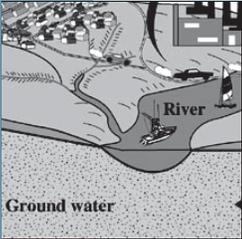


CHAPTER 10

Groundwater

See Pg...145



See Pg...147



See Pg...149



See Pg...151



CEQA and Groundwater: California's "Invisible" Natural Resource

David Beckman 145

Groundwater Overdraft in Rohnert Park

John E. King 147

CEQA, The Carmel River, and September Ranch

Fran Farina 149

Lakeside: All-American River Town

Suzanne M. Michel 150

The Keller Canyon Landfill: How CEQA Mitigations Prevent
Groundwater Contamination through Improved Design

John Thelen Steere 151

Threats to California's GROUNDWATER

Groundwater, one of the planet's most abundant natural resources, is also one of its most vulnerable. The two major threats to groundwater in California and throughout the world are overdraft and contamination.

Groundwater is not an infinitely renewable resource. When the rate of groundwater removal exceeds the rate at which it is being naturally replenished, the aquifer becomes less saturated, the water table drops, and eventually the groundwater supply becomes depleted. This condition is known as groundwater overdraft.

Because the recharge rate of most aquifers is exceedingly slow, groundwater overdraft has become a common practice in many parts of the world, including: China, India, Mexico, Thailand, North Africa, the Middle East, and the western United States. Indeed, the largest aquifer in the world—the Ogallala, which lies underneath most of Nebraska and parts of Kansas, Colorado, Oklahoma, New Mexico, Wyoming, South Dakota, and Texas—is being consumed so rapidly that its water table is dropping an average of two meters per year. At this rate the Ogallala Aquifer, which supplies about 30 percent of the water used in the United States for irrigation, will be entirely depleted in less than fifty years.

Continued on the following page.

CEQA & GROUNDWATER: California's "Invisible" Natural Resource

By David Beckman

Beneath the surface of the earth lies a vast body of water. It does not exist in a large underground lake or a flowing underground stream but rather as tiny droplets of water, interspersed among the grains of soil and rock that we commonly picture when imagining the world underground.

surface water, especially in the southern half of the state, have caused Californians to turn time and time again to the state's groundwater supply.

Indisputably, the availability—and, more importantly, the deficiency—of all forms of freshwater have

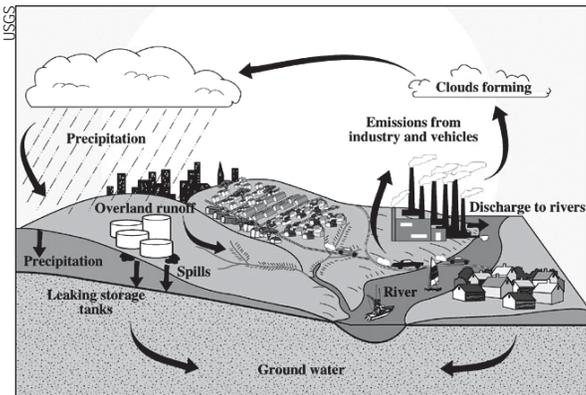
The contamination and overdraft of California's groundwater resources is a serious, long-term threat to the viability of the resource in California.

Nevertheless, the aggregate volume of those tiny water droplets is greater than the volume of all the lakes and rivers of the world combined. In fact, the volume of groundwater is estimated to be more than 30 times the combined volume of all fresh-water lakes in the world and more than 3,000 times the combined volume of all the world's streams. In California alone, current supplies of usable groundwater are estimated at about 250 million acre-feet—six times the volume of all of the state's surface water reservoirs combined.

For more than 100 years, groundwater has provided a substantial and essential resource for California's agriculture, its industries, and its cities. It was not long after statehood in 1850 that California's residents began building pumps to extract this plentiful resource from the subsurface. The scarcity and seasonal availability of

substantially influenced California's history and development. In fact, water is widely considered the single most significant natural resource affecting the growth of the state. Given the arid climate that pervades most of the southern half of the state and the limited supply of running water, legendary political and economic battles occurred over access to the waters of the Mono Basin, the San Joaquin River, the Owens Valley, the Colorado River, and the Sacramento-San Joaquin Bay Delta.

Yet despite their importance, these surface water bodies are only part of the water picture in California. Between 25 and 40 percent of California's water supply in an average year comes not from surface streams or reservoirs but rather from beneath the ground. That figure can be as high as two-thirds in critically dry years. In fact, California uses more groundwater



Groundwater is one of the world's most abundant and vulnerable natural resources. Sources of contamination include: industrial and vehicular emissions, industrial waste, stormwater runoff from urban and suburban developments, leaking storage tanks, and commercial as well as recreational boating.

than does any other state. Californians extract an average of 14.5 billion gallons of groundwater every day—nearly twice as much as Texas, the second-ranked state.

