	C2/--
Lost Hills saltbush (*Atriplex vallicola*)	C2/--
Talus fritillary (*Fritillaria falcata*)	C2/--
San Benito fritillary (*Fritillaria viridea*)	C2/--
Rayless layia (*Layia discoidea*)	C2/--
Mt. Diablo phacelia (*Phacelia phacelioides*)	C2/--
Jared's peppergrass (*Lepidium jaredii*)	BLM

STATUS CODES
F = Federal **S** = State **E** = Endangered **T** = Threatened **P** = Proposed
C1 = Candidate for federal listing; sufficient information exists to warrant listing
C2 = Candidate for federal listing; insufficient information available to permit listing
BLM = Bureau of Land Management sensitive species
SSC = Dept. of Fish & Game species of special concern

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USDI-Bureau of Land Management, Hollister Resource Area. 1993b. Silver Creek/Panoche Creek Watershed Sensitive Plant and Animal Locations. Map, scale 1:75,000.

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Date: 10/26/93

WATER BODY FACT SHEET

Region: 5

Water Body Name: PANOCHE CREEK | Hydrologic Unit No.: | Total Areal Extent: 1 MI | Type of Resource: Rivers and Streams

Clean Water Strategy Rating | Resource Value: | Uniqueness: | Magnitude of Use:

SUMMARY OF PROBLEM(s) OR CONCERN(s)

Type of Problem/Need: Sedimentation
Selenium
Aquatic .ife Impairment

Location: Rear boundary between Merced and Fresno Counties.

Problem/Need(s) and Source Description: Panoche is an intermittent stream which contributes substantial sediment loads downstream due to overgrazing of the watershed. Selenium is transported within the sediment. Mercury levels exceed water quality criteria; source is the Silver Creek tributary with its up stream mine.

	Concern 1	Concern 2	Concern 3
Specific Location:	Entire Creek	Entire Creek 2	Entire Creek 2
Type of Pollutants/Parameters:	SED	SELENIUM	MERCURY
Method of Assessment:	Best Professional Judgement	Measured	Measured
Water Quality Impaired or Threatened?:	Impaired - 1	Impaired - 1	Impaired - 1
Major Beneficial Use Category Affected:	Aquatic	Aquatic	Aquatic
Type of Source(s):	AGRI	AGRI	MINI
Areal Extent:	1e MI	1e MI	1e MI
Programs Affected:	NPS, MONITOR, SPEC-INV	NPS, MONITOR, SPEC-INV	NPS, MONITOR, SPEC-INV

	Concern 4	Concern 5	Concern 6
Specific Location:			
Type of Pollutants/Parameters:			
Method of Assessment:			
Water Quality Impaired or Threatened?:			
Major Beneficial Use Category Affected:			
Type of Source(s):			
Areal Extent:			
Programs Affected:			

e = areal extent of problem is estimated

Date Last Updated: 10/26/93

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URBAN PLANNER

ELIZABETH M. DODD
OF COUNSEL

RESUME

Shute, Mihaly & Weinberger is a law partnership formed in 1980 to practice government, environmental, natural resources, land use, and appellate law. The firm offers a full array of litigation, counseling and planning services, and works regularly with technical consultants in a broad range of disciplines. The firm also has an urban planner who works with public agencies and other clients in land use disputes, planning efforts, and the environmental review and permitting process.

Shute, Mihaly & Weinberger specializes in the following areas:

- Land Use Issues (including General Plan, Zoning, Subdivision Map Act, Development Agreement and Open Space Matters)
- Takings Defense and Exactions
- California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA)
- Initiative and Referendum
- Solid Waste
- Hazardous and Toxic Materials
- Affordable Housing
- Water Issues and Wetlands
- Air Quality and Transportation
- Municipal Financing and Taxation
- Other practice areas, including public agency administration, redevelopment law, and legislative drafting and analysis

Shute, Mihaly & Weinberger serves as special counsel to numerous local governments and other public agencies. The firm provides advice regarding environmental and land use matters and compliance with environmental laws. It also represents public entities in negotiations with state and federal regulatory agencies, and drafts and negotiates contractual agreements concerning land use and development, settlement or avoidance of litigation, and real estate transactions. In addition, the firm brings and defends litigation on behalf of public agencies.

AREAS OF PRACTICE

Land Use Issues

The firm provides advice on and brings and defends litigation involving all aspects of general planning and zoning requirements, as well as specific plans, use permits, variances, and local government reorganization under the Cortese-Knox Act. Members of the firm have participated in drafting local general plans and zoning ordinances, LAFCO guidelines, and state legislation concerning general plans and zoning requirements. The firm also negotiates development agreements and participates in other complex land use negotiations.

- The firm assisted the City of Berkeley in preparation of general plan amendments and a specific plan to preserve open space on the privately held portions of the Berkeley Waterfront. The firm also successfully defended the plan against litigation and assisted the City in working with other cities, the East Bay Regional Park District and the State to implement an East Bay shoreline park.

- The firm advised the cities of Benicia, Fairfield, and Vallejo in developing a long term planning strategy for open space lands between the three cities and now serves as general counsel to the Tri-City and County Cooperative Planning Group, a joint powers agency comprised of the three cities and Solano County. The Group is responsible for developing and implementing an agriculture and open space preservation plan for a 10,000 acre open space area. The firm drafted the joint powers agreement establishing the Group and advises the group in connection with plan preparation and administration, compliance with the California Environmental Quality Act, acquisition of land and open space easements, and other matters arising in the course of agency administration.

- After bringing litigation on behalf of the City of Livermore challenging the approval of major development in the unincorporated area south of Livermore, the firm negotiated a complex settlement agreement among the City, Alameda County and private landowners that launched a cooperative planning process which will result in permanent protection of a substantial portion of the South Livermore Valley for agricultural use.

- The firm represented the City of Sacramento in negotiating a development agreement concerning mixed use redevelopment of the 240-acre Southern Pacific Railyards adjacent to the City's downtown. The issues negotiated by the parties included phasing, major public facilities financing, design standards, vested rights, assignment rights, liability and hazardous materials remediation. The principles of agreement were memorialized in a Preliminary Agreement between the City and Southern Pacific Transportation Company, as well as in the specific plan and special zoning ordinance for the area. The firm also represented the City in negotiations with the property owners in the remainder of the 1000-acre Railyards/Richards Boulevard Redevelopment Area concerning

the plan for redevelopment. The firm advised the City on environmental review and planning issues throughout the planning process.

- The firm provided legal advice to the City of Malibu regarding the City's adoption of its first general plan. The firm worked with the City to develop strategies for protecting the environment and avoiding unconstitutional takings of private property.

Takings Defense and Exactions

The firm defends public entities in takings challenges and other related challenges, such as alleged equal protection and due process violations under 42 U.S.C. Section 1983. The firm also advises public entities on how to avoid takings and assists public entities with nexus studies to support desired regulations and exactions.

- The firm assisted the City of Sacramento in preparing a nexus study, drafting a low income housing fee ordinance, and then successfully defending litigation challenging the ordinance. Commercial Builders of North America v. City of Sacramento, 941 F.2d 872 (9th Cir. 1991), cert. denied. The district court granted the City's motion for summary judgment and found that the ordinance, challenged by a building industry association, did not constitute a taking and did not violate the due process and equal protection clauses. The Ninth Circuit upheld the district court decision, and the Supreme Court denied review.

- The firm represented the City of Tiburon before the United States Supreme Court in Agins v. City of Tiburon, 447 U.S. 255 (1980), in which the landowner alleged that the City's large lot open space zoning ordinance had taken its land. The Court endorsed the open space purposes of the ordinance and unanimously upheld the City's actions.

- The firm successfully defended Santa Cruz County in a takings challenge to its mobile home rent control ordinance. De Anza Properties, Ltd. v. County of Santa Cruz, 936 F.2d 1084 (9th Cir. 1991). The Ninth Circuit upheld the district court's decision granting the County's motion for summary judgment on the grounds that the plaintiff's challenge was barred by the statute of limitations.

- The firm represented East Bay Regional Park District in takings actions filed by a developer in both state and federal courts for alleged inequitable precondemnation activity and regulatory takings. The state court of appeal upheld the state trial court's decision sustaining the District's demurrer and imposing sanctions against plaintiffs for filing a frivolous lawsuit. Likewise, the Ninth Circuit Court of Appeals upheld the federal district court's decision granting the District's motion to dismiss the federal action on both Younger abstention and ripeness grounds.

California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA)

The firm provides consultation regarding CEQA and NEPA compliance and brings and defends CEQA and NEPA litigation on behalf of local and state government agencies and citizens' groups. Members of the firm have participated in drafting CEQA legislation, reviewed and commented on proposed amendments to CEQA, and assisted the Resources Agency in drafting the CEQA Guidelines. Firm members also have taught CEQA and NEPA courses at law schools, planning seminars and attorney continuing education conferences.

- The firm advises the University of California, Davis campus, on numerous CEQA compliance issues related to development, and has assisted in preparing seven EIRs for the campus. The firm also has defended five CEQA lawsuits on behalf of the Davis campus. In addition, the firm served as special counsel to the University for its preparation of an EIR for selection of a new University of California campus in the central region of the state. The firm advised the University on CEQA and other legal issues pertaining to site selection, reviewed consultant drafts of the EIR, and drafted mitigation measures, responses to comments and findings for the project. The firm also assisted the University in its preparation of a revised EIR for its San Francisco campus following the California Supreme Court's decision in Laurel Heights v. Regents of the University of California, and assisted in the litigation successfully defending the revised EIR.

- The firm is advising the San Francisco Redevelopment Agency ("SFRA") in connection with SFRA's preparation of a joint EIR/EIS with the federal General Services Administration ("GSA") for construction of a federal office building in downtown San Francisco. The firm negotiated a memorandum of understanding with GSA regarding the procedure for preparation of the EIR/EIS and resolution of interagency disputes, and provided advice regarding the interrelationship between CEQA and NEPA. The firm also assisted in the EIR/EIS scoping and the determination of approaches for evaluation of potential impacts, reviewed consultant drafts for legal adequacy, and drafted mitigation policies.

- On behalf of the East Bay Municipal Utility District, the firm successfully challenged Contra Costa County's approval of an 11,000-home development in the Dougherty Valley, persuading the trial court that the environmental impact report ("EIR") failed to consider adequately the availability of water and impacts to the local water supply in violation of CEQA. As a result, the court set aside the project approval. The firm also successfully represented the cities of Danville, San Ramon, Pleasanton, and Walnut Creek, and several environmental groups in separate litigation challenging other aspects of the County's CEQA compliance in connection with the same project.

Initiative and Referendum

The firm represents public entities in litigation challenging adopted initiatives and referenda affecting land use issues, such as management of future growth and preservation of agricultural and open space lands. The firm also drafts local initiative measures and referenda.

- The firm successfully defended Napa County in litigation under the state planning law challenging a citizen initiative to protect farmland in the County. The firm drafted the initiative and was retained by the County to defend the measure in litigation brought by the Pacific Legal Foundation, a building industry association, and local landowners. The trial court found that the initiative was not preempted by state planning laws. The court of appeal affirmed the trial court; the state Supreme Court granted review and affirmed the court of appeal decision. DeVita v. County of Napa, 9 Cal.4th 763 (1995). The firm represented the County throughout the litigation.

- The firm drafted and in cooperation with Orange County successfully defended an initiative that establishes a planning process for reuse of a military airforce base designated for closure. The trial court held that aviation law did not preempt the initiative, and that the initiative did not violate the County's general plan.

- The firm has assisted numerous other cities and counties in defending legal challenges to adopted land use initiatives. Published decisions include Garat v. City of Riverside, 2 Cal.App.4th 259 (1991), and Lesher Communications, Inc. v. City of Walnut Creek, 52 Cal.3d 531 (1990).

- The firm drafted and assisted in drafting numerous initiatives and referenda, including City of Fremont Measure A (1981), Solano County Measure A (1984), Yolo County Measure G (1990), Morgan Hill Measure C (1990), Napa County Measure J (1990), San Diego County Proposition C (1993), Stanislaus County Measure F (1993), Amador County Measure A (1994), Orange County Measure A (1994), the update for Solano County Measure A (1994), and City of Saratoga Measure G (1996).

Solid Waste

The firm advises public agencies on solid waste management and recycling issues. The firm has expertise in the California Integrated Waste Management Act and the regulations and practices of the California Integrated Waste Management Board, local air quality management districts and the State and Regional Water Quality Control Boards.

- The firm serves as general counsel to the Alameda County Waste Management Authority ("ACWMA"), a joint powers agency comprised of Alameda County,

two sanitary districts, and all the cities in Alameda County. ACWMA is responsible for preparing and implementing the County Integrated Waste Management Plan and Hazardous Waste Management Plan, solid waste facility siting, and assisting member agencies in matters pertaining to solid and hazardous waste management. The firm advises ACWMA in these areas on an ongoing basis and provides legal services in connection with a wide range of public agency matters such as Brown Act and Public Records Act compliance, conflicts of interest, land acquisition, and public contracts.

- The firm has extensive experience advising public agencies in negotiating, drafting, and enforcing waste collection and disposal agreements. On behalf of the ACWMA, the firm evaluated all member agency franchise agreements to identify opportunities for influencing waste flow and to develop strategies for franchise renewal negotiations. In addition, the firm advised Riverside County and the Del Norte Solid Waste Management Agency in drafting new franchise agreements, represented the City of Mountain View in a dispute with a franchised solid waste hauler regarding the scope of its franchise agreement, and served as an expert witness on behalf of the City of Fairfax in litigation concerning the nature and scope of waste collection franchises.

- The firm provides ongoing representation to the City of Mountain View regarding permitting, landfill closure and other regulatory requirements associated with owning a large landfill operation. In addition, the firm advises the City on interim and end uses for its landfill sites as well as compatibility with adjacent uses. The firm advises the ACWMA regarding that agency's design, permitting, and development of a greenwaste/biosolids co-composting facility.

Hazardous and Toxic Materials

The firm is well-versed in hazardous materials law and the redevelopment of contaminated properties (brownfields), including development of land use-based cleanup strategies, minimization of risks to future landowners, implications for financing, and the powers of local agencies to direct remediation. The firm regularly works with the California Environmental Protection Agency, Department of Toxic Substances Control ("DTSC"), various Regional Water Quality Control Boards, and local hazardous materials regulatory officials.

- The firm represented the City of Sacramento regarding potential development of the Southern Pacific Railyards/Richards Boulevard redevelopment area. The proposed plan involved large-scale, mixed-use development adjacent to the City's downtown area. The firm advised the City on the cleanup of hazardous materials at the superfund site located on the Southern Pacific property, retained and worked with hazardous materials experts, represented the City in negotiations with Southern Pacific and DTSC over cleanup standards, drafted a Memorandum of Understanding between the City, DTSC and Southern Pacific regarding ongoing land use authority over the site, and drafted the Hazardous

Substances element for the Railyards Specific Plan and a development agreement to govern development and cleanup of the 240 acre site.

- The firm represents the City of Benicia with regard to the operations and subsequent closure of a Class I hazardous waste facility adjacent to Benicia. In response to litigation claiming that state hazardous waste law preempted the exercise of the County's local land use authority, the firm authored an amicus brief on behalf of fifteen California cities and counties in support of Solano County's authority to require IT Corporation to comply with the County's land use permit. The court ruled for the County. IT Corporation v. Solano County, 1 Cal.4th 81 (1991).

- The firm represents the City of Mountain View, and has represented the Whisman School District, with regard to the interrelationship between the Teledyne/Spectra-Physics Lasers ground water plume (a federal Superfund site), the City's landfill operations, redevelopment and use of affected City property, and cleanup of the School District's leaking underground storage tanks.

Affordable Housing

The firm represents cities, counties and redevelopment agencies in connection with constitutional and regulatory issues associated with affordable housing.

- The firm provided drafting assistance and legal advice to the City of Sacramento and the Sacramento Housing Redevelopment Agency regarding the creation of affordable housing through a Sacramento Housing Trust Fund. The firm worked with the Agency in the selection of a consultant to prepare a nexus report, defining the legal requirements for the report, and in developing an analytic approach to satisfy those requirements. In collaboration with Agency staff and the Department of City Planning, the firm drafted the Housing Trust Fund Ordinance and advised the Agency during the hearing process. The firm also successfully defended litigation challenging the ordinance.

- The firm drafted an inclusionary housing and affordable housing trust fund ordinance for San Luis Obispo County. The firm identified alternative approaches to inclusionary housing used by other jurisdictions in California, worked with County staff and consultants to identify a conservative nexus for imposition of the inclusionary housing requirement, prepared options papers for County staff, and drafted a final ordinance and accompanying findings for approval by the Board of Supervisors.

Water Issues and Wetlands

The firm works on a wide variety of cases involving water quality, water rights, wetlands, public trust and coastal issues. The firm has expertise in the Clean Water Act, Porter-Cologne Water Quality Control Act and regional water quality regulations and standards.

- The firm serves as counsel to the Sacramento Area Water Forum, which is engaged in an innovative effort to solve regional long term water supply problems through a mediator-led negotiation process. The Water Forum is a stakeholder coalition including the County of Sacramento, the cities within the County, water districts, business, labor, agricultural interests, and environmental groups. The Forum seeks to formulate a Water Plan that will provide the region with a safe and reliable long term water supply while preserving the fishery, wildlife, recreational and aesthetic values of the Lower American River.

- The firm represents the Sacramento Area Flood Control Agency ("SAFCA"), a joint powers agency including the City of Sacramento, Sacramento County, Sutter County, the American River Flood Control District, and Reclamation District 1000. SAFCA is responsible for planning and implementing flood protection measures in the Sacramento region. The firm has advised SAFCA with regard to such matters as compliance with the California Environmental Quality Act, the National Environmental Policy Act, and state and federal endangered species acts. The firm assisted SAFCA in obtaining a Clean Water Act section 404 permit for the proposed construction of a $30 million levee improvement project between the Sacramento and American Rivers. The firm has also advised SAFCA in its efforts to obtain state and federal support for regional flood protection and to develop local development fees and other cost recovery programs to finance local flood control programs.

- Clem Shute serves as referee to the Los Angeles Superior Court in the Ballona Wetlands dispute in Los Angeles, working with the parties to reach a solution to regulatory problems involving numerous public and private entities.

- The firm prepared a handbook for local governments and citizens' groups that addresses local, state and federal wetlands regulations, and provides advice on techniques local governments can use to protect wetlands within their jurisdictions.