Fifty percent of California's population—some 16 million people—depends on groundwater for its drinking water supplies. But of course, groundwater is used for

As a result, the contamination and overdraft of our groundwater resources is a serious, long-term threat to the viability of the resource in California, a state that relies on its groundwater for many purposes. Understanding the full extent of the problem, and generating reliable information on trends that can inform policy and resource allocation decisions, are

the best, and indeed, most basic, approaches to safeguarding this natural resource. While many statutes and agencies have an important role to play in meeting this critical mandate, CEQA's role cannot be overstated. No other statutory tool enables decision-makers and the public to understand the impact of new development on groundwater quantity and

CEQA's role cannot be overstated. No other statutory tool enables decision-makers and the public to understand the impact of new development on groundwater quantity and quality.

much more than just drinking water. California also leads the nation in the number of agricultural irrigation wells, with more than 71,000. In the Lower Sacramento River Valley alone, approximately 750,000 acres of prime agricultural land are irrigated, at least in part, by groundwater. Indeed, many areas of the state rely *exclusively* on groundwater for their water supplies. In the lower Sacramento Valley, for example, approximately 1 million people rely on groundwater to supply all of their water needs.

quality. The information generated by faithful compliance with CEQA is and will continue to be instrumental in protecting California's most important "invisible" natural resource.

David Beckman is a senior attorney and heads the coastal water quality program in NRDC's Los Angeles office. Mr. Beckman focuses on enforcing the Clean Water Act and related coastal laws, and on issues involving environmental justice.

Continued from the previous page.

California is no stranger to the problem of overdraft. Parts of the Central Valley have dropped more than a dozen feet because of groundwater overdraft.

Contamination is the second major threat to the world's groundwater. Gasoline and other harmful liquids wind up in the groundwater supply because of storage leaks or improper disposal methods. Pollutants seep into groundwater from poorly constructed landfills or septic systems. And, finally, groundwater is contaminated by runoff from fertilized fields, livestock areas, abandoned mines, salted roads, and industrial areas.

California's groundwater is badly contaminated, especially in urban areas. It is estimated that more than one-third of California's groundwater is badly contaminated. Yet this polluted groundwater has been officially designated as the future drinking water supply for our cities.

Groundwater contaminated with bacteria, chemicals, pesticides, gasoline or oil is a serious human health risk. Those who drink it or come in contact with it can suffer bacterial diseases, nervous system disorders, liver or kidney failure, or cancer. And while restoring contaminated groundwater is possible, it is time consuming, expensive, and rarely 100 percent effective.

Written by PCLF Staff.

Groundwater Overdraft in Rohnert Park

By John E. King

My ranch in Penngrove, California, has been in the family for almost 100 years. It was originally purchased by my great-grandfather, David McClure. Over the 1920s, '30s, and '40s, most of the property—about 130 acres—was put under irrigation for crops and pasture.

As the decades passed, my father and uncle noted that the 100 foot deep well, with a 30-foot static water level, could not be pumped dry, even with a large horsepower turbine pump. By the 1950s the turbine pump was replaced with a modern and more efficient submersible pump.

The 1960s marked the beginning of exponential growth in neighboring Rohnert Park to the North and Petaluma to the South. By the end of the decade, the water table began to decline, and for the first time we had to add lengths of pipe to lower the submersible pump deeper. The decline continued throughout the 1970s, '80s, and early '90s.

By 1996 the old 100-foot well went dry. We installed a new 383-foot replacement well which produces considerably less water.

In 1999, I discovered that Rohnert Park's new General Plan proposal called for an additional 4,500 homes, and 5,000,000 square feet of commercial and industrial space.



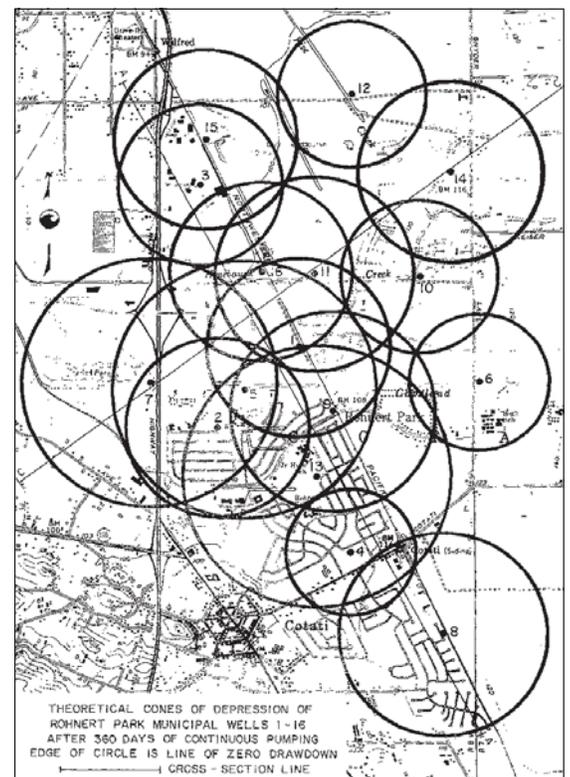
John King displays an original, hand-dug well from approximately 1888. As the surrounding communities grew, wells on the family property began to go dry.