Air Quality/Transportation

The firm provides representation to public entities on air quality and transportation issues. The firm regularly works with regional air quality management districts and has expertise in the state and federal Clean Air Acts.

- The firm represents the South Coast Air Quality Management District in the defense of air quality regulations adopted by the District to reduce air pollution emissions. For example, working with District Counsel, the firm has defended challenges to air emissions limitations on architectural coatings, aerosol coatings, hydrogen fluoride, and barbecue charcoal lighter materials and related products.

- The firm has represented the County of Santa Cruz in connection with its regulation of a sand quarry operation. The firm worked extensively with the Monterey Bay Unified Air Pollution Control District and the County's air quality consultant on analyzing impacts from the quarry operation, particularly concerns regarding PM10 and crystalline silica emissions.

- The firm has represented numerous public agencies and citizens' groups in challenges to transportation agencies' approvals of freeways and major thoroughfares, including the Hatton Canyon Freeway in Monterey County and the San Joaquin Hills Transportation Corridor and Eastern Transportation Corridor in Orange County.

Municipal Financing and Taxation

The firm advises public agencies on methods for funding public projects, including taxation, assessment districts and development fees.

- The firm successfully defended an assessment district formed by the City of San Buenaventura to perform dredging and maintenance of boat channels in a waterfront subdivision. The lawsuit included allegations of illegal taxation under Proposition 13. The firm also advised the City throughout the assessment district formation process.

- The firm is currently advising a flood control district on structuring a development fee to be imposed in conjunction with an assessment district, and on issues arising in connection with formation of a Mello-Roos Community Facilities District.

- The firm has advised local jurisdictions, including the Cities of Sacramento and San Diego, and the County of Sacramento, concerning the various mechanisms available to fund programs such as low income housing, and parks and open space acquisition. The firm also has advised special districts regarding open space and other special use taxes, and the implications of various proposed statewide ballot measures that would affect the taxing powers of municipalities and special districts.

Other Areas of Practice

Other areas in which the firm specializes include:

- Public agency administration with respect to matters such as the Brown Act, Public Records Act, Freedom Of Information Act, and conflict of interest issues
- Historic Preservation
- Energy Matters
- Redevelopment Law
- Indian Law
- Public Trust
- Mobile Home Rent Control
- Preservation of Significant Resources through acquisition, conservation easements and other means
- Real Estate Transactions
- Legislative Drafting and Analysis

Members of the firm provide litigation, counseling and planning services in each of these practice areas.

SAMPLING OF PUBLIC ENTITY CLIENTS

CITIES

- Benicia
- Berkeley
- Carlsbad
- Carmel-By-The-Sea
- Danville
- Eureka
- Fairfax
- Fullerton
- Half Moon Bay
- Irvine
- Lafayette
- Laguna Beach
- Livermore
- Malibu
- Martinez
- Mill Valley
- Mountain View
- Newport Beach
- Oakland
- Orinda
- Pacifica
- Patterson
- Piedmont
- Pleasant Hill
- Pleasanton
- Roseville
- Ross
- Sacramento
- San Buenaventura
- San Diego
- San Rafael
- San Ramon
- Santa Ana
- Santa Barbara
- Santa Clara
- Santa Rosa
- Sausalito
- South Pasadena
- Tiburon
- Walnut Creek

SPECIAL DISTRICTS AND GOVERNMENT AGENCIES

- Alameda County Waste Management Authority
- California Coastal Commission
- California Department of Forestry
- California State Lands Commission
- Central Contra Costa Sanitary District
- Colorado River Indian Tribes
- Del Norte Solid Waste Management Authority
- East Bay Municipal Utility District
- East Bay Regional Park District
- Fairfield-Suisun Sewer Department
- Irish Beach Water District
- Metropolitan Water District of Southern California
- Monterey Bay Unified Air Pollution Control District
- Monterey County LAFCO
- Monterey Peninsula Regional Park District
- Sacramento Area Flood Control Agency
- Sacramento Housing and Redevelopment Agency
- San Francisco Port District
- San Francisco Redevelopment Agency
- South Coast Air Quality Management District
- Tri-City and County Cooperative Planning Group
- University of California

COUNTIES

- Marin
- Napa
- San Bernardino
- Santa Clara
- Santa Barbara
- Santa Cruz
- Sonoma
- Yolo

FIRM MEMBERS

E. Clement Shute, Jr., a Boalt Hall School of Law graduate, was Assistant Attorney General in charge of the Environmental and Consumer Protection Section of the Attorney General's Office before leaving to found Shute, Mihaly & Weinberger. He was a member of the Attorney General's office from 1964 to 1980. Mr. Shute received his undergraduate degree from the University of California at Berkeley, and completed a program in Environmental Policy and Management at Harvard University.

Marc B. Mihaly worked in the California Attorney General's Environmental Unit from 1976 to 1980 prior to founding the firm. He also worked in the San Mateo County Legal Aid Society following his graduation from Boalt Hall School of Law. Mr. Mihaly received his undergraduate degree from Harvard College.

Mark I. Weinberger was a member of the Attorney General's office from 1975 to 1980, where he was lead attorney for the Environmental Unit in San Diego and also worked in the Sacramento office before leaving to found Shute, Mihaly & Weinberger. He is a graduate of Harvard Law School and received his undergraduate degree from Stanford University.

Fran M. Layton joined the firm in 1983 after three years as an attorney at Wald, Harkrader & Ross in Washington, D.C., where she was involved in litigation before federal courts and federal administrative agencies. Ms. Layton holds a law degree from Boalt Hall School of Law and an undergraduate degree from the University of California at Berkeley.

Rachel B. Hooper began working with the firm in 1984 after two years as a law clerk for U.S. District Judge Laughlin E. Waters and two years as an attorney at Kinsella, Boesch, Fujikawa & Towle in Los Angeles. Her law degree is from Boalt Hall School of Law and her undergraduate degree is from Yale College.

Ellen J. Garber, a graduate of Boalt Hall School of Law, joined the firm in 1987. Before attending law school, she worked for seven years as an urban planner in public and private practice. Ms. Garber received a Bachelor of Urban Planning from the University of Cincinnati.

Christy H. Taylor worked as a law clerk and staff attorney for Chief Justice Malcolm Lucas of the California Supreme Court for two years prior to joining the firm in 1990. She is a graduate of Boalt Hall School of Law and Dartmouth College.

Tamara S. Galanter, a graduate of Yale Law School, joined the firm in 1989. Prior to law school, she worked as a political organizer and fundraiser for a statewide environmental and consumer advocacy organization. She received her undergraduate degree from the University of California at Berkeley.

Ellison Folk, who joined the firm in 1990, received her law degree from Boalt Hall School of Law. She also holds a Masters in City and Regional Planning from the University of California at Berkeley and an undergraduate degree from Princeton University.

Richard S. Taylor, who joined the firm in 1991, previously worked as an attorney for Paul, Weiss, Rifkind, Wharton & Garrison in Washington, D.C., where he was involved in environmental compliance and international trade. He holds a law degree from Boalt Hall School of Law and a Masters in Business Administration from the University of California at Berkeley; his undergraduate degree is from the University of California at Davis.

Elizabeth M. Dodd graduated from the King Hall School of Law, University of California at Davis. She practiced environmental law with the Sierra Club Legal Defense Fund for three years before joining the firm in 1986. She received her undergraduate degree from Radcliffe College.

Susannah T. French, a Boalt Hall School of Law graduate, began working at the firm in 1993. Prior to law school, she worked as a research assistant at the Sierra Club Legal Defense Fund. She received her undergraduate degree from Harvard College.

William J. White graduated from New York University Law School and joined the firm as an environmental fellow in 1995. During law school he worked at the Natural Resources Defense Council and Sierra Club Legal Defense Fund, and prior to law school worked at Greenpeace. He received his undergraduate degree from the University of Virginia.

Susan A. Austin, a Harvard Law School graduate, clerked for the Honorable William C. Canby, Ninth Circuit Court of Appeals, before joining the firm in 1996 as an environmental fellow. She holds an undergraduate degree from Stanford University.

Aaron S. Isherwood joined the firm as an environmental fellow in 1996. He received his law degree from the University of Oregon School of Law and his undergraduate degree from the University of Chicago. Before joining the firm, he clerked for Justice Robert Durham of the Oregon Supreme Court.

Robert S. Perlmutter, a Boalt Hall School of Law graduate, joined the firm as an environmental fellow in 1996 after completing a judicial clerkship for the Honorable Thelton E. Henderson, Chief Judge of the U.S. District Court for the Northern District of California. He received his undergraduate degree from Harvard College.

Laurel L. Impett, the firm's urban and regional planner, joined the firm in 1989, after working with the EPA for two years as an air quality specialist. She has a Masters in Urban Planning and Architecture and an undergraduate degree from the University of California at Los Angeles, and is a member of the American Institute of Certified Planners.

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Revised 3/19/97

EIP Associates

I-007413

Overview of EIP Associates

Who We Are

We are committed to maintaining the high standards that have contributed to the success of the company since 1968

Our offices are located in Sacramento, San Francisco and the Los Angeles area

EIP Associates is a full-service planning and environmental firm with over 29 years experience serving public- and private-sector clients throughout California.

Our staff is comprised of some of California's leading environmental planners, land use analysts, biologists, and project managers. We pride ourselves on guiding clients through the environmental review process and helping them to find creative, yet practical, solutions to complex environmental issues. We have prepared more than 5,000 environmental documents for cities, counties, governmental agencies, and private sector clients. Our award-winning projects cover the spectrum of possibilities from, for example, small natural resource or planning studies to large-scale multi-issue habitat conservation plans.

Our Capabilities

EIP Associates is a leader in combining environmental, economic, and socio-political concerns in the environmental decision making process

EIP Associates has grown from a company focused primarily on preparing environmental impact assessments to a full-service environmental consulting and planning firm.

Today, EIP's services span three major technical areas: environmental assessment, natural resource management, and urban and regional planning. Our multi-disciplinary technical specialists provide project support throughout multiple development phases. For example, a development project may at first focus on land-use planning services, but later bring in EIP's restoration ecologists to construct wetlands or other habitats to meet CEQA-mandated mitigation or other requirements.

EIP's goal is to provide an integrated team of planners and scientists who are able to respond to the full range of project needs. In working together efficiently, EIP staff deliver comprehensive solutions cost-effectively.

Overview of EIP Associates

Environmental Assessment and Compliance

EIP Associates is an established leader in environmental assessment and compliance documentation. Our highly qualified staff is committed to ensuring that clients are in full compliance with myriad environmental laws and regulations that face regulatory agencies and project sponsors.

Since 1968 we have produced more than 5,000 quality environmental documents

Environmental Impact Reports/Statements. We were one of the first firms to specialize in the California Environmental Quality Act. Over the years, we've prepared thousands of environmental impact reports, statements, and related documentation. EIP is accustomed to preparing documents that fit project needs. We prepare cost-effective program- and project-level analyses, as well as tiered documents for projects and policies.

EIP's mitigation programs utilize state of art best management practices to offset environmental impacts

Mitigation Programs. EIP's scientists are skilled in developing and implementing programs to offset environmental impacts, which can be an instrumental component of winning project approval.

Permit Acquisition. EIP successfully secures permits from regulatory agencies, including the U.S. Army Corps of Engineers (404 Permits), the U.S. Fish and Wildlife Service (Section 7 and 10). We also prepare streambed alteration agreements, NPDES discharge permits, RCRA permits, and others.

EIP's public involvement programs have earned top honors from the American Planning Association and the Association of Environmental Professionals

Public Involvement Programs and Facilitation. Addressing local concerns in coordination with state and local entities is an important component of the environmental decision-making process. EIP has skilled facilitators and mediators on staff who develop programs to promote open discussions that help clarify – and resolve – contentious issues.

Overview of EIP Associates

Natural Resource Management

EIP is one of a handful of firms setting the standard nationwide for restoring and protecting natural habitats

One of EIP's key technical strengths is our team of natural resource scientists and biologists. Our staff includes individuals with decades of field experience studying all types of habitat. In consultation with responsible agencies and project proponents, we develop a work approach that achieves study goals within efficient schedules and budgets.

We routinely develop original project-specific techniques that are superior to widely applied, but not always appropriate, assessment and management techniques

Habitat Restoration and Mitigation Planning. EIP is a national leader in the field of habitat restoration. Our work includes repairing or completely recreating wetlands, river and stream ecosystems, woodlands, and other natural environments. Our restoration projects are cost-effective, feasible, and permanent.

Mine Reclamation. EIP's scientists have a successful record of restoring old mines by designing and overseeing innovative, cost-effective grading and revegetation programs.

Water and Aquatic Resource Management. EIP's hydrologists and aquatic scientists provide watershed planning and conduct studies to evaluate how projects could impact water quality, fish stocks, and aquatic ecosystems. We are skilled at designing erosion-control measures to reduce pollution at reservoirs, aqueducts, and other water-supply projects.

EIP often advises clients on state and federal Endangered Species Act compliance

Endangered Species Assessments. California is home to many threatened and endangered species – and more may join the list in coming years. EIP surveys properties for sensitive plants and wildlife and advises clients on state and federal Endangered Species Act compliance.

Erosion Control and Stormwater Plans. EIP prepares Stormwater Pollution Prevention Plans (SWPPP) and assists clients in minimizing erosion through best management practices, including proper grading and vegetation programs.

Overview of EIP Associates

Urban and Regional Planning

Since 1968, our firm has assisted cities and counties in preparing general plans and EIRs as well as representing project sponsors in obtaining necessary federal, state and local land use approvals.

As EIP Associates has grown, we've found that project planning is most effective – and economical – when environmental concerns are integrated with land use, zoning and long-term capital planning programs. Our staff includes certified planners, landscape architects, and public policy analysts who readily assist clients through all phases of urban and regional planning.

General and Specific Plans. EIP staff assist planners in developing municipal and county plans – and in supporting the plans by determining whether elements are likely to cause significant harm to the environment.

Economic Studies. EIP's analysts are trained in the latest economic forecasting techniques and can provide detailed projections of how projects could impact employment, housing, income, and other socioeconomic variables.

Transportation Planning. EIP seeks solutions to traffic congestion, noise, and air pollution by evaluating environmental consequences of mass transit and regional transportation alternatives.

Institutional Development Plans. EIP has substantial experience assisting universities, colleges and government agencies in their plans to expand facilities and develop long-term capital expenditure programs.

Relevant Project Experience

EIP Associates has tremendous experience and expertise in preparing environmental documents for mixed development projects.

EIP brings a highly skilled team of environmental professionals to mining projects with experience throughout California and Nevada. Our experience has helped us to build a strong track record throughout this region for our professional objectivity, comprehensive environmental analysis, scientific accuracy, and effective public involvement programs.

During the last decade, EIP Associates has worked on a continual basis on CEQA/NEPA studies and environmental studies for mines. A consulting firm's familiarity with local issues and concerns and an intimate understanding of relevant regulations and previously prepared documentation enables a project to begin immediately, stay on track, and provide the highest caliber environmental documentation.

We have included relevant mining and CEQA/NEPA project experience for your consideration.

Selected Mining Related Projects

Syar Industries Reclamation Plan EIS/EIR
Sonoma County, California

Faced with the prospect of continued streambed degradation, EIP developed several alternatives to the proposed mining operations and suggested alternative approaches to reclamation of the mined sites.

Working with three co-lead agencies--the California Board of Mining and Geology, the San Francisco District of the Corps, and the City of Healdsburg--EIP prepared a Draft EIS/EIR on the development and reclamation of six proposed instream and riparian terrace aggregate mining sites along a nine-mile reach of the Russian River in Sonoma County. The Final EIS/EIR is currently in progress, and identifies several significant impacts on the river's riparian resources and adjacent aquifers associated with instream and terrace mining operations and proposed reclamation plans. Chief among these involved continued degradation of the elevation of the streambed. Historically, mining operations in the Russian River have removed more aggregate than is naturally replenished from upstream sources.

This has resulted in the lowering or "degradation" of the elevation of the streambed. This degradation has

several environmental consequences for stream morphology, groundwater availability, riparian vegetation, and fisheries.

Several innovative approaches were developed by EIP and presented in the Draft EIR/EIS including changing the focus of proposed mining and reclamation operations from instream areas to riparian terrace areas

EIP developed alternatives that provided a range of options to the decision-makers. These alternatives presented means to combine the removal of aggregate from riparian areas with the long-term enhancement of previously disturbed valley riparian habitat, which is currently limited to narrow bands along the river-sides. Historically, the middle reach of the Russian River has been subject to extensive modification resulting from instream mining operations and indirect channelization as a result of the development of adjacent agricultural uses. One option developed by EIP involved the use of mining operations to lower floodplain terrace elevations in order to widen the riparian corridor. This would allow the river to establish a more natural meandering pattern, create more area for the establishment of riparian habitat in areas which are currently farmed, and create a link to other historically mined areas that are currently being reclaimed as wildlife habitat, while still providing Sonoma County with an affordable source of high quality aggregate.

Lake Piombo Mine Reclamation Project
Kaiser Sand and Gravel

EIP's report identified design flaws in the revegetation plan, including an inadequate irrigation system that prevented new plants from taking hold

EIP assisted Kaiser Sand and Gravel in analyzing a previously unsuccessful riparian revegetation program at the Lake Piombo quarry on the terraces of the Russian River in Sonoma County, and to design a new plan to reclaim 7.5-acres of slopes around this gravel quarry. EIP's report identified design flaws in the revegetation plan, including an inadequate irrigation system that prevented new plants from taking hold.

EIP supervised the planting and irrigation of over 2,500 native riparian plants on the banks of an abandoned quarry.

EIP's new vegetation plan, which is now being implemented, calls for the planting of over 2,500 plants on the banks of an abandoned quarry to develop as riparian forest. The design was based on an ecological study of adjacent riparian areas and lessons learned from the previous vegetation attempts. The plan included

sufficient irrigation and appropriate installation methods.

After producing the reclamation documents and gaining approval from the California Department of Fish and Game and Sonoma County, EIP helped select the plant growers and supervised the planting program. Existing gully erosion was controlled using willow cuttings as check dams based on an innovative EIP design. The slopes have become almost fully vegetated and rapid attainment of the success criteria is anticipated.

Sycamore Ranch Mining and Reclamation Plan
Southern Pacific Milling Company

EIP's inventory was essential in helping SP Milling design an environmentally sensitive project

EIP's director of biological services, Richard Nichols, conducted a biological baseline inventory and endangered species survey, and prepared a biological impact assessment and mitigation plan to facilitate approval of a major new 120-acre sand and gravel mining operation in Ventura County. The inventory was essential in helping SP Milling design an environmentally sensitive project.

Mitigation plans included specifications for replacement of about one acre of riparian habitat and 14 oak trees

The baseline inventory, impact assessment, and mitigation plan were thorough and objective enough to allow the environmental impact report preparers working for Ventura County to adopt the conclusions with a minimum of original biological field work and analysis. The primary biological issues were direct impacts to riparian habitats from a road crossing and the realignment of a small drainage channel known as Hardison Ditch.

Because of the early and thorough attention to avoidance and mitigation of biological impacts, controversy surrounding the mine has been defused.

Mitigation plans included specifications for replacement of about one acre of riparian habitat and 14 oak trees. Potential indirect impacts to nesting hawks in the adjacent Boulder Creek riparian forest were addressed with a raptor nest survey conducted by EIP biologists.

EIP is currently providing comments and responses on biological issues for SP Milling during the controversial permit approval process. Because of the early and thorough attention to avoidance and mitigation of

biological impacts, controversy surrounding the mine has been defused.

Sisquoc Quarry Mining and Reclamation Project
Southern Pacific Milling Company

Richard Nichols developed a mitigation plan that would replace the wetlands habitat so that no net loss of wetlands would occur

EIP's Richard Nichols assisted SP Milling with a range of mining reclamation and permitting activities related to operation of a 100,000-ton-per-year aggregate quarry on the Sisquoc River in Santa Barbara County. To gain approval to operate the mine, SP Milling applied for a Section 404 permit, which required a wetlands determination and a mitigation and monitoring plan.

After selecting seven areas for mitigation, EIP developed an implementation schedule and planting plan

The wetlands study determined that mining discharges would impact several acres of jurisdictional wetlands. Consequently a mitigation plan was developed that would replace the wetlands habitat so that no net loss of wetlands would occur.

The plan's performance criteria included survivability levels for willows, cottonwoods and native cover plants

Following Corps of Engineers guidelines, the mitigation plan established the wetlands area and types of plants and wildlife habitats to be replaced. After selecting seven areas for mitigation, EIP developed an implementation schedule and planting plan. EIP staff also conducted an endangered species assessment of the impacted site.

The mitigation monitoring plan specified performance goals to be attained over a five-year period. Criteria included survivability and cover levels for willows, cottonwoods and understory plants. Monitoring techniques included sampling of vegetation and measurements of plants for survival, density and height. Maintenance activities during the monitoring period were also specified, including weed control, irrigation system inspection and plant replacement as needed over five years.

EIP experts are currently attending public hearings and responded to comments from agencies and the public regarding the permit application.

Relevant Project Experience

Boulder Creek Riparian Mitigation and Monitoring Project
Southern Pacific Milling Company

EIP's work includes performance five-year monitoring of tree-scrub density using line intercept methods and measurement of tree height and diameter.

EIP assisted SP Milling in preparing and implementing mitigation plans for a sand and gravel cleanout of the Boulder Creek channel in Ventura County. The project involved acquiring a Section 404 Nationwide Permit from the Army Corps of Engineers and a Streambed Alteration Agreement from the California Department of Fish and Game.

EIP prepared annual reports to the California Department of Fish and Game to document successful attainment of mitigation goals.

EIP's services included planning and overseeing the restoration of a 3.5-acre riparian scrub and alluvial scrub habitat along the banks of Boulder Creek, a tributary of the Santa Clara River. After the initial revegetation program was established, EIP helped with maintenance of the habitat and prepared a five-year program to monitor the success of the restored habitat.

Monitoring tasks included measuring tree/shrub density and vegetative cover using line intercept methods and by recording tree height and diameter. EIP is also preparing annual reports to Fish and Game documenting successful attainment of the mitigation goals.

Sand and Gravel Management Plan and EIR
Sonoma County, California

Among the reclamation methods EIP evaluated was diverting the river to let fine materials settle out.

EIP Associates assisted Sonoma County in evaluating its plan for providing sufficient supplies of sand and gravel for the construction industry while minimizing environmental impacts and land-use conflicts. At issue was whether the land should be used for agriculture (mainly vineyards) or mined for the underlying gravel deposits. Also at issue was how to reclaim the pits that were already mined. Among the reclamation methods EIP evaluated was diverting the river to let fine materials settle out.

Relevant Project Experience

EIP examined these land-use and environmental issues as part a program-level environmental impact report. EIP's update of the county's plan included a comprehensive analysis of the supply and demand for aggregate materials in the county, taking into account quarry, instream and terrace aggregate resources as well as processing and marketing requirements and expected mitigation needs.

Surface Mining Reclamation Planning
California Mining and Geology Board

Among the issues EIP examined were the mines' effect on fisheries, plants and wildlife and streambank erosion

EIP assisted the California Mining and Geology Board in reviewing environmental documentation for several mine reclamation plans. In cases where the plans were inadequate or nonexistent, EIP prepared the necessary environmental documents. In addition, EIP prepared a joint EIR/EIS for the operation and reclamation of seven aggregate mining sites along nine miles of the Russian River in Sonoma Co.

Among the issues EIP examined were the mines' effect on fisheries, plants, and wildlife and streambank erosion. Noise, recreational values, aesthetics and other land use issues were also evaluated. Coordination with local, state and federal agencies and public participation during the review process was critical to the success of this project.

Mining Permits, Reclamation Plan and EIR
Kaweah River Rock Mine, Tulare County, California

Issues of concern included the effects of mining excavation on ground and surface water supplies and the effects of dust and noise on nearby residences.

EIP Associates prepared mining permits, a reclamation plan and an environmental impact report and for a proposed 775-acre rock mine near the town of Woodlake on the Kaweah River. Permits secured by EIP included a surface mining permit for operating an open-pit aggregate mine and a special use permit for operation of an asphalt and concrete plant at the site.

EIP also prepared a reclamation plan and an environmental impact report for the mine. Issues of concern included the effects of mining excavation on ground and surface water supplies; the effects of dust

and noise on nearby residences; the conversion of farmland; the effect of the project on public health and safety; and the effect of the project on local plants and wildlife. Other issues included potential impacts to soils, land use, traffic, archaeological resources, air quality, and public services and utilities.

Leona Quarry EIR
City of Oakland

Two issues of major concern to the city were the steepness of the slopes and the danger to trespassers.

EIP prepared a focused environmental impact report for the City of Oakland addressing the impacts of surface mining operations at the Leona Quarry, the last operating quarry in Oakland. EIP's work examined whether future mining activities and closure of the site would jeopardize public safety. Two issues of major concern to the city were the steepness of the slopes and the danger to trespassers.

The report addressed environmental effects by evaluating their severity and probability of occurrence, focusing on concerns identified in the city's initial study.

Cache Creek Technical Studies
Yolo County, California

Yolo County is currently in the process of developing a Resources Management Plan for the lower Cache Creek to manage the many resources provided by the creek for the good of the public.

Lower Cache Creek in Yolo County, California has historically been an area of multiple values and competing interests. These interests center on aggregate resources, agriculture, and native habitat. In preparation for this plan, the County contracted EIP to oversee the preparation of three technical studies.

EIP prepared a Riparian Habitat Technical Study for lower Cache Creek. Two other technical studies will be prepared: a Streamway Morphology Study (performed by Northwest Hydraulic Corporation) and a Groundwater Hydrology Study (performed by David Keith Todd Consulting Engineers). EIP was the prime consultant for coordinating and consolidating the three studies.

Relevant Project Experience

Working together, those who prepare the studies will define the relationships between stream morphology and groundwater conditions and habitat along Cache Creek, describe changes to the creek over time, plus the reasons for those changes and make recommendations for future management, protection and enhancement of the creek's resources.

These studies will provide a strong factual base for preparation of the Resources Management Plan and will include the following: a comprehensive evaluation of all existing relevant data on Cache Creek resources; a thorough review of historic conditions on and adjacent to the creek; a credible evaluation of changes in the nature of the creek and its resources over time, as well as a defensible determination as to why those changes occurred; and finally, an effective presentation of information and conclusions provided in previous studies.

Petaluma River Habitat Restoration
City of Petaluma

EIP chose a natural biotechnical approach to control streambank erosion.

EIP's San Francisco office Director of Biological Services, Richard Nichols, designed and implemented a major habitat restoration project for the Petaluma River. The project restored native plant and wildlife habitat to 1,000-foot stretch of the river and stopped severe erosion that threatened a bridge crossing and nearby shopping center.

Since it did not require a 404 permit, the biotechnical approach was installed quickly and cost effectively and created a natural looking habitat.

Mr. Nichols' approach to erosion control employed natural biotechnical systems, including installation of willow wattling, coconut fibre rolls and mattresses and intensive planting of native species to stabilize the bank and prevent further erosion. Since it did not require a 404 permit, the biotechnical system was installed quickly and cost-effectively and created a natural-looking habitat.

Even after two major floods, the restoration remained intact, as native plants reintroduced along the river thrived.

The biotechnical bank stabilization began with careful grading of the top bank to create a more gradual slop for improved stability and a larger planting area. Coconut fiber rolls were installed and anchored to the lower bank while the upper bank was protected by rows of wattling trenched and wedged with wood stakes. Areas in between were covered by coconut fiber "mattresses." Native seedlings were planted into this covering, which anchored the roots and prevented erosion until the plantings took hold.

The restoration was successful both in regenerating a natural riparian habitat and in stabilizing the Petaluma River bank. Even after two major floods, the biotechnical systems remained intact, while the native plants reintroduced along the river thrived.

Mitigation Monitoring for the Petaluma River Habitat Restoration Project
City of Petaluma

Mitigation performance criteria included vegetative cover and density, slope stability and inundation frequency and duration.

EIP staff collected and analyzed data to determine progress towards successful attainment of performance criteria for a major biological mitigation project along the Petaluma River in Sonoma County.

The mitigation plan, prepared by EIP's San Francisco office Director of Biological Services, Richard Nichols, proposed creation of five acres of riparian forest and two acres of seasonal wetlands as mitigation for development of a major factory outlet shopping center.

Considerable progress towards attainment of the fifth year performance criteria was documented by the first year, based on analysis of vegetative cover and density, slope stability and inundation frequency and duration.

Guadalupe Valley Quarry Environmental Review
City of Brisbane, California

Of special concern to the city was the dust generated by the quarry and noise from delivery trucks passing near downtown and residential neighborhoods.

For the City of Brisbane EIP Associates reviewed and commented on the adequacy of a Supplemental EIR for an asphalt batching plant proposed for construction at the quarry. Key issues analyzed by EIP included the potential for traffic congestion and noise, and impacts to air, water and visual quality. Of special concern to the city was the dust generated by the quarry and noise from delivery trucks passing near downtown and residential neighborhoods.

As part of the review, EIP recommended mitigation measures that included covered conveyors and baffled sediment traps to reduce air- and water-borne dust and silt.

Relevant Project Experience

Golden Eagle Nest Survey in Elko and Eureka Counties, Nevada
Newmont Gold Company

The Bureau of Land Management has since circulated EIP's study to other project owners as a model report.

To facilitate mine expansion in accordance with the Bald Eagle Protection Act, Newmont applied to the U.S. Fish and Wildlife Service for a permit to remove a golden eagle nest during the inactive season. As part of the permit application, EIP conducted an area-wide nesting studies that included a 20-mile wide helicopter mapping survey and visits to each nest to determine if it had been used during the previous nesting season. Since the survey indicated that no net impact would result from removing the target nest, the Fish and Wildlife Service issued the nest-removal permit without mitigation requirements. The Bureau of Land Management has since circulated EIP's study to other project owners as a model report.

Relevant Project Experience

Summary of CEQA and NEPA Documents Completed by Firm

Cullinan Ranch Final EIR/EIS Services
City of Vallejo and the U.S. Army Corps of Engineers

Issues of concern centered around loss of wetlands, growth inducement, water quality impacts, sedimentation and bay mud soil settlement, dredge disposal, traffic impacts, plants and wildlife, public services and infrastructure financing. EIP's Final EIR/EIS responded to all expressed concerns and provided additional new analysis as required.

Cullinan Ranch is a 1,493-acre parcel of diked historic wetlands along the northern edge of San Pablo Bay, near the City of Vallejo. The City and the U.S. Army Corps of Engineers have received an application to develop this site, now used for dry farming, into a water-oriented residential community.

Because Cullinan Ranch is one of the larger remaining historic wetlands open space parcels in the San Francisco Bay area, a great deal of public controversy has been associated with the project. A consultant was retained to prepare an EIR/EIS on several proposed development alternatives, and the responsible agencies received hundreds of comments on the Draft document. EIP was subsequently hired by the City of Vallejo to prepare responses to these comments and to complete the Final EIR/EIS.

The proposed development alternatives call for channels and marinas, residential, commercial, public facilities and recreational land uses and open space areas in varying densities. Housing would primarily serve middle- and upper-income households.

Comments on the Draft EIR/EIS were received from local, regional, state and federal agencies and from community members and public interest groups.

Relevant Project Experience

San Clemente Dam Water Supply Project EIR/EIS
Monterey Peninsula Water Management District

A key element in the environmental studies was the modeling and analysis of different groundwater pumping scenarios in combination with different reservoir releases in order to provide sufficient flow to sustain the steelhead population

The Monterey Peninsula Water Management District (MPWMD) selected EIP to prepare environmental studies for a large-scale water supply project proposed by the District to meet future water demand and lessen the adverse effects of water management practices on the Carmel River. Studies of the economic and demographic future of the Monterey Peninsula and of the declining steelhead runs in the river have suggested the need for an increase in water supply. MPWMD's project proposes construction of a new and larger San Clemente Dam and Reservoir close to the site of the existing dam. Other elements of the project include future hydroelectric power generation at the reservoir, altered reservoir operations to allow greater instream river flows, increased use of the Seaside groundwater aquifer and the implementation of a water conservation program.

EIP is reviewing existing documentation in the areas of geology and geomorphology, fisheries, traffic, hydrology and water supply, noise, archaeology and regional economics and growth. New technical studies are being conducted in the areas of wildlife and botany, visual quality, fiscal impacts, air quality and land use.

Flow in the lower reaches of the Carmel River has been depleted by heavy groundwater pumping for municipal supply.

Gibraltar Dam EIR/EIS
City of Santa Barbara/Los Padres National Forest

EIP Associates worked closely with the Forest Service to develop ways in which the dam could be built without adversely affecting natural resources and recreation in the Forest.

The City of Santa Barbara needed to expand its water supply to provide water for growth and to replace water lost through reservoir siltation. The City of Santa Barbara and the U.S. Forest Service acted jointly as the lead agency for preparation of the environmental documentation. EIP Associates prepared the EIR/EIS on the project.

Relevant Project Experience

Principal environmental issues included effects on the Least Bell's Vireo, a federally-endangered species, the treatment of mine tailings within the watershed and the effects of a raised dam on downstream users of water from the Santa Ynez River. A consultation with the U.S. Fish and Wildlife Service was conducted under Section 7 of the Endangered Species Act to determine whether mitigation measures could be built into the project to protect the Vireo's habitat.

Armored Vehicle Corridor EIR/EIS
U.S. Department of the Navy

EIP studied the impacts associated with a proposed corridor that will run about 25 miles between Fort Irwin and Twentynine Palms, in the Mojave Desert. EIP prepared the study under a two-year term contract with the U.S. Department of the Navy.

The study area included the Bureau of Land Management Wilderness Study Area (WSA). Concerns included impacts on rare plants, wildlife, Manix Wash Historic Trail, and nearby housing and windmills in the Newberry Community.

Stockton East Water District Farmington Canal Environmental Assessment, Wetlands Regulatory Compliance, and Rare Species Surveys and Mitigation Plans
Stockton East Water District

This project is composed of the excavation of tunnels construction of an open canal and use of existing seasonal creek channels for the conveyance of Stanislaus River water behind the New Melones Dam from the Goodwin Reservoir

Since 1984, the Stockton East Water District (SEWD) has planned and constructed the 38-mile long Farmington Canal project, a water conveyance system between the Stanislaus River in Stanislaus County and the SEWD treatment plant in San Joaquin County. During the planning and construction of the Farmington Canal Project, EIP provided the following services:

EIR/EIS - EIP prepared a scoping report based on the issues identified at a series of public and agency meetings. An EIR/EIS was prepared and certified that identified and mitigated critical areas of concern such as

salt water intrusion into groundwater basins, surface water quality, impacts to agriculture, cultural resources, and fish and wildlife.

Wetland Regulatory Compliance - EIP conducted a wetland delineation along the entire 38-mile long project reach. Based on the Corps verified wetland delineation, an impact analysis and a conceptual wetland mitigation plan was prepared to accompany an application for a Section 404 of the Clean Water Act Individual Permit. Upon issuance of the Individual Permit, EIP prepared wetland creation construction specifications and grading plans and supervised the construction and revegetation of nine acres of created wetland habitat in 1993. EIP will conduct a five-year maintenance and monitoring program to ensure success of the wetland mitigation effort.

Rare Species Surveys and Mitigation Planning - During the planning stages of this project, EIP conducted surveys for rare, threatened, or endangered plant and wildlife species. An unrecorded occurrence of Colusa grass (*Neostaphia colusiana*) was discovered along the proposed canal route. The canal route was relocated to avoid this endangered plant species.

The lower reaches of the Farmington Canal fall within the range of the giant garter snake (*Thamnophis gigas*), a state- and federally-listed threatened species. As a part of the Corps 404 process in accordance with Section 7 of the Endangered Species Act, EIP prepared a giant garter snake mitigation plan that was approved by USFWS and DFG. EIP supervised the implementation of the mitigation plan in 1993 that mitigated for the loss of potential giant garter snake habitat from canal construction along portions of Rock and Duck Creeks.

Relevant Project Experience

Monterey Peninsula Water Management District Water Supply Project EIR/EIS
Monterey Peninsula Water Management District

In this continually evolving project, EIP prepared two Supplemental Draft EIR/EIS's in 1988 and in 1991 responding to the need to analyze additional alternatives to the New San Clemente Dam.

EIP has been involved with the Monterey Peninsula Water Management District (MPWMD), assisting in their long-term water supply planning since 1986. This work effort was initiated with the completion of the New San Clemente Dam EIR, the first of several studies, surveys and planning documents prepared for MPWMD that examined numerous water supply alternatives.

Supplemental Draft EIR/EISs I and II, prepared for MPWMD and the San Francisco District of the Corps of Engineers, each examined ten and five alternative storage reservoirs (respectively) on the mainstream or tributaries to the Carmel River. In addition, both documents examined a desalination plant component in combination with a storage reservoir for some of the alternatives. The Final EIR/EIS examined the environmental impacts of the preferred alternative, the 24,000 acre-foot New Los Padres Dam and Reservoir, as well as the No-Project alternative. The Final EIR/EIS includes a comprehensive Mitigation and Monitoring Program Plan. Some of the major issues that surrounded this project are listed below:

- Fisheries and aquatic life
- Water supply performance, water quality, and sediment transport
- Red-legged frog, southwestern pond turtle, and spotted owl surveys
- Wetlands and riparian habitat protection and enhancement
- Recreation and land use
- Traffic, air quality and noise
- Native American Esselen Indian Archeological concerns
- Growth inducement

Relevant Project Experience

Eastern Municipal Water District Reclaimed Wastewater Pipeline (Reach 4) EIR/EIS
Eastern Municipal Water District

As a result of EIP's work, the pipeline alignment was revised to avoid all direct impacts on listed species or their habitat.

EIP Associates conducted biological reconnaissance surveys of several alternative alignments for Reach 4 of the proposed EMWD Reclaimed Wastewater Pipeline in Riverside County, California. This reach of the pipeline extended from the Sun City Regional Wastewater Treatment Plant through the community of Lake Elsinore to Temescal Wash, a tributary of the Santa Ana River. Several state and federally listed endangered species were known to be present in the project area and were assessed by EIP. These species were the Stephens' kangaroo rat, the least Bell's vireo, the California gnatcatcher, and the orange-throated whiptail. Several listed plants were also present. Investigations focused on potential direct and indirect impacts to these species. An extensive analysis of the potential indirect impacts of the traffic noise, construction noise, and air emissions was performed to address both the long-term and short-term impacts on species occupying areas in proximity to the pipeline construction corridor.

Cajon Pipeline EIS/EIR
Cajon Pipeline Company and the Bureau of Land Management

EIP undertook a complete environmental analysis of the proposed pipeline, including extensive biological and cultural surveys.

EIP Associates was selected to prepare the CEQA and NEPA environmental documentation for the proposed Cajon Pipeline project. EIP Associates prepared a joint EIS/EIR for the project which originally proposed the construction of a 142-mile, insulated pipeline which would carry heavy crude oil from the All American Pipeline's 12 Gauge Lake Heater Station in the High Desert to the GATX crude oil station in Carson. The Final EIR/EIS was completed in 1993 and, subsequently, a Grant of Right-of-Way was issued to the project by the Bureau of Land Management.

The Cajon Pipeline project was subsequently revised to instead construct a shorter pipeline which would transport crude from 12 Gauge Lake to the Etiwanda Generating Station in the City of Rancho Cucamonga.

Relevant Project Experience

At the Etiwanda Generating Station, the Cajon Pipeline would connect with an existing pipeline owned by the Edison Pipeline and Terminal Company (EPTC). The EPTC Pipeline will be used to transport oil to refineries and terminals in the Los Angeles basin. EIP prepared a Supplemental Final EIS and a Subsequent EIR analyzing the environmental effects of the Cajon/EPTC proposal.

For each phase and or modification to the project, EIP has conducted the appropriate biological, archaeological and other technical studies necessary for completing the environmental analysis.

EIP has prepared an Erosion and Sedimentation Control Plan, a Revegetation Plan, and a Construction, Operation, and Maintenance Plan for the Cajon Pipeline. Cultural and biological surveys were also completed by EIP for three segments of the EPTC Pipeline (totaling 19 miles) which need to be replaced with larger diameter pipe in order to accept oil delivered by the Cajon Pipeline.

Biological studies conducted for the Cajon/EPTC project have included: botanical and wildlife reconnaissance surveys (Cajon and EPTC); field surveys and habitat evaluations; sensitive species surveys; coordination with U.S. Fish and Wildlife Service, California Department of Fish and Game, and California Native Plant Society; development of Revegetation and Restoration Plan; and stream crossings and waters of the U.S. analysis. Archaeological studies for the Cajon/EPTC Pipeline Project included archival research and development of historic contexts; intensive survey of the project's area-of-potential effect; resource mapping and documentation; site testing and resource evaluations using National Register and California Register criteria; preservation planning; and consultation with affected Native American groups and responsible agencies.

BARBARA W. SAHM
Senior Associate

Barbara Sahm has over 18 years of experience in managing preparation of complex environmental analyses pursuant to CEQA and NEPA. She was the Environmental Review Officer for the City and County of San Francisco for 11 years. In that capacity, she supervised preparation of environmental documents for San Francisco's Department of Public Works, the Clean Water Program, the San Francisco Water Department and Hetch Hetchy Water & Power, San Francisco International Airport, and other County agencies and departments, as well as for private development projects.

TECHNICAL CAPABILITIES

- Review of CEQA and NEPA documents for legal adequacy
- Interpret CEQA Guidelines and NEPA Regulations
- Manage preparation of environmental documents on complex projects with wide varieties of issues such as transportation, air quality, noise, archaeology/historic preservation, geotechnical, hazardous waste, socioeconomics, land use/zoning, and growth inducement
- Managed staff of the San Francisco Office of Environmental Review and consultant teams preparing EIRs, joint EIR/EIS's, negative declarations, and other environmental review documents on major urban planning and public development projects

EDUCATION AND AFFILIATIONS

J.D., Cum Laude, University of Santa Clara School of Law, Community Services Award, Environmental Law Society
A.B., Biological Sciences, Smith College, Northampton, Mass.
Member, State Bar of California

PROFESSIONAL AWARDS

American Planning Association, National 1993 Current Topic Award, Environmental Planning; for Mission Bay Final Environmental Impact Report
American Planning Association, California Northern Section, Honorable Mention, Focused Topic, 1992, Highlights & Conclusions: FEIR Summary
Association of Environmental Professionals, Outstanding Environmental Document, 1989, for Mission Bay Draft Environmental Impact Report

PROFESSIONAL ACTIVITIES/PUBLICATIONS

Panelist, Environmental Review of Military Base Reuse Plans, Association of Environmental Professionals annual conference, April, 1995
Presenter, commenting on proposed revisions to State CEQA Guidelines on behalf of the City and County of San Francisco, California Resources Agency hearings, Sacramento, 1993 and 1996
Program Participant, New York City Environmental Quality Review (CEQR) Generic/Programmatic Impact Analysis Workshop, New York Department of City Planning and Environmental Protection, New York, January 1991.

Panelist, Workshop on Cumulative Impact Analysis in CEQA, Association of Environmental Professionals annual conference, May, 1990

Participant and author of paper, "Coping with Environmental Factors in a Hillside City: The San Francisco Experience," at International Conference on Hillside Cities, sponsored by United Nations Center for Regional Development and the City of Nagasaki, Nagasaki, Japan, November, 1989

PROJECT EXPERIENCE

- Environmental Review Officer or EIR Project Manager for over 50 EIRs or EIR/EISs on high rise office buildings, hotels, residential developments, General Plan amendments, Redevelopment Plans, and public buildings.
- Alternatives to Replacement of The Embarcadero Freeway and the Terminal Separator Structure EIS/EIR. Environmental Review Officer for joint EIS/EIR by San Francisco, Caltrans and FHWA.
- Waterfront Land Use Plan EIR. Environmental Review Officer for Program EIR on land use plan for 7-mile Bay shoreline under the jurisdiction of the Port of San Francisco.
- San Francisco International Airport Master Plan EIR. Environmental Review Officer and EIR Project Manager for Program EIR.
- Environmental Review Officer and/or EIR Project Manager for 9 EIRs and several negative declarations on various sewage treatment, pump station, storage and transport projects for the San Francisco Clean Water Program.
- Environmental Review Officer for environmental evaluations of San Francisco Water Department and Hetch Hetchy Water and Power projects expanding the San Andreas Water Treatment Plant, enlarging storage reservoirs in the Sierra Nevada foothills and rehabilitating major supply pipelines that cross San Francisco Bay and various endangered species habitats.

RICHARD NICHOLS
Director, Biological Resources

Richard Nichols has 15 years of experience as a professional biologist and range manager. His responsibilities include preparation of environmental analyses for development plans and projects, mitigation and restoration planning and monitoring, mining reclamation, erosion control, endangered species investigations, and wetland delineation and assessment.

TECHNICAL CAPABILITIES

- Directs preparation and implementation of reclamation, erosion control, and mitigation plans to restore upland habitats such as oak woodlands, dune scrub, and desert shrublands, as well as wetlands habitats including riparian woodlands, vernal pools, salt marshes, and freshwater marshes.
- Conducts and manages botanical inventories and rare plant surveys and is thoroughly familiar with both Federal and State Endangered Species Act requirements and agency guidelines for surveys, permits, and mitigation plans.
- Directs field inventories, literature reviews, research, and monitoring to assess impacts from development projects and formulate/evaluate feasible and successful mitigation measures.
- Prepares and manages CEQA/NEPA documents and mitigation/ management plans to evaluate and mitigate impacts from development, mining, or agricultural activities on wetlands, riparian corridors and other sensitive habitats.
- Has extensive training and experience in conducting jurisdictional wetland delineations and function/value assessments.

EDUCATION AND AFFILIATIONS

M.S., Range Management, University of California, Davis
B.A., Biological Sciences, California State University, Chico

Instructor on Wetland Delineation and Regulation, University of Wisconsin-Madison 9th Annual Dredging and Placer Mining Conference

Certificate of Achievement, Gen. T.D. White Natural Resources Conservation Award

Society for Ecological Restoration
Society of Wetland Scientists
California Botanical Society
California Native Plant Society
Society of Range Management
Soil and Water Conservation Society

PROJECT EXPERIENCE

Biological Mitigation/Habitat Restoration
- Petaluma River Bank Stabilization, Erosion Control, and Biological Mitigation Project for the Petaluma Factory Outlet Village, Sonoma County
- Lake Piombo Riparian Restoration Project, Sonoma County
- Boulder Creek Riparian Restoration Project, Ventura County
- Upper Sacramento River Fish and Wildlife Habitat Restoration Reconnaissance Report, Butte, Tehama, Glenn, and Colusa Counties
- Natomas Area Revised Flood Control Improvement Project, Sacramento County
- Sisquoc river Quarry Habitat Mitigation and Monitoring Plan, Santa Barbara County

Erosion Control/Stormwater Pollution Prevention Plans
- SWPPP, Priest Reservoir
- SWPPP, Tuolumne County
- Santa Margarita Emergency Erosinon Control Plan, San Luis Obispo County
- Tuolumne Meadows Sewer Replacement, SWPPP, Toulumne County

CEQA/NEPA
- Pebble Beach Lot Program EIR, Monterey County
- Stanford Sand Hill Road Projects EIR, Santa Clara County
- Lower Crystal Springs Reservoir Dam Improvements, IS/EA, San Mateo County
- Hayward South of Route 92 Specific Plan EIR, Alameda County
- Blomquist Road Realignment EIR/EIS, San Mateo County

Biological Monitoring
- Rush Ranch Vegetation and Waterfowl Monitoring Project, Solano County
- Hunter Ranch Golf Course Biological Mitigation 5-Year Monitoring, San Luis Obispo County
- Petaluma Biological Mitigation Monitoring Program
- Calaveras Creek Biological Mitigation Monitoring Program, Alameda County

Wetland Delineation and 404 Permitting
- Redwood City Police Facility, 404 juisdictional delineation and mitigation plan, San Mateo County
- Benicia Bridge/I-680 Highway Improvement, 404 jurisdictional delineation, Solano County
- Sisquoc River Quarry 404 Permit, Santa Barbara County
- Priest Reservoir Diversion 404 Permit, Tuolumne County
- Early Intake Rehabilitation 404 Permit, Tuolumne County

I-007436

ROY LEIDY
Senior Technical Director, Biological Resources Group

Mr. Leidy, as the Senior Technical Director of EIP's Biological Resources Group, provides leadership, technical expertise and guidance to EIP's biological resources staff.

TECHNICAL CAPABILITIES

- Technical experience includes fish and wildlife impact assessments using HEP, WHR and IFIM, wetlands delineations and assessments, endangered species surveys and impact evaluations, HCP/HMP planning, river-reservoir ecosystem modeling, water quality modeling and analysis, stream channel stability and watershed assessments, and fish passage and screening design.
- Extensive experience working in the western U.S. on fisheries and water quality issues.
- Intimately familiar with NEPA and CEQA compliance procedures and regulations. He possesses extensive knowledge of resource management issues and has served as an expert witness on a variety of fish and wildlife topics.
- Formerly employed twelve years with the U.S. Forest Service, U.S. Geological Survey, and U.S. Fish and Wildlife Service working with many local, state, and federal agencies. His work with the U.S. Corps of Engineers and Bureau of Reclamation included fish screening on the Columbia River, bank protection projects, 404 permitting, flood control projects, aquatic ecosystem modeling, and reservoir fisheries management.
- Responsibilities include project and technical management of natural resource studies and regulatory permitting and compliance.

EDUCATION AND AFFILIATIONS

B.S., 1972. University of California, Berkeley, Forestry and Resource Management

Certified Fisheries Scientist, #1730,
CA Registered Environmental Assessor, #02704, 1991
American Fisheries Society, 1985
Pacific Fisheries Biologists
North American Lake Management Society
Society of American Icthyologlists and Herpetologists

PROJECT EXPERIENCE

Ecological Studies
- CVPIA Anadromous Fish Restoration Program Assistance - prepared Plan of Action
- Fishery Management Problems at Major Central Valley Reservoirs, California
- Ecology, Status and Management of the Giant Garter Snake, Central Valley of California
- Life Stage Periodicities of Anadromous Salmonids in the Klamath River Basin, Northwestern California

Instream Flow Studies
- Fisheries Investigations of the Yuba River, Sacramento River Basin, California
- American River Instream Flow Evaluation, California
- Rush Creek Instream Flow Study, California
- Bear Creek Instream Flow Study, California

Hydroelectric Projects
- Garden Bar Dam and Reservoir Pumped Storage Hydroelectric Project, California
- Bonneville Second Powerhouse, Washington-Oregon
- Shelley Hydroelectric Project, Idaho

Environmental Impact Reports
- Bodie Mineral Exploration Program Environmental Impact Report
- Conway Ranch Environmental Impact Report
- Mammoth Lakes Basin Comprehensive Water Management Environmental Impact Report
- Snowcreek Ski Area Supplemental Environmental Impact Statement

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- Rush Ranch, Northern California - Burrowing Owl Trapping and Relocation
- Magma Nevada Mining Company, Golden Eagle Studies and Federal Permit Acquisition, Ely, Nevada
- Catalina Island Bald Eagle Reintroduction Project
- USFWS - California Condor Egg Shell Collection for Analysis Program
- Santa Cruz Predatory Bird Research Group - Southern California Peregrine Falcons reintroduction manager
- United States Forest Service, Central California - Protection and Observation of Nesting Peregrine Falcons, field technician
- The Peregrine Fund, Laboratory of Ornithology, Cornell University, Ithaca, New York, field technician

DAVID WOLFF
Biologist/Wetland Specialist

TECHNICAL CAPABILITIES

David Wolff is a biologist, wetland specialist, and project manager for wetland related and biological resource management projects. Mr. Wolff has special expertise in both flora and fauna, including terrestrial, aquatic, and marine environments. He is trained and experienced in the identification and delineation of U.S. Army Corps of Engineers (Corps) jurisdictional wetlands. Mr. Wolff has performed U.S. Army Corps of Engineers verified wetland delineations on sites ranging from 100 to 4,500 acres with up to 600 acres of wetlands and other waters of the U.S. He is well versed in the wetland regulatory program and has prepared applications and wetland mitigation plans for obtaining Section 404 of the Clean Water Act Corps Permits and Authorizations. Mr. Wolff is also experienced in the creation and restoration of wetland and riparian habitats.

Mr. Wolff is skilled in the preparation of biotic resource sections for NEPA and CEQA documents and biological resource assessments involving sensitive habitats and special-status species, aerial photograph interpretation, and vegetation mapping. Mr. Wolff is very knowledgeable in the regulatory requirements and laws for special-status plant and wildlife species, including the Habitat Conservation Plan process. Mr. Wolff has special expertise in the identification of plants and the identification and mapping of vegetation types and plant communities. Mr. Wolff is also skilled in the identification, habitat requirements, and ecology of vertebrates of the Pacific states. He has managed and conducted rare, threatened, and endangered plant and wildlife species surveys, and raptor and sensitive bird species nesting surveys for biological assessments and environmental documents. He is experienced in agency consultation/ coordination with local, state, and federal regulatory agencies including the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the California Department of Fish and Game, and the California Department of Transportation.

PROJECT EXPERIENCE

Sacramento Area Flood Control Agency Habitat Conservation Plan
Deputy Project Manager and staff biologist for the preparation of a Habitat Conservation Plan for the Swainson's hawk and giant garter snake. Coordinated in-depth biological studies and literature search and review, developed alternatives analysis, and assisted in the coordination of the consensus process with all affected parties for the development of a final plan.

Stockton East Water District Farmington Canal Wetland Studies

Acted as project manager, conducted wetland delineation and prepared mitigation plan (including feasibility studies) for obtaining both individual and nationwide permits for the fill of 4 acres of waters of the U.S. for a 38-mile-long water conveyance project. Prepared giant garter snake mitigation plan. Implemented mitigation plan by managing the creation of nine acres of wetlands.

Roseville Monitoring and Permit Compliance
Performed wetlands assessment and prepared wetland mitigation plan for obtaining 404 Individual Permit for road and infrastructure projects.

Valensin Ranch Wetland Delineation and Biological Assessment
Conducted wetland delineation on 4,500-acre site that resulted in the delineation of over 600 acres of wetlands including streams, lakes, marshes, and vernal pools. Prepared a biological assessment report that included managing and conducting a rare plant survey and sensitive wildlife species surveys for the Swainson's hawk, tricolored blackbird, burrowing owl, tiger salamander, western spade-foot toad, and the valley elderberry longhorn beetle.

Rancho Murieta Wetland Delineation and Mitigation Plan Development
Conducted wetland delineations, performed feasibility studies, and prepared wetland mitigation plan for obtaining nationwide permit for the fill of approximately 8 acres of wetlands for residential development projects. Assisted with the implementation of the mitigation plan to create over 10 acres of wetland, riparian and vernal pool habitats.

Caltrans Format Environmental Documents
Conducted and prepared Natural Environmental Studies and Biological Assessments for projects requiring compliance with Caltrans guidelines for CEQA and NEPA documents. This has included numerous highway improvement and bridge replacement projects involving wetlands and special-status plant and wildlife species. Projects include U.S. 50/Zinfandel Overpass Expansion Negative Declaration, Leisure Town Road Initial Study, and Sacramento County bridge replacement projects for Eagles Nest Road, Lee School Crossing Road and Cherokee Lane.

CEQA Biological Resource Studies
Conducted necessary studies and prepared biological resource sections for CEQA and NEPA environmental documents. Studies and reports prepared for both program and project-specific analysis. Projects include the Lincoln Public Facilities Element, Modesto Village I Specific Plan, City of Sacramento Methodist Hospital Retail Center, City of Vacaville Kaiser Hospital, Chicken Ranch Slough

Drainage Masterplan Study, and Weatherstone (Placerville) and New Standard (Sonora) Subdivision EIR's.

EDUCATION & AFFILIATIONS

B.A. in Ecology and Systematic Biology, San Francisco State University

Member of the Association of Environmental Professionals, American Planning Association, the Society for Wetland Scientists, the Association of State Wetland Managers, the California Native Plant Society, the Planning and Conservation League, the Nature Conservancy, and the Audubon Society

E.J. KOFORD, M.S., C.W.B.
Senior Biologist

Mr. Koford is a certified biologist, with broad experience in water quality, hazardous waste, NEPA/CEQA and threatened and endangered species issues.

TECHNICAL CAPABILITIES

- Mr. Koford has over 17 years of experience in wildlife and fisheries investigations and threatened and endangered wildlife surveys.
- Mr. Koford has extensive experience in environmental regulatory compliance with the federal and state Endangered Species Acts. He is well versed in the requirements of NEPA and CEQA.
- Mr Koford has performed wildlife surveys in a total of 18 states and countries. He has prepared EIS/EIRs for a variety of clients, and has created several mitigation plans.
- His experience includes preparing biological analyses, endangered species consultations, preparing permits, mitigation and compliance studies for 110 miles of levee improvements in San Joaquin County.
- His experience includes endangered species surveys for approximately 80 miles of SMUD transmission lines and gas line corridors and 20 miles of proposed oil pipelines for Southern California Edison.

EDUCATION AND AFFILIATIONS

M.S. in Ecology, from the University of California
B.A. in Zoology, from the University of California
Natural Communities of California, University of California Extension Class; Co-instructor, 1996
Certified Wildlife Biologist, the Wildlife Society, 1990
Certification for Hazardous Waste Operations, 1988-1992
Operator License (OUPV), US Coast Guard
Designing and Negotiating Studies Using IFIM
Habitat Evaluation Procedure (HEP)
Wildlife Society, Western Chapter

PUBLICATIONS

"Environmental Impact Reports on the Internet," Association of Environmental Professionals, Environmental Monitor, Summer 1996.

"Living Fossils-Fairy Shrimp of California," *Outdoor California*, September-October 54(5), pp. 23-26

"Conceptual Habitat Suitability Index Model for Swainson's Hawk," *Habitat Evaluation Notes and Instream Flow Chronicle*, July 1993, III (2), pp. 2-6.

"Assessment and Mitigation for Endangered Vernal Pool Fairy Shrimp." *Published by Ebasco Environmental for ASCE 1993 Water Resources Planning and Management Division Conference*, May 1-5, 1993.

"Why Should We Bother to Save Endangered Species," *The Business Journal*, February 22, 1993.

PROJECT EXPERIENCE

NEPA/CEQA
- Beneficial Reuse of Biosolids by Land Application EIR, City of Modesto.
- San Joaquin River Parkway Program EIR for Master Plan, San Joaquin River Conservancy.
- San Joaquin Flood Prevention Program EIR and SEIR, San Joaquin Area Flood Control Agency
- *UC San Joaquin Campus EIR and Water Supply Report*, University of California.
- EIR and Permitting for Ark Energy, Carson Energy Group, Campbell's Soup, and Proctor & Gamble Cogeneration Facilities
- Licensing Review Program; Federal Energy Regulatory Commission
- *Sacramento Army Depot Relocation/ Realignment EIS*; Army Corps of Engineers

Wildlife
- Deer Creek Hills General Amendment EIR, Sacramento *County Department of Environmental Review and* Assessment.
- Tonner Canyon Biological Surveys and Permitting support; Southern California Edison.
- Sacramento Army Depot Natural Resources Management Program/Biological Data Report, Army Corps of Engineers, Sacramento
- *Wildlife and HEP Evaluations for Ramsey-French Meadow* Hydroelectric Project, Upper Stanislaus River, NCPA Tuolumne County, California
- Sierra Ski Ranch Expansion EIR/EIS
- Devil's Nose Hydroelectric Project, Exhibit E, Amador County Water Agency.

Threatened and Endangered Species
- Biological Sensitivity Brochures, Training and Compliance, San Joaquin Area Flood Control Agency, Carson Energy.
- Habitat Conservation Plan, Section 2081, Implementing Agreement for Mustang Hill Landfill, Kings Co., California
- FERC Relicensing Studies for Umpqua Hydroelectric Project, Pacific Corps
- Threatened and Endangered Species Surveys for New Transmission and Gas Line Corridors; Sacramento Municipal Utility District, Sacramento County
- California-Oregon Transmission Project: Transmission Agency of Northern California
- Survey and evaluations for Vernal Pool Fairy Shrimp for SMUD, SAFCA and SJAFCA

Water Quality
- Water Quality Reports for CalTrans projects.
- *Water Quality Analysis for American River Parkway* Restoration Project, Sacramento Area Flood Control Agency
- Phoenix Fields Vernal Pools Preserve Water Quality Runoff Study; Sacramento
- Stockton Cogeneration Plant NPDES and Supplementary EIR, Air Products Corporation
- RI/FS, Water Quality Assessment; Lorentz Barrel & Drum, U.S. Environmental Protection Agency
- Shelley and Mono Basin Hydroelectric Projects Permit Review; Federal Energy Regulatory Commission

RONALD P. WALKER
Wildlife/Wetlands Biologist

As an EIP biologist and wetland specialist, Mr. Walker conducts a variety of wildlife and wetland studies for proposed development projects.

TECHNICAL CAPABILITIES

- Mr. Walker's responsibilities include evaluating and mapping wildlife habitats, assessing potential impacts and identifying feasible mitigation measures.
- Mr. Walker is trained and experienced in the identification and delineation of U.S. Army Corps of Engineers jurisdictional wetlands on sites ranging from 1 to 1,000 acres.
- Mr. Walker is well versed in the wetland regulatory program and has prepared applications for obtaining Section 404 permits and other authorizations.
- Mr. Walker has prepared biological resource sections for NEPA and CEQA documents and biological resource assessments involving sensitive habitats and special-status species. He has conducted rare, threatened, and endangered plant and wildlife surveys, and raptor nesting surveys for biological assessments and other environmental documents.
- Mr. Walker has 16 years of experience dealing with raptors, including field research in Kenya, Fiji, Cook Islands, Paraguay, Brazil, Baja California, and Australia. Mr. Walker is knowledgeable in the habitat requirements, identification, and ecology of raptors of North America. He is skilled in trapping, banding, radio-telemetry, captive propagation and reintroduction of various large raptors, including California condor, peregrine falcon, and bald eagle. He has designed and prepared artificial nest ledges for falcons and successfully trapped and relocated burrowing owls into artificial burrows.

EDUCATION AND AFFILIATIONS

Research Associate, Western Foundation of Vertebrate Zoology
Member, National Association of Environmental Professionals
Member, Raptor Research Foundation
Member, American Ornithologists' Union
Technical Lead for Fish and Wildlife Subcommittee, California Mining Association

PROJECT EXPERIENCE

Wetland Ecology
- Sacramento Area Flood Control Agency, Wetland Delineations for Local Projects
- Newmont Gold Company, Gold Quarry Study Area, Delineation of Wetlands and other Waters of the U.S., Elko, Nevada
- Barrick Goldstrike Mine, Wetland Delineation and Permit Compliance, Nevada
- Dutch Ravine Trout Restoration, and Habitat Enhancement Project
- Nordic Log Home Construction Facility, Wetland Delineation, Lincoln
- SR 65 Interchange Vernal Pool Surveys, Lincoln

Biological Resources
- Newmont Gold Company, Environmental Studies Emigrant Spring Study Area, Carlin, Nevada
- Snowcreek Ski Area, Forest Carnivore Field Survey, USFS, Mammoth Lakes, California
- Morro Bay Kangaroo Rat Population Studies, including Trapping and Marking
- Biological Constraints Analysis for proposed Vista Del Lagos Subdivision, Auburn, California
- Atlantic Salmon Surveys, New Hampshire
- Big Bear Municipal Water District, fish population sampling in Bear Creek, Big Bear, California
- North Villages Development, Rare Fauna Surveys, Vacaville, California
- Ripon Interchange, Biological Constraints Survey, Ripon, California
- Twelve Bridges Specific Plan EIR, Wildlife Surveys, Lincoln

Ornithological Studies
- Sacramento Area Flood Control Agency, Burrowing Owl and Swainson's Hawk surveys
- FirstMiss Goldmine, Golden Eagle Protection and Enhancement Plan

LEONORA P. ELLIS
Biologist/Botanist

Lee Ellis has more than 20 years experience as a biologist, conducting numerous rare plant and wildlife searches, biological resources and habitat assessments and inventories, and wetlands determinations.

TECHNICAL CAPABILITIES

- Contributes to the biological sections and writes impacts and mitigation sections for resource management reports.
- Conducts wetlands determinations.

EDUCATION AND AFFILIATIONS

B.S. Conservation from Cornell University, Ithaca, New York
M.S. Zoology from the University of New Hampshire, Durham, New Hampshire

California Community College Instructor
California Botanical Society
National Audubon Society - Ohlone Chapter, field trip leader, Christmas Bird Count section leader
Northern California Botanists
Phi Sigma National Honorary Biology Fraternity

PROJECT EXPERIENCE

Environmental Compliance Monitoring
- Priest Reservoir, San Francisco Water Department, Utilities Engineering Bureau, Tuolumne County
- Calaveras Pipeline/Maguire Springs, San Francisco Water Department, Utilities Engineering Bureau, Alameda County
- Laguna Grande/Roberts Lake, Monterey County
- Olympia and Santa Cruz Aggregates Quarries, Santa Cruz County
- Bay Division Pipelines Maintenance Project, Alameda County
- Lake Piombo, Sonoma County

Wetlands Determinations
- Kaiser Foundation Hospital, Union City
- Pepsi - Milpitas Plant, Santa Clara County
- Spectrum 1, San Diego Creek, Bee Canyon Wash, Agua Chinon Wash, Orange County

Floral and Faunal Surveys
- Inventories of East Bay Municipal Utility District Watershed Lands: Pardee Reservoir, Calaveras County; Camanche Reservoir, Amador County; Briones, San Pablo, San Leandro Reservoirs, Contra Costa County
- Sargent Ranch, Santa Cruz/Santa Clara Counties
- Thousand Hills, Stanislaus County
- Inventories of Southeast and Southwest General Plan Areas, City of Santa Rosa

Desert Vegetation Surveys
- Amerigold, Blackhawk Mine, San Bernardino County
- SoCal Gas Pipelines, Riverside County; Chocolate Mountains, Imperial County; Delano-Pixley, Tulare County

Habitat and Impact Assessment
- Proposed Reservoir and Pipeline Alignment Sites, Pajaro Valley Water Management District, Monterey County
- Proposed Reservoir Sites, Santa Cruz Water Department, Santa Cruz County
- Unocal, Tosco, Wickland Selby, and Wickland Crockett, Contra Costa County
- Stanford West Apartments and Senior Housing, Palo Alto, Santa Clara County
- Sand Hill Road Extension, Santa Clara County
- Hunter's Point, City and County of San Francisco
- Alameda Creek Diversion Dam, Alameda County
- Upper and Lower Crystal Springs Reservoirs, San Mateo County
- UCSF - LRDP Major New Bay Area Sites
- Park Avenue Redevelopment, South Lake Tahoe, Eldorado County

Habitat Assessment and Rare Plant and Wildlife Surveys
- Denniston Reservoir and Pipeline/Crystal Springs Pipeline, Coastside Water District, San Mateo County

Vegetation Mapping and Rare Species Survey
- Elwood Beach, Santa Barbara County
- Bay Division Pipelines 1 and 2, San Francisco Water Department, Alameda and San Mateo Counties
- Oakdale General Plan, Stanislaus County
- Gilroy Foods Cogeneration Project, PG&E Tower Relocation, Morgan Hill, Santa Clara County
- Contra Costa Central Landfill, Contra Costa County

JULIA D. CURLETTE
Botanist

As a botanist, Ms. Curlette has over two years of experience in conducting rare plant and animal surveys and performing wetland delineations. Ms. Curlette also is experienced in wetland and riparian vegetation restoration and vegetation management for waterfowl.

TECHNICAL CAPABILITIES

- Ms. Curlette has completed the Wetland Training Institute - Wetland Delineation course and has conducted wetland delineations in accordance with U.S. Army Corps of Engineers guidelines and regulations to determine jurisdictional wetlands.
- Ms. Curlette has written biological constraints sections for Initial Studies and EIRs.
- Ms. Curlette is experienced in performing rare plant identifications and inventories. She has conducted surveys for the purpose of mapping special-status plant species and habitats in the Central Valley and foothill regions. Ms. Curlette's experience also includes conducting surveys in vernal pools, wetlands, valley foothill and grassland areas, and chaparral.
- Ms. Curlette has experience in habitat restoration for riparian, wetland, and grassland communities. She has managed planting and establishing vegetation for restoration areas in the Central Valley.
- Ms. Curlette has supervised the installation of erosion control materials and plants for stream bank stabilization.
- Ms. Curlette is experienced in conducting plant inventories, collection, and cataloging for the purpose of herbarium entry.
- Ms. Curlette is experienced in waterfowl inventory and wetland vegetation management.

EDUCATION AND AFFILIATIONS

B.A. in Botany, University of California at Davis

California Native Plant Society
The Nature Conservancy-Cosumnes River Preserve Volunteer
Stone Lakes National Wildlife Refuge-Biological Tour Guide

PROJECT EXPERIENCE

Wetland Ecology
- Wetland Delineation, Sacramento Area Flood Control Agency, Sacramento, California
- Wetland Delineation, San Joaquin Area Flood Control Agency, Stockton, California
- Restoration of Wetland and Riparian Vegetation, Vegetation Management for Wildlife Habitat, Bufferlands, Sacramento Regional Wastewater Treatment Plant, Elk Grove, California
- Dry Creek Bank Stabilization Project, Cherry Island Golf Course, Elverta, California

Biological Resources
- Red-legged frog survey - Marble Valley, CA
- Gabbroic and Serpentine Soil - Rare Plant Survey - Marble Valley, CA
- Valley Elderberry Longhorn Beetle Survey, Sacramento Area Flood Control Agency, Sacramento, California
- Biological Constraints Survey, San Joaquin Area Flood Control Agency, Stockton, California
- Waterfowl Inventory, Cosumnes River Preserve
- Vascular Plant Inventory and Collection for Bufferlands Herbarium, Sacramento Regional Wastewater Treatment Plant, Bufferlands, Elk Grove, California
- Biological Resource Field Studies, Cajon Pipeline, California
- San Joaquin Kit Fox Survey, EMCON Mustang Hills Landfill, Kettleman Hills, California
- Biological and Habitat Assessment, Northwest Interceptor, Rio Linda, California
- Biological Constraints Surveys, Office of Project Development and Management-California Department of Forestry Station Development in Murphys, Ione, Columbia, Napa, and Tracy

Vernal Pool Survey
- Special-Status Plant Survey, Sun Lakes Estates, Galt, California
- Special-Status Plant Survey, Bufferlands, Sacramento Regional Wastewater Treatment Plant Elk Grove, California
- Special-Status Plans Survey, Aerojet, Rancho Cordova

RICHARD B. HANSON
Associate Planner
Fisheries and Wildlife Biologist

TECHNICAL CAPABILITIES

Mr. Hanson is an associate planner with 15 years of experience in the design, preparation, and management of environmental impact studies. At EIP, Mr. Hanson participates in and directs the preparation of EIRs and EISs. He is thoroughly familiar with CEQA/NEPA compliance and other pertinent federal and State regulations, specializing in those which relate to the protection of fish, wildlife, plant communities and water quality in California and Nevada. Mr. Hanson is certified in Habitat Evaluation Procedures (HEP) by the U.S. Fish and Wildlife Service and has performed Instream Flow Incremental Methodology (IFIM) data analyses. He has a working knowledge of the California Surface Mining and Reclamation Act (SMARA) acquired during his management of several past and ongoing mining-related projects.

From 1976 to 1983, Mr. Hanson participated in the Interagency Ecological Studies Program involving the study of the Sacramento/San Joaquin Delta and San Francisco Bay Estuary. He performed fisheries research and water quality evaluations throughout the system in an effort to assist in the assessment of long-term impacts on Bay/Delta resources associated with increasing water development throughout the State. For the past eight years, Mr. Hanson has prepared and managed numerous environmental documents, including Initial Studies, Environmental Assessments, FONSIs, Negative Declarations, Biological Assessments, Wildlife Coordination Act Reports, and Environmental Impact Reports and Statements. Included in these efforts was the preparation of the Fisheries Impact Study for the Truckee River Operating Criteria and Procedures EIS for the Bureau of Reclamation. He has also assisted in the preparation of applications for Stream Alteration, NPDES, and Section 404 permits for a variety of projects, including aggregate mining operations, general plan updates and amendments, residential developments, and habitat restoration projects. He has performed field surveys and technical analysis for these documents in close coordination with numerous resource agencies, including USFWS, CDFG, National Marine Fisheries Service, Regional Water Quality Control Boards, Environmental Protection Agency, California Division of Mines and Geology, and others.

RELEVANT EXPERIENCE

Southport Sewage Collection and Treatment Facilities Focused EIR
Project Manager for the preparation of a focused EIR on the first two stages of construction of a wastewater master plan for the City of West Sacramento. The first stage of construction would involve improvements to the conveyance system from the Southport area to the existing treatment. It would include two new pump stations and two sections of new force main. The second stage of construction would involve construction of new 3MGD treatment plant in the Southport area and diversion of most of the flow from the Southport area to the new treatment plant.

1992 South Tahoe Public Utilities District Sewage Treatment Plant Expansion (7.7 MGD to 7.9 MGD) EIR/EIS
Project Manager for the preparation of an EIR/EIS on the District's proposal to expand plant capacity from 7.7 MGD to 7.9 MGD.

Syar Mining and Reclamation EIR/EIS
Mr. Hanson is currently Project Manager for the preparation of an EIR/EIS on the proposal to mine and reclaim six separate sites within a nine-mile reach of the Russian River in Sonoma County.

City of Tracy Aggregate Resources EIR
Project Manager for the preparation of an EIR on the annexation of lands designated by the State as containing significant aggregate resources to the City of Tracy (EIR certified November 1990).

Kaweah River Rock Mining and Reclamation Project
Project Manager for preparation of an EIR on the proposed development of a 775-acre aggregate mine and processing plant adjacent to the Kaweah River in Tulare County currently in progress.

EDUCATION & AFFILIATIONS

B.S. in Zoology from the University of California at Davis in 1975
M.S. in Biological Sciences with a specialization in fisheries management from California State University at Sacramento in 1985

RITA C. LEE
Environmental Scientist

Rita Lee is an environmental scientist with broad experience in a diverse array of natural resource, development, and industrial projects. She specializes in performing CEQA-level analyses in numerous areas including hydrology and water quality, erosion control, public services and utilities, energy, and cultural resources.

TECHNICAL CAPABILITIES

- Performs comprehensive analyses of water quality and hydrologic effects for environmental impact reports.
- Provides experience in federal Clean Water Act Section 404 permitting requirements, NPDES wastewater and stormwater requirements, and other local and regional agency requirements.
- Assists in developing and analyzing Storm Water Pollution Prevention Plans.
- Supports and assists field monitoring activities for biological resources and wetland studies.
- Performs CEQA-related initial studies.
- Analyzes impacts to public services and utilities.
- Performs quantitative assessments and analysis of energy consumption.
- Evaluates impacts to archaeological and architectural resources and develops mitigation measures in cultural resources sections.

EDUCATION AND AFFILIATIONS

B.S., Soil and Water Science, University of California, Davis
U.C. Davis Extension, Erosion Control and Land Restoration Course

PROJECT EXPERIENCE

Wastewater/Water Supply
- Maintenance of Bay Division Pipelines 1 and 2, Section 404 Permit and Mitigated Negative Declaration, City and County of San Francisco. Responsible for coordinating environmental permit application package for pipeline repair project.
- Tuolumne Meadows Sewer Rehabilitation Storm Water Pollution Prevention Plan (SWPPP), City and County of San Francisco. Developed construction SWPPP for sewer replacement project.
- Priest Reservoir Stormwater Pollution Prevention Plan, City and County of San Francisco. Assisted in development of an erosion control plan as an addendum to Stormwater Pollution Prevention Plan; included biotechnical slope stabilization systems.
- Bayside Discharge Alternatives EIR, City and County of San Francisco
- Downer Canoas Ferrous Chloride Injection Station Project, Negative Declaration, City of San Jose

Transportation
- San Ramon Valley Boulevard Safety Improvements Project, Mitigated Negative Declaration, City of San Ramon. Performed initial study analysis of road-widening project.

Industrial
- Unocal Reformulated Gasoline Project EIR, Contra Costa County. Responsible for analysis of water quality issues for this oil refinery.
- Tosco Clean Fuels Project EIR, Contra Costa County. Responsible for analysis of water quality issues.

Institutions/Universities
- Kaiser Geary Campus Expansion Project EIR, San Francisco. Responsible for analysis of hydrology and water quality, public services, and energy for medical office building expansion.
- University of California, San Francisco, Long Range Development Plan EIR. Responsible for analysis of hydrology and water quality, and cultural resources for site selection for campus expansion.
- University of California, San Joaquin, Site Selection EIR
- State of California Department of Health Services Richmond Laboratories EIR

Land Use
- Pebble Beach Lot Program EIR, Monterey County
- Park Avenue Development Plan EIR/EIS, South Lake Tahoe Redevelopment Agency/Tahoe Regional Planning Agency
- South Lake Tahoe Redevelopment Project No. 1 EIR/EIS, Tahoe Regional Planning Agency and South Lake Tahoe Redevelopment Agency

I-007446

GEORGE BURWASSER
Senior Geologist

George Burwasser has more than 20 years experience in the study of recent geologic processes and deposits. He gives particular consideration to the effects of seismically-related land instability in California.

TECHNICAL CAPABILITIES

- Responsible for the pedologic, lithologic and seismologic components of environmental impact assessments, studies, and reports.
- Reviews geotechnical reports submitted for General Plan elements, Specific Area Plans and for site-specific projects.
- Conducts site investigations and literature searches to provide, compile, analyze, and evaluate information related to soil and slope stability, landslide and land subsidence susceptibility, erosion potential, and flooding and earthquake hazards.
- Techniques include the interpretation of stereoscopic aerial and terrestrial photographs, soil and rock examination, geologic and geomorphologic mapping.

EDUCATION AND AFFILIATIONS

B.A. in Geology, Case Western Reserve University
M.S. in Quaternary Geology, University of Saskatchewan

Member of the Geological Society of America
Member of the Astronomical Society of the Pacific
Member of the Association of Environmental Professionals

PROJECT EXPERIENCE

General Plans/Specific Plans

- Murrieta General Plan EIR and Specific Plan Review. Under a long-term contract to the city, reviews geologic, seismic, erosion-control and stormwater drainage control chapters of development proposals for compliance with Murrieta's Natural Resources and Safety Elements.

Institutions/Universities

Evaluated geologic and geotechnical investigations and prepared environmental documentation for the following projects:

- University of California, San Francisco, Long Range Development Plan EIR
- University of California, Berkeley, Long Range Development Plan EIR
- University of California, Los Angeles, Long Range Development Plan EIR

Commercial/Residential

- The Woods at Fitch Mountain Initial Study and Mitigation Program, Sonoma County. Prepared geology and hydrology documentation for this upscale project. An innovative drainage system using oversized pipes as retention ponds for stormwater was the major component to be evaluated and redesigned.

Water Supply

- Crystal Springs Water Supply Project EIR and Application for Coastal Development Permit, San Mateo County. Examined effects of new project design including 35,000 more feet of pipeline, a surge tank pump station. Continues evaluation of ongoing maintenance and replacement of other components of the system.
- Pajaro Basin Management Plan Program EIR. Prepared the geology, soils and seismicity impacts evaluation for alternatives to provide nearly 20,000 acre-feet of water to this important agricultural area. Major concerns included aquifer overdraft, seawater intrusion, and construction effects of transmission and storage facilities.

Transportation

- BART—SFO Extension AA/EIS/EIR, San Francisco and San Mateo Counties. Prepared geology section and reviewed hydrology section of the project, including the short-term construction impacts analysis and the long-term effects of the proposed extension. Objectives included identifying soil limitations, developing site rankings, and ascertaining design implications of reducing seismic risk.

Mining and Reclamation

- Leona Quarry Closure and Reclamation Plan/EIR, Oakland. Prepared a focused EIR for the City of Oakland to address impacts associated with continued surface mining operations at the Leona Quarry. Issues of major concern included steepness of the slopes on the site and danger to trespassers.

Waste Management

- Santa Rosa Wastewater Management Plan EIR/EIS. Prepared the geology and hydrology section of the EIR/EIS. Investigations included the Dunham and Brookfield faults as part of corridor analysis from Santa Rosa to the Geysers Geothermal Area.

I-007447

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COMPENSATION SCHEDULE
SAN FRANCISCO OFFICE

Principal I	$ 160/hour
Principal II	$ 150/hour
Senior Associate I	$ 125/hour
Senior Associate II	$ 115/hour
Associate	$ 95/hour
Senior Professional	$ 85/hour
Professional I	$ 75/hour
Professional II	$ 65/hour
Technician I	$ 60/hour
Technician II	$ 50/hour
Technician III	$ 35/hour
Mileage is charged at	$ .30/mile
Photocopies are charged at	$ .15/page

Direct costs (i.e., travel, meals, lodging, auto rentals, printing, graphic materials, etc.) and subcontractor fees are subject to a 10% administration charge.

1. This schedule is effective from October 1, 1996 to September 30, 1997, and subject to revision thereafter.

2. Invoices will be submitted by Consultant monthly. Client will notify Consultant, in writing, of any objections to an invoice within ten (10 days) of the date of invoice. Otherwise, the invoice shall be deemed acceptable by the Client. Amounts indicated on invoices are due and payable immediately upon receipt. The Client's account will be considered delinquent if Consultant does not receive full payment within thirty (30) days after the invoice date.

3. A service charge will be applied at the rate of 1.0 percent per month (or the maximum rate allowable by law) to delinquent accounts. Payment thereafter will be applied first to accrued interest and then to the principal unpaid by the Client.

4. EXPERT TESTIMONY. For situations requiring expert testimony, services will be provided at 1.5 times the standard hourly rates listed, with a minimum of four hours. Time spent in preparation and review of testimony will be charged at standard rates.

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APPROACH AND EMPHASIS

Addressing real world problems with a comprehensive and integrative approach to water resource management, Balance Hydrologics provides in depth expertise in the hydrology of surface and ground-water systems and their complex interactions.

The staff of Balance Hydrologics, Inc. includes senior scientists and engineers who have demonstrated expertise in the fields of:

- Ground-water basin and recharge management
- Conjunctive use of surface and ground waters
- Aquifer storage and recovery
- Managing ground water near sensitive habitat areas
- Safe-yield estimates of water supply aquifers
- Yields and contributing areas of seeps and springs
- Underflow analyses for water rights determinations
- Irrigation percolate and its role in shallow aquifer management
- Development and management of brackish aquifers
- Nonpoint source pollution control
- Migration of nitrates and other nutrients in shallow ground water
- Wellhead protection programs

We emphasize a thorough understanding of the fundamental hydrogeologic processes in a particular area. Rather than rushing into a ground-water model, we will often carefully review historical water level and water quality records in an area, including how they have varied over drought and wet cycles or over a sustained period of water level declines. This type of review can frequently lead to insights which allow us to recommend courses of action specific to our clients' sites and needs. Among these courses of action have been (a) active field studies, such as aquifer testing, tracer tests, or monitoring changes in pumping or water application; (b) passive field studies, such as monitoring of the effects of existing practices, or evaluating ionic or isotopic tracers which occur naturally in various aquifers; (c) geophysical or geologic assessments to better describe the properties or boundaries of an aquifer system; (d) ground-water modeling, using one of several approaches of varying levels of intensity; or (e) preliminary assessments of the feasibility of water treatment (to be designed by others). If models are used, they are calibrated with local field observations, and are usually validated by checking their abilities to predict conditions during previous droughts.

Over the years, we have learned that it is often helpful to approach water or habitat management challenges with an integrated 'conjunctive use' understanding of the local hydrogeologic system. We have also found that development of ground and surface waters seldom occurs in isolation, and calls for considering the concerns of neighboring landholders, or of effects upon nearby communities or environmentally sensitive riparian zones and wetlands. Balance Hydrologics was founded, in large part, to provide clients with the capabilities of responsibly using both ground and surface waters. Our staff consists primarily of senior professionals, each of whom is conversant with both ground water and surface water hydrology and some of the key regulations which guide their management.

Balance Hydrologics is unusual in that all technical staff are relatively senior professionals. This allows us to tailor our work to the specific site and regulatory setting at each stage of a project. Since our experienced staff make the key observations and measurements, work proceeds more quickly, with fewer redundant steps. Results are more credible, because the senior professional presenting the findings at meetings and hearings has been intimately involved with the work. Additionally, the experts on the Balance staff are more available to clients during critical stages, since they are largely free of supervisory responsibilities. When technicians and junior professionals can usefully be assigned to a project, we find that the most knowledgeable individuals are usually available from the client's staff, or from those of their civil engineer, planner, or contractors. This process of 'partnering' strengthens communication within the project team, adding both immediate and long-term value.

The following projects are representative of Balance Hydrologics' staff experience. These projects have been included in this statement of qualifications to illustrate a representative range of the work we have undertaken in areas of recharge management or surface/ground-water interaction, and the related water supply and water quality challenges. A few of these projects were conceived, supervised and directed by our senior staff during prior employment. These projects are marked with an asterisk.

SELECTED PROJECT EXPERIENCE

WATER SUPPLY

City of Watsonville Water Supply Investigation, Watsonville, California

In conjunction with an engineering firm specializing in water distribution and treatment, Balance hydrogeologists assessed various ground-water supply alternatives available in this overdrafted basin subject to sea water intrusion. Older Pleistocene and Pliocene aquifers, largely separate from the presently developed basin were identified. The water supply potential of these possible new sources was assessed through use of geophysical logs from oil exploration boreholes and other seismic data.

City of Ventura, Wells No. 3A and 4A, Ventura County, California *

To support continued growth, the City of Ventura constructed two deep aquifer (Fox Canyon) wells. These wells supplement existing diversions from the Ventura River. The project included geological and engineering support, well design and specifications preparation, construction management, aquifer testing, and water quality analysis. Each 18-inch diameter well had discharge rates in excess of 4,000 gpm.

Aromas/San Juan High School Well, San Juan Bautista, California

Balance staff conducted a hydrogeologic investigation to develop a new ground-water supply for a new high school in the Aromas San Juan Unified School District. Water quality in the San Juan Bautista Basin is locally poor, and well yields can vary considerably. Included in the investigation were: assessment of water quality and water supply issues, geologic services, well design services, and contractor management.

Mt. Diablo Hospital Emergency Backup Well, Concord, California

Mt. Diablo Hospital sought to install a high capacity backup well to provide cooling water, fire flow, and potable water in the event the municipal supply source is disrupted. The hospital engineer specified that the water be suited for only limited treatment, anticipating potential concurrent failure of the facility's water treatment systems.

Working closely with the project engineer, Balance staff utilized well logs, geophysical data, and geotechnical boring to site a well on the hospital grounds,

* Projects marked by an asterisk were performed by another firm with a current Balance staff member serving as project manager or lead investigator while employed by that firm.

supervised the drilling of a pilot hole to a depth of 220 feet, interpreted the geophysical logs and aquifer tests, and assessed the quality of waters in each of the production zones encountered. High sodium waters were found at depth exceeding 175 feet. A design for the well was developed, including specifications for low maintenance, high reliability components appropriate to a backup well.

Monterey Peninsula Water Management District — Sand City Desalination Plant Saline Intake and Brine Disposal, Monterey County, California *

In order to satisfy increased water demands, the MPWMD has proposed the construction of a 3.0 MGD seawater desalination facility that will extract water from coastal dune sands through the use of Ranney collectors. The feasibility of this approach was investigated and the conclusion reached that three Ranney collectors at the site would be capable of producing the required design flow. Also investigated was the use of Ranney collectors to inject brine into the shallow subsurface offshore. The project included drilling, well construction, aquifer testing and solute/flow modeling. It successfully demonstrated that Ranney collectors would be suitable for use and that brine injection was feasible.

Cascade Ranch Water Supply Investigation, Pescadero, California

Balance Hydrologics is serving as the hydrogeologic consultant in developing a lodge and campground in coastal San Mateo County. The Balance staff sited, supervised, and documented drilling of two major exploratory boreholes, up to 740 feet deep, and designed and directed completion of a well meeting the quantity and quality needs for an overnight population of appropriately 500 people. Balance staff specified and performed a development program which included continuous measurement of specific conductance, allowing projection of varying water quality in measured streamflow during development of one well near a coastal stream, so that the extent of stream/aquifer interaction could be quantified.

Shorelands Road and Water Company, Mendocino, California

Balance Hydrologics conducted a hydrogeologic and well siting investigation for a four well mutual water company. Geologic, hydrologic, and water quality criteria were all used to identify three potential well sites meeting the client's criteria of high reliability during late summer and high water quality. A well drilled at the first site produced sufficient water to double available supplies. Balance staff worked with the water company's Board to complete the testing and permitting of the well.

Highland Ranch Water Resources Evaluation, Sonoma County, California

A hydrologic investigation of a 400 acre rural mountain top parcel in Sonoma County evaluated available water resources and existing water quality. The site is located in a setting of variable volcanic rock deposits, portions of which are within a designated active fault zone. Work was completed in conjunction with several

other geology and planning studies to address development alternatives for the site. Tasks included collecting and analyzing water samples for a suite of water quality parameters; identifying possible water well drilling locations; assessing and predicting late summer yields from existing springs, seeps, and an artesian well; reviewing the siting of proposed sub-parcels and septic systems; and evaluating an existing water right.

Hydrologic Assessment of the Gilroy Hot Springs Area, Gilroy, California

Balance Hydrologics conducted a comprehensive hydrologic evaluation of a proposed destination resort at Gilroy Hot Springs, within the rugged Diablo Range of southeastern Santa Clara County. Specific assignments included:

1. Assessing recharge, discharge, and other key elements of the hydrologic budget under varying rainfall conditions
2. Evaluating the water-bearing potential of deeply weathered serpentinitic rocks and fractured consolidated sediments
3. Projecting possible effects of developing local ground water on the discharge or temperature of the hot springs
4. Assessing the quality of water yielded by the hot springs for a range of possible uses, including bathing, bottling, and landscape irrigation.
5. Evaluating nonpoint source discharges to the local streams that feed reservoirs used for public water supply, including assessing various erosion control alternatives

Balance hydrologists designed and directed construction of several successful exploratory wells developed in weathered serpentine that demonstrated sustained yield of good quality. The wells were then compared with other potential water sources in the immediate area to enable the project engineer to design a water-supply system.

Robinson Rancheria Ground-water Supply Investigation, Clear Lake, California

The water quality and potential ground-water yield of wells developed in older alluvium near Clear Lake, California, were assessed for the Robinson Rancheria community. Balance staff worked in close cooperation with local agencies and water treatment engineers to beneficially develop water high in magnesium and carbonate from the alluvial aquifer.

GROUND-WATER BASIN MANAGEMENT

Pajaro Valley Surface and Ground-water Management Study, Monterey County, California

This basin wide study, sponsored by the Association of Monterey Bay Area Governments, encompassed three major elements: recharge protection, recharge augmentation, and development of a management program. Technical tasks emphasized quantifying infiltration through channels, developing a discharge weighted, seasonally variable water quality model of the Pajaro River to assess its suitability for diversion, installing a stream gage at Watsonville, and closely calibrated hydrologic budgeting of 10 sandy watersheds underlain by the Aromas aquifer. Additionally, detailed facies analysis of several formations were undertaken in the coastal portions of the valley to determine most suitable areas for recharge augmentation on the scale of 5,000 to 10,000 acre feet per year.

Salinas River Basin Management Plan — Geohydrologic Study, Monterey County, California*

Monterey County is developing a Basin Management Plan (BMP) to resolve water supply shortfalls in some portions of the Salinas ground-water basin. These shortfalls have resulted in seawater intrusion and localized nitrate contamination. The BMP process is evaluating several water supply projects that will augment the water supply in the basin. In support of the screening process, a study was conducted that consolidated and summarized the hydrogeologic conditions in the study area. The study included analysis of land use, development of hydrogeologic cross sections, locating of more than 400 wells using a GPS system, review of well construction data, evaluation of recharge basin feasibility, and review of water quality and aquifer properties.

Mono Lake Basin Water Management Studies, California

Balance Hydrologics has been conducting a number of field assessments of in-stream and wetland water needs in the Mono Lake watershed as part of the State Water Resources Control Board program to revise water rights in the Mono Basin. Working with botanists and plant ecologists, Balance hydrologists, hydrogeologists and engineers are quantifying surface/ground-water exchange and alluvial aquifer response to changes in flows within streams from which large diversions are made. Results are being used to implement alternative flow regimes optimizing the extent of riparian vegetation and other resource needs. Balance hydrogeologists and sediment quality specialists are evaluating the response of very shallow ground waters sustainining wetlands near the lake and are participating in an interdisciplinary team projecting likely responses of vegetation, wildlife and soil salinity to alternative management levels for the lake.

El Granada Aquifer Yield Assessment, San Mateo County, California

Balance staff, working with a large engineering firm, directed and conducted a detailed hydrogeologic investigation of a 700 acre coastal terrace aquifer system. Ground-water occurrence, aquifer properties, and calibrated water budget calculations for key subareas were analyzed. Basin management strategies tailored to the unique hydrogeologic setting were proposed, and adopted by the Board of Supervisors. The Board also requested that the County's well ordinance be reviewed in light of the findings, and requested that we recommend changes and adaptations appropriate to conditions found in this and other areas of San Mateo County.

Brunei Water Well, Brunei, Southeast Asia*

Ground water in the country of Brunei is an under-utilized resource. Martin Feeney, now Supervising Hydrogeologist with Balance, assisted with developing an alternate water supply to be used during periods when surface supplies are impaired by high turbidity. The 1500-foot well was one this county's first major water wells. Work included direct supervision of the drilling contractor and provision of technical and geologic support for Brunei's technical staff. The well was successfully completed, and further development of the resource is underway.

CONJUNCTIVE USE AND MANAGEMENT OF RECHARGE

Sisquoc River Sediment and Ground-water Study, Santa Barbara County, California

Balance Hydrologics has been charged with developing a comprehensive hydrologic, geomorphic, and hydrogeologic assessment of the Sisquoc Plain area of northern Santa Barbara County, California. The assessment will be used to evaluate alternatives for producing sand and gravel from this designated regionally significant source of PCC-grade aggregates. Balance hydrogeologists have carried out a detailed drilling program to evaluate the resource at depth, and have installed piezometers to measure aquifer response to seasonal recharge. Staff geomorphologists have developed a 61 year daily sediment transport model to estimate mean annual delivery of coarse sediment, year-to-year variability of delivery, and the role of wildfires in delivery of coarse sediment to the Sisquoc Plain. Simulations have been calibrated with measured changes in channel geometry using sequential aerial photographs and other archival information, and with limited sediment transport monitoring. Balance staff are simulating and evaluating use of gravel pits for a program of managed aquifer recharge intended to offset regional ground-water overdraft and to control salinity increases now reaching levels which restrict beneficial uses of the aquifer.

Arroyo Seco Cone Area Investigation, Monterey County, California

The investigation quantified the interaction between the surface flows of the Arroyo Seco cone area and the underlying ground-water system. Under consideration was the development of spreading basins to allow the use of Arroyo Seco surface water flows for artificial ground-water recharge. The project included: hydrogeologic exploratory drilling/well construction; construction and testing of a pilot recharge basin; and observation of a recharge cycle through one winter season. The investigation concluded that while percolation rates were very high, the proposed project could not cost effectively increase the volume of recharge over natural recharge rates due to the limited availability of ground-water storage and the seasonal duration of flow of the Arroyo Seco.

Seaside Basin Injection/Recovery Study, Monterey County, California

Working in cooperation with an engineering firm, Balance hydrogeologists are developing a conjunctive use program to direct surplus runoff into semi-consolidated sand aquifers in the Seaside area near Fort Ord. The program will use ground-water injection wells. Balance's responsibility involves designing the injection tests, overseeing modifications to the wells to allow effective testing, evaluating the tests to quantify aquifer properties and likely environmental effects, and simulating likely pressures and geochemical responses.

Aquifer Management and Wastewater Re-Use Potential, Ada County, Idaho

Balance Hydrologics staff participated in preparing an Environmental Impact Statement assessing a proposed wastewater management plan for the Boise Valley, Idaho. Their responsibilities in this project included describing existing ground-water hydrology and aquifer characteristics, evaluating the impact of septic tanks and other diffuse sources of pollution on ground-water quality, and analysis of the mitigative effects of alternative wastewater management plans on existing and anticipated conditions. The analysis included quantifying local recharge form unlined irrigation canals and assessing nutrient loadings percolating form nearby agricultural areas. The possible occurrence of naturally occurring nitrogen sources was also evaluated.

Point of Diversion Study, Carmel River, Monterey County, California

Balance Hydrologics hydrogeologists and hydrologists, as part of a larger team, are assessing the feasibility of drawing the Monterey Peninsula's main water supply from a shallow aquifer rather than as a direct diversion from a reservoir. This change would allow existing treatment facilities and pipelines to be utilized while providing important fisheries and riparian habitat benefits as well as sharply reduced treatment costs. Balance's scope includes re-evaluating the geometry of the uppermost Carmel River alluvial aquifer, adapting the existing ground-water model to

incorporate the proposed changes in point diversion, and assisting the local water district in modifying its operational models and in-stream flow simulations.

GROUND-WATER SALINITY AND WATER QUALITY MANAGEMENT

Salinity Management Model, Santa Ynez and Lompoc Valleys, Santa Barbara County, California

Working on behalf of the City of Santa Barbara and four adjoining major water districts, Balance has been developing a water quality model to assess the effects of alternative operations of Lake Cachuma on salinity in alluvial aquifers downstream from the lake. The daily model is based on process (e.g., storm hydrograph separations), substrate (the soils and geology of each subwatershed or distinguishable aquifer) and additions from known point and nonpoint sources. It included contributions of sodium and other dissolved solids upwelling from deep aquifers along fracture zones and through abandoned oil and gas wells. It is calibrated to field records obtained by state and federal agencies during past years when the reservoir and ground-water basins were operated in manners similar to those proposed.

Seawater Intrusion Delineation — 180 foot Aquifer — Salinas Valley Ground-water Basin, Monterey County, California*

Seawater intrusion in the 180 foot aquifer system of the Salinas Valley has advanced inland as far as seven miles. A combination of controlled source audiomagnetotellurics geophysical methods, monitoring well installation and ground-water sampling techniques, was used to delineate the extent of seawater encroachment in this aquifer system. Geophysical data were also combined with well log data to develop an understanding of the nature of the interfingering between fluvial deposits of the Pressure subarea and alluvial fan deposits of the East Side subarea. The project resulted in a significantly improved understanding of the mechanisms controlling the movement of seawater in this aquifer system.

Resort at Squaw Valley, California

The Perini Corporation constructed an 18-hole, links-type golf course at Squaw Valley. The aquifer which underlies the golf course is the sole source of water for the surrounding community. The alluvial sands and gravels beneath and near the golf course are the sole source of water supply for the community of Squaw Valley, a major destination resort. Additionally, state and local agencies maintain a stringent non-degradation policy for both surface and ground-water quality. Kleinfelder engineers and scientists, supported by Balance hydrologists, conducted a seven element site investigation:

1. Comprehensive mapping of soils at the site, including nutrient content and moisture regimes,

2. Constructing a test green and fairway where the actual effects of various fertilizer and herbicide applications on soil, ground water, and storm runoff could be measured,

3. Implementing a water quality monitoring program for the local aquifer, with about 30 wells from which samples can be taken from varying depths,

4. Developing a rigorous chemical management plan based on the results of the previous tasks,

5. Establishing where former uses of portions of the site (stables, sheep camps, wastewater disposal, parking lots, contractor's storage yard) may have affected water quality and characterizing these pre-existing conditions,

6. Designing sediment retention ponds and other erosion control elements to prevent sedimentation of Squaw Creek during construction of the golf course and to protect the course from off-site erosion.

Balance hydrologists presented the results of their studies in papers describing the sedimentology and recharge of Squaw Valley and of a nitrogen budget for the meadow area.

Water Quality Protection Plan for the Santa Lucia Preserve Golf Trail, Carmel Valley, California

Owners of this 18,000 acre preserve are proposing a unique golf trail as the main organized recreational activity in this large natural area. They seek a course which would not harm the quality of water in the adjoining streams and aquifers. Balance led a team, including the project engineers and several specialists, which developed a program meeting the no harm criterion and which rigorously tested several management alternatives by simulating constituent movement and attenuation under severe conditions. Risk analyses were developed for each constituent proposed for application, with human health and index aquatic species tolerances providing the thresholds of significance. The water quality protection program has been accepted essentially as submitted by the County as mitigation for effects of the proposed golf trail.

Nitrate Budget for the San Lorenzo Valley, Santa Cruz County, California

Balance hydrologists and engineers developed a comprehensive nitrate budget for the San Lorenzo Valley. The watershed, primary source of water for a population of roughly 90,000, is home to about 40,000 residents served by approximately 14,000 septic systems. The County's Environmental Health Service conducted a number of investigations addressing concerns over potential taste, odor, and trihalomethane precursors in water diverted from the river. Balance staff quantified the contribution of nitrate-nitrogen from numerous subwatersheds and individual aquifers throughout the watershed and identified nonpoint source control measures appropriate for each of these hydrologic

units. In a later phase of the program, specific control plans were developed and demonstration projects built.

Water Quality Impacts of Parking Lot Runoff on a Sole Source Aquifer, Squaw Valley, California

Runoff from the main parking area for a major ski resort is collected, passed through oil-and-grease separators, and then discharged to shallow ground water through a leach field. The water district that supplies most of the Squaw Valley retained Balance Hydrologics to assess possible effects of this procedure on four nearby water supply wells in shallow sand-and-gravel units within the valley fill. The program developed by Balance staff introduced fluorescent dye into the separators that traced the movement of the leached effluent in the local stream network or into the well field. Effects were estimated for a range of seasonal water levels using field data, finite difference simulations developed by others, and detailed aquifer analysis.

Wellhead and Aquifer Protection Program, McCarthy, Alaska

McCarthy's residents draw water from unusual year round springs and shallow wells in an alluvial aquifer near the snout of the Kennicott Glacier. Visitors to this former mining community in Wrangell St. Elias National Park have increased from 1,000 to 30,000 per year during the past decade. Gradual development of infrastructure and sanitation issues arising from intensive informal camping pose imminent health risks to users of these water sources. Balance Hydrologics has been assisting the McCarthy Area Council with all technical hydrogeologic services in connection with a well head protection program being developed through a grant provided by the State of Alaska and the Environmental Protection Agency (EPA). These include tracing salts injected into the shallow aquifer at several points of interest.

SPECIAL STUDIES: WATER RIGHTS AND AQUIFER CARRYING CAPACITY

Rancho San Carlos Riparian Underflow Management Plan, Monterey County, California

Balance hydrologists and hydrogeologists prepared a plan to protect shallow alluvial water supplies sustaining riparian woodland and aquatic habitat in several small canyons draining from the Rancho San Carlos area south of Carmel. Their detailed mapping of inflows and outflows from these streams during summer months, coupled with analysis of fracture systems and ionic ratios, allowed estimation of which reaches may be affected by proposed water supply pumping from hard rock aquifers at depths of several hundred feet below the alluvial corridors. They confirmed the inferred connections by telemetric monitoring of key stream segments during long duration tests of the target aquifers.

Brush Creek Water Rights Assessment, Mendocino County, California

Brush Creek, near Point Arena, drains a small coastal basin supporting a significant riparian, freshwater aquatic, and estuarine biota. A land owner near the mouth of the stream proposed to irrigate 100 acres of pasture by diverting 200 acre feet annually, primarily from limited summer flows. Balance staff conducted an intensive study of the lower 1.5 miles of the stream on behalf of protestants to the proposed diversion, who draw upon high capacity alluvial wells. The investigation included basic monitoring of stream flow, specific conductance, and water temperatures at six stations on Brush Creek. Water imported into the basin for agricultural use was measured, and the significant relationship between subsurface irrigation return flows and stream discharge was quantified.

San Francisco Theological Seminary Water Rights and Water Supply Program, Marin County, California

Balance assisted the San Francisco Theological Seminary in developing alternatives to protect the yield from bedrock springs on Bald Mountain, which the seminary has used for nearly 100 years for irrigation and backup water supply. Our client was concerned that new bedrock wells proposed by about 20 lot owners on Bald Mountain might deplete the yield of these springs. Historical use was established using aerial photographs showing the extent of irrigated areas, (b) observations and data from archival documents found in various public repositories, and (c) analysis of records developed by the seminary's staff over the years. Working with seminary staff and community planners, three sets of alternatives were developed to minimize effects on the springs, which otherwise would be quite significant.

Montara-Moss Beach Water Well EIR, San Mateo County, California

Balance directed a multidisciplinary investigation of the effects of 59 proposed and 166 potential wells serving residences in the Montara and Moss Beach areas. The master EIR assessed the effects of the proposed program on the amount and quality of water in the dissected marine terrace aquifers underlying the area. Alternatives, including developing community wells and valley scale recharge and extractive programs, were also evaluated.

Well Interference Study, Santa Barbara County, California*

During the assessment of overall ground-water supply in a coastal canyon, issues arose regarding potential interference effects between water users in adjacent canyons. An aquifer testing program was developed to test the sandstone bedrock aquifer system and included the installation of several monitoring wells and the performance of a 14 day aquifer test. Data analysis revealed the existence of a dual porosity system where storage is controlled by primary porosity and transmissivity by secondary porosity.

Image Interpretation for Mojave Water District Water Rights Adjudication, Mojave Desert, California

Landsat space imagery and aerial photography was acquired and analyzed digitally and manually to develop an irrigation history of several different sites. In many cases, evidence had to be developed based on inferences from changes in images taken before and after, but not during, the period of concern. Much of the analysis was corroborated using additional lines of evidence such as power consumption by pumps and testimony. Results were presented to the Division of Water Rights in implementing the recent Mohave River adjudication.

SPECIALIZED STAFF EXPERTISE

Balance Hydrologics offers an expert professional staff, with a broad array of experience in areas throughout the western states and Alaska. Particular staff expertise includes:

Martin Feeney *Senior hydrogeologist*	• Aquifer testing and analysis • Ground-water modeling • Well design, planning, and coordination • Recharge management • Conjunctive use simulations • Injection well feasibility, planning and permitting
Barry Hecht *Senior hydrogeologist/hydrologist*	• Recharge feasibility and management • Development of fractured and bedrock aquifers • Shallow ground-water exchange with wetlands and streams • Underflow analyses, water rights • Isotope and tracer interpretations
Daniel O. Holmes *Hydrologist/remote imagery specialist*	• Consumptive use and crop water demand • Data base coordination • Recharge of urban runoff • Historical water use searches and documentation
Christopher C. White *Water quality specialist*	• Soil salinity and drainage • Agricultural percolate and pesticide mobility • Effects of septic systems, dairies, and stables on shallow aquifers • Salt and dye tracer applications • Nitrogen and phosphorus mobility • Vadose zone sampling and instrumentation • Control and recharge of treated effluent
Gary Kittleson *Hydrologist*	• Nitrogen and phosphorus management • Well head protection programs • Water use by phreatophytic vegetation
Jonathan Owens *Hydrologic Engineer*	• Aquifer properties, emphasizing spatial variability of permeability • Aquifer tests • Monitoring program design and telemetry • Vadose zone simulations

The firm also draws upon widely recognized specialists to meet the needs of specific projects.

RESUMES

MARTIN B. FEENEY
Hydrogeologist

Education

B.S., Earth Science (Geology), University of California, Santa Cruz, 1976

Secondary Teaching Credential (Physical Science), University of California, Santa Barbara, 1979

Graduate Program, Water Science, University of California, Davis, 1981-82

M.A., Environmental Planning (Ground Water), California State University, Northridge, 1987

State Registrations and Professional Society Certification

Certified Ground Water Professional, National Ground Water Association, 1994 (**473**)
Registered Geologist, California, 1989 (**4634**)
Certified Engineering Geologist, California, 1989 (**1454**)
Certified Hydrogeologist, 1995 (**145**)
Registered Environmental Assessor, California, 1988 (**812**)

Summary of Experience

Mr. Feeney has been involved in complex ground-water supply, well design, aquifer storage and recovery and recharge management issues for 15 years.

Experience

1996-present — Supervising Hydrogeologist, Balance Hydrologics, Inc.

Directs ground water basin management, ground water supply, and recharge augmentation programs conducted by Balance. Leads most assessments of brackish water resources and surface/ground water interaction. Participates in assessment and monitoring of treated effluent at diverse sites. Provides design criteria for water intakes in beach sands or other severe environments.

1992-1996 — Supervising Hydrogeologist, Principal-in-Charge, Monterey Branch Office, Fugro West, Inc.

Experience includes hydrogeologic analysis of ground water basins; injection wells/artificial recharge programs; development of ground water flow and transport models; development of saline ground water source for desalination plants; underground storage tank site assessment and remediation.

1985-1992 — Senior Hydrogeologist/Vice President, Staal, Gardner & Dunne, Inc. (SGD)

A founding principal of the firm in 1985. Participated in ground water resource evaluations, development of ground water models, municipal water well feasibility studies, design and construction management; evaluation of hazardous waste sites and underground storage tanks, water quality assessments; landfill siting studies. Co-founded Monterey office in 1987. In 1992, SGD became a member of the Fugro group of companies.

MARTIN B. FEENEY
Hydrogeologist

1983-1985 Staff Geologist, Geotechnical Consultants, Inc.

Performed geotechnical investigations for major engineering works, including dams, oil processing facilities, pipelines, and water reclamation facilities. Supervised water well drilling and completion and participated in hydrogeologic investigations including water availability, contaminant assessment and remediation, and ground water modeling.

1979-1980 Field Geologist, M.I.T. Department of Earth and Planetary Science

1977-1978 Petroleum Well-Site Geologist, Borst & Giddens, Inc.

Professional Affiliations

American Water Resources Association
Association of Ground Water Scientists and Engineers
Groundwater Resources Association of California
National Water Supply Improvement Association

Partial List of Representative Projects

Ground Water Resources
- Hydrogeologic Study, North Monterey County
- Basin Management Plan, Salinas Valley, Monterey County
- Ground Water Basin Management Plan, Santa Rosa Basin, Ventura County
- Hydrogeologic Update, Fort Ord Military Reservation, Monterey County
- Hydrogeologic Assessment, Airox Mine, Orcutt, Santa Barbara County
- Hydrogeologic Assessment, Rancho San Juan, Monterey County
- Water Supply Availability Investigation, Laguna Seca Subarea, Monterey County
- Hydrogeologic Investigation, Seaside Coastal Ground Water Basin, Monterey County
- Environmental Assessment, Carpinteria Water Allocation Study, Santa Barbara County
- Water Supply Availability Investigation, El Toro Subarea, Monterey County
- Hydrogeologic Investigation, Carmel River Aquifer-Coastal Portion, Monterey County
- Hydrogeologic Update, Seaside Coastal Ground Water Basin, Monterey County
- Sea Water Intrusion Delineation Study, Salinas Valley
- Sea Water Intake Feasibility Study, Marina Coast Water District, Monterey County
- Brackish Aquifers Feasibility-of-Use Study, City of Santa Cruz

Artificial Recharge/Injection Well Projects
- Arroyo Seco Artificial Recharge Study, Salinas Valley
- Brine Disposal Wells, Marina Coast Water District, Monterey County
- San Tomas Injection Well Project, Santa Clara Valley Water District
- Carmel River/Seaside Aquifer Seasonal Storage Project, Monterey Peninsula Water Management District, Monterey County

Water Well Projects
- Anzar High School Well, San Juan Bautista
- Castroville Seawater Intrusion Project—Supplemental Wells
- Emergency Water Wells Project, Oxnard, Ventura County
- Well Interference Study, EXXON, Corral/Las Flores Canyon, Santa Barbara County
- Rehabilitation of Well Nos. 17 and 19, Oxnard, Ventura County
- Sea Water Intrusion Abatement Project Wells, Oxnard Plain, Ventura County

MARTIN B. FEENEY
Hydrogeologist

Water Well Projects (continued)

Well Nos. 3A and 4A, City of Ventura, Ventura County
High School Well, Carpinteria Water District, Santa Barbara County
Production Well Program, City of Santa Barbara
Rehabilitation of Well Nos. 1 and 2, City of Greenfield, Monterey County
Water Well Field Assessment Program, Channel Islands Beach, Ventura County
Paralta Test Well, California-American Water Company, Seaside, Monterey County
Laguna Seca Park Well, Monterey County
Royal Oaks Park Well, Monterey County
Water Well Design and Construction Supervision, Sultan of Brunei, Brunei, S.E. Asia

BARRY HECHT
Principal Hydrogeologist

Education

BS	Geology (Honors), University of California, Santa Cruz, 1970
AB	Geography and Regional Planning (Honors), University of California, Santa Cruz, 1970
MA	Geography, University of California, Berkeley, 1972
PhD Cand.	Geography, University of California, Berkeley, 1975

State Registrations and Professional Society Certifications

Registered Geologist: California (3664)
Alaska (232)
Oregon (1262)
Certified Engineering Geologist: California(1245)
Oregon (E1262)
Certified Hydrogeologist: California (50)
Registered Environmental Assessor: California (22)
Certified Ground Water Professional 235, National Ground Water Association
Certified Professional Geologist 7786, American Institute of Professional Geologists

Summary of Experience

Mr. Hecht has directed specialized investigations of complex hydrogeologic, water-quality, water-rights and recharge-management issues for more than 20 years.

Experience

1988-Present — Principal, Balance Hydrologics, Inc.

Directs and conducts investigations of hydrology, hydrogeology, ground-water recharge, water quality, sedimentation and sediment quality, with particular attention to surface/ground water interaction. Leads field and simulative investigations of recharge rates and quality. Directs studies of shallow percolate volumes and quality beneath agricultural and river-corridor areas, often involving combined use of simulations and ionic or isotopic tracers. Responsible for overall technical direction and integration of the firm.

1982-1988 — Chief Hydrologist and Geologist, Kleinfelder

Responsible for all investigations of hydrogeologic and geologic investigations, firm-wide. Directed studies of sediment transport and water quality conditions as they affected streams and wetland habitats for federal, state and local agencies. Supervised studies and analyses of ground water movement or quality at both the site and regional scale. Directly managed firm-wide alluvial hydrology program, providing integrated analysis of surface and ground waters in alluvial systems. Led firm's pesticide migration group, including managing remedial investigations

	(RI/FS) at a pesticide-formulator Superfund site, plus major leachability studies at golf courses, cut flowers and truck crop sites.
1977-1982	H. Esmaili & Associates, Inc., Principal Hydrologist.
	Responsible for hydrogeologic, geomorphic, and geologic investigations at HEA. Developed ground-water management plans for basins in California, Idaho, Oregon and Washington. Assessed and simulated effects of applying treated municipal and industrial effluent at sites throughout California, Oregon and Washington. Directed nutrient management and water-quality monitoring programs in many western states. Led radionuclide and hazardous waste migration studies in most western states.
	HEA merged into Kleinfelder, August 1982
1975-1977	Doctoral studies at U.C. Berkeley, Woodrow Wilson Fellow
	Primary research in alluvial hydrology and geomorphology. As part of graduate program, served as scientific assistant at the USGS Bedload Research Project near Pinedale, Wyoming. Worked with USFS personnel at Idaho Panhandle National Forest in field surveys of channel geometry and sediment transport rates; developed related 2000-step computer code.
1973-1975	University of California, Santa Cruz. Lecturer in Environmental Studies and director of student field program. Taught courses in geomorphology, field methods, hydrology, and watershed management. Field instruction programs were carried out for 150 students with a three-member staff team.
1972-1973	University of California, Santa Cruz and Ahtna, Inc., Copper Center, Alaska. Led a three-member technical team dealing with land selection and other immediate problems related to the Alaska Native Claims Settlement Act and the trans-Alaska pipeline impact in the area.
1969-1972	Geography and Environmental Studies Office, University of California, Santa Cruz. Employed intermittently while assisting in development of departmental field program, including three terms as a graduate field instructor.
1968-1970	Santa Cruz County Planning Department, California. Assistant Planner. Compiled geologic and hydrologic data, coordinated aquifer management, drafted a quarry ordinance, and worked in zoning administration and enforcement.

Other

1972-1975	Member, then chairman, Santa Cruz County Watershed Commission
1982-1992	Member, Upper Sacramento River Salmon and Steelhead Advisory Committee, California Department of Fish and Game (Governor's at-large appointee).
1973-Present	Instructor, University of California Extension (intermittent)

BARRY HECHT
Principal Hydrogeologist

1983-1989 Instructor, San Francisco State University Extension (intermittent)

Professional Affiliations

Association of Ground Water Scientists and Engineers/National Ground Water Association
Groundwater Resources Association of California
American Geophysical Union
American Institute of Professional Geologists
American Water Resources Association
Association of State Flood-Plain Managers
Floodplain Management Association of California

Expert Testimony

EPA Administrative Law Hearings
U.S.D.A. Forest Service
State of California, Water Resources Control Board
State of California, Coastal Commission
County of Santa Clara, California
County of Santa Cruz, California
County of Trinity, California
City of Santa Barbara
Montecito Water District
Marin Municipal Water District
Joint Federal/State Land Use Planning Commission (Alaska)
State of Alaska, Department of Natural Resources
City of Santa Barbara
Marin Municipal Water District
Montecito Water District
Association of Village Council Presidents, Bethel, AK
Cenaliulriit Coastal Zone Management District, Southwest Alaska
Civil Litigation (Miscellaneous)

Publications

"Sequential changes in physical conditions affecting aquatic habitat in the upper Carmel River, California, following the Marble-Cone Fire of August 1977." *Proceedings of the California Riparian Symposium*, September 1981. University of California Press. pp. 134-142.

"Deformation along a postulated branch of the Hayward Fault, Berkeley: Faulting or landsliding?" Proceedings of the Conference on Earthquake Hazards in the Eastern San Francisco Bay Area. California Division of Mines and Geology Special Publication No. 62, March 1982. pp. 217-226 (with D. Hoexter, C. Levine, and G. Collier).

"Appropriate uses of sediment source tracing in habitat assessments of mountain streams." Proceedings of the American Fishery Society's Assessment of Impacts of Hydropower Development Conference, May 1985. Denver, CO. pp. 416-422.

"Sedimentology and recharge of a Sierran glacial valley aquifer." Proceedings of the International Mountain Watershed Symposium, June 1988. Lake Tahoe, CA (with G. Jett).

"Streamflow, nitrate, and sediment budgets for Squaw Valley, California." Proceedings of the International Mountain Watershed Symposium, June 1988. Lake Tahoe, CA (with M. Woyshner).

"Vernal pool relationships in the eastern Central Valley, California." Proceedings of Chico Vernal Pool Conference, American Association for the Advancement of Science and the Botanical Society of America, July 1989. Chico, CA. CSU Chico, Studies from the Herbarium No. 8, pp. 49-60 (with W.T. Hanes, L.P. Stromberg).

"Natural restoration of normal bed conditions for steelhead spawning and rearing after a major storm: Corralitos and Brown Creeks, Santa Cruz County, California." Proceedings of the Ninth Annual California Salmon, Steelhead and Trout Restoration Conference, February, 22-24, 1991. Santa Cruz, CA. pp. 24-26.

"Diversity as opportunity: Bed-habitat conditions in pools and riffles downstream from channel confluences." Proceedings American Fisheries Society 26th Annual Conference, February 7-9, 1991. South San Francisco, CA. pp. 20-1.

"Response of riparian-zone shallow ground water to water-level changes in streams tributary to Mono Lake." Program with Abstracts, History of Water Symposium, UC White Mountain Research Center, September 1991. Bishop, CA. pp. 34-35 (with A. Finnerty, I. Flaschka, M. Napolitano).

"Sediment quality of tailings ponds — Considerations for reclamation planning." Proceedings of Ninth Annual Dredging and Placer Mining Conference. Reno, NV. 19 pp.

"Creep and downslope movements in the Hayward fault zone in North Berkeley: Ten years later." Proceedings of the 1992 Conference on Earthquake Hazard, Eastern San Francisco Bay Area, California Division of Mines and Geology Special Report 113, pp. 121-129 (with D.F. Hoexter, K. Knudsen, D.M. Laduzinsky and G. Fiedler).

"South of the spotted owl - Restoration strategies for episodic channels and riparian corridors in central California." Proceedings of the Society of Wetlands Scientists, Western Wetlands Conference, March 25-27, 1993. Davis, CA. pp. 104-117.

"Area-wide wastewater management for the San Lorenzo River watershed, California." Proceedings of the Seventh National symposium on Individual and Small Community Sewage Systems. American Society of Agricultural Engineers Dec. 11-12, 1994, Atlanta, GA. 10 pp. (in press, with J. Ricker, N. Hantsche, and H. Kolb).

"Potential effectiveness of shallow leachfields in reducing nitrogen loadings to ground and surface waters from deep trench leachfield in areas of sandy soils." Presentation to the California Environmental Health Association, 1996 Annual Convention. Oakland, CA (with C. White, J. Ricker, and P. Gill).

"Sources of nitrogen at low flow in the San Lorenzo River, California, and costs of alternatives for its control." In prep for submittal to *Ground Water* (with C. White and J. Ricker).

GARY KITTLESON
Hydrologist

Education

B.A. (honors), Anthropology and Environmental Studies, Boston University, 1987.

M.S. (by thesis), Natural Resource Management and Administration, Antioch/New England Graduate School, 1991.

Summary of Experience

Mr. Kittleson has been performing focused hydrologic assessments related to wetlands, riparian habitats, and land use planning since 1987. His responsibilities have included wetland delineation, hydrogeologic investigations, hydrologic or geomorphic aspects of riparian inventories, and spawning gravel surveys. He has worked effectively at the site, stream, and basin-wide scales. In addition, Mr. Kittleson has experience with many different ways of applying hydrologic data to site design review, Geographic Information Systems, and public policy development.

Experience

1995 - present	Hydrologist, Balance Hydrologics, Inc. Directs feasibility investigations of the compatibility between agricultural uses and water-quality goals and/or specific hydrologic requirements in sensitive habitat areas. Participates in basin planning and stakeholder meetings, with emphasis on hydrologic aspects of riparian-area management and water rights. Assists in geomorphic and channel-stability restoration efforts. Supports stream gaging, well-monitoring and other hydrographic functions performed by Balance.
1992-1995	Basin Management Planner, Monterey County Water Resources Agency, Salinas, CA Performed hydrologic analyses, wetland and riparian habitat assessments, steelhead surveys, land use studies, and water demand projections for the Salinas River Basin Management Plan. Additional responsibilities included supervising graphic design and production, ArcInfo GIS mapping, and publishing Agency's quarterly newsletter. Completed initial studies, CEQA applications, U.S. Army Corps of Engineers Section 404 permits, and California Department of Fish and Game Streambed Alteration Permits. In addition, conducted public meetings and coordinated the Enhanced Groundwater Recharge Demonstration Project.
1990-1991	Assistant Planner, City of Watsonville, CA Responsibilities included architectural and landscape design review, processing of land use permits, CEQA compliance, wetland protection, water-quality planning and public information. Completed Master's thesis on city wetland resources, entitled, "Watsonville's Freshwater Wetland Resources: Planning for Conservation in an Urban Context."
1989	Environmental Planning Technician, Dubois and King, Inc., Randolf, VT Primary activities included the preparation of EIS's, 404 permits, and Vermont Act 250 Applications. Historical and archaeological impacts, wetland mapping, and social/economic impacts were areas of concentration.

GARY KITTLESON
Hydrologist

1988	Manager, St. Albans Bay Town Park, St. Albans, VT
	Responsible for all elements of public open space management, including naturalist interpretation, community relations, seasonal staffing, park revenues, public dock management, and buildings and grounds maintenance.
1987-1988	Assistant Environmental Analyst, Massachusetts Metropolitan District Commission - Reservations and Historic Sites Unit, Boston, MA
	Responsible for environmental protection of land under stewardship of the MDC. This included cleanup of illegal dumping activities, delineation of wetlands, creation of a computer database for site/issue tracking, computer maps and graphics, and a Wetlands Protection Handbook for MDC staff.
1987	Research Coordinator, Quincy Quarries Historic Site, Massachusetts Metropolitan District Commission - Reservations and Historic Sites Unit, Boston, MA
	Primarily responsibilities were historic and naturalist interpretation, creation of a computer database, photography, public relations, and trailwork.

Professional Affiliations

Society for Ecological Restoration
Association of Environmental Professionals
Association of Ground Water Scientists and Engineers

Reports

Salinas River Basin Management Plan Task 2.06: Water Quality Assessment. Prepared in conjunction with Dr. U. Win, L. Howard, and M. Zidar of Monterey County Water Resources Agency, 1994.

Wetland and Surface Water Quality Impacts — Salinas Basin Management Plan Alternatives Analysis. February 1994.

The Enhanced Groundwater Recharge Demonstration Project, Salinas River Near Gonzales. Prepared for the Monterey County Water Resources Agency, 1994. (Discussion Draft)

Municipal and Industrial Water Demand Projections for the Salinas River Basin: The Application of MWD-MAIN. Monterey County Water Resources Agency. Prepared in conjunction with Dr. U. Win, G. MeAmber, and L. Howard of Monterey County Water Resources Agency, 1993.

Publications

Water Demand Modeling and Public Participation in the Salinas River Basin, California. Oral Paper presented at American Water Resources Association Summer Symposium, Jackson, Wyoming. June 1994.

Watsonville's Freshwater Wetland Resources: Planning for Conservation in an Urban Context. 1991. 45 pp. plus tables, figures, and appendices.

Wetlands Protection Handbook for MDC Staff. Prepared for Commonwealth of Massachusetts, Metropolitan District Commission — Reservations and Historic Sites Unit. 1987. 24 pp. plus tables, figures, and appendices.

BALANCE HYDROLOGICS, Inc.
900 Modoc Street
Berkeley, CA 94707
(510) 527-0727 (FAX) 527-8531

Effective October 1, 1996

PROFESSIONAL FEE SCHEDULE, 1996-1997

Professional Staff*	Hourly Rate
Assistant Professional	$62
Staff Professional	$72
Senior Staff Professional	$80
Project Professional	$90
Senior Professional	$100
Principal	$120
Support Staff	
Technical Typist	$42
Technical Editor	$50
Senior Project Administrator	$54
Drafter or CADD Operator	$42
Hydrologic Technician	$44
Senior Technician	$52
Data or CADD Manager	$52

**Includes environmental scientists and engineers practicing in hydrology, geology, soil and watershed sciences, and civil and erosion-control engineering.*

- Mileage will be charged at $0.37/mile (2WD) and $0.45/mile (4WD).
- Nominal use charges are applied for certain field and analytical instruments and for protective gear; fees vary with the nature, duration, and frequency of use. Daily-use schedule available on request.
- A fee of $20/hour is in effect for technical computers used directly in analysis, programming or simulation; no charges are applied for data entry or word processing. Variable fees of up to $25/hour may be incurred for CADD or GIS computer services. On-line search computer services are charged at cost plus 15%, plus $25/hour.
- Per diem rates vary between $78 and $99 per day, depending upon local costs; actual costs are used as the basis for food and lodging charges in certain urban areas, Alaska, and selected other locations.
- Project-related expenses will be billed at cost plus 15 percent.
- Rather than charge separately for communications (phone, mobile phones, fax) routine copying, and routine deliveries, we add 4 percent to labor costs.
- Certain surcharges and minimums apply to courtroom or hearing testimony and to; particulars available upon request.

File: 304 Fee Schedule 96/97
Revised: 10/96