I contacted hundreds of regional property owners and learned that other wells had also gone dry or had lowered pumps to stay in water. That's when I heard about the massive cone of depression, for which Rohnert Park has since become famous.

Imagine a straw in the bottom of a martini glass. As liquid is pulled up the straw from the bottom of the glass, the height of the liquid drops. That's exactly what has been happening underneath Rohnert Park. Over the past two decades, as public and private wells pulled water from underneath the city, some areas of the water table sank precipitously. When all municipal wells are pumping at once, levels can drop 400 feet.

The Environmental Impact Report (EIR) for Rohnert

Park's May 2000 General Plan acknowledged that their static water table had dropped as much as 150 feet over the past thirty years. Indeed, the City alone has been pumping 4.2 million gallons per day (mgd) in a region that recharges at a rate of 1.6 mgd, a clear case of overdrafting. Despite this, and despite the fact that newly proposed developments would cover up precious groundwater recharge areas, increase groundwater demand, and increase storm-water runoff, the EIR failed to assess impacts on groundwater supplies beyond the City limits.



A 1979 Department of Water Resources map predicts the worsening cones of depression from competing wells in Cotati and Rohnert Park (see sidebar).

Rohnert Park's Cones of Depression

The problems of Rohnert Park's water supply extend deep into the ground and deep into the past. For over twenty-five years, the City has resisted the advice of State Agencies and water experts who warned of too much groundwater pumping. One particularly striking wake-up call came in the form of a report entitled, *Meeting Water Demands in Rohnert Park*, prepared for the city by the Department of Water Resources (DWR) in 1979.

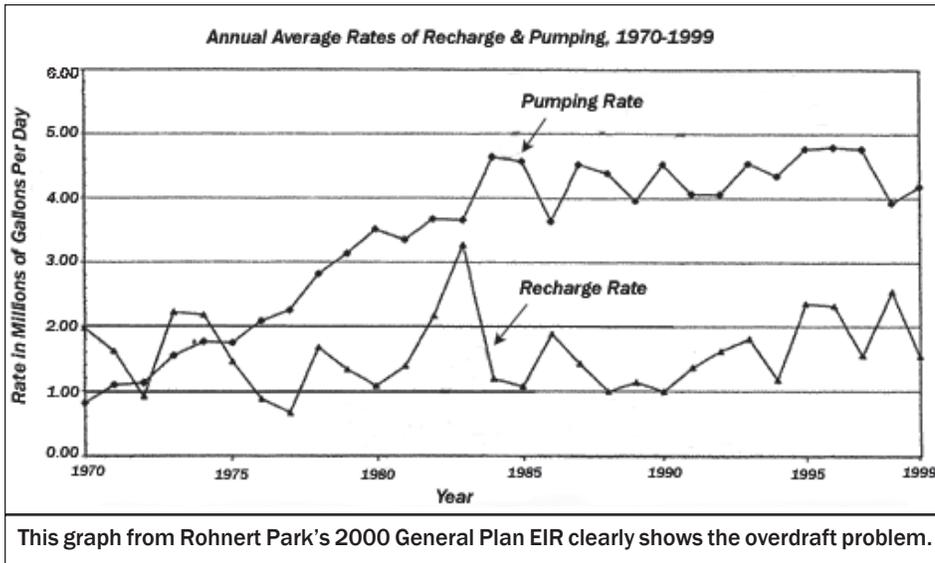
The report includes a diagram (see previous page) showing the effects of continuous pumping after 360 days in the city's wellfields. Each ring depicts the area of drawdown for an individual pumping location.

Overlapping rings indicate areas where wells are competing with one another, pulling water from the same source. Commercial wells within the city tap the water supplies of private wells outside city limits. As too many wells pump water, the water level drops, creating overlapping cones of depression.

Because the city failed to adopt sound water management principles, by the 1980s DWR's predictions came true. Rohnert Park now has twice as many wells and the cones of depression have grown substantially.

A 2004 Sonoma County Grand Jury Report cited John King's 2000 suit when it recommended the adoption of a groundwater management plan to address the worsening water situation. So far the county has resisted creating such a plan.

Written by PCLF Staff.



When the City moved forward with the General Plan, I organized a group of regional supporters and filed a CEQA lawsuit under the name of the South County Resource Preservation Committee and John E. King. The CEQA lawsuit charged that the General Plan failed to adequately analyze or mitigate groundwater related impacts.

The administrative record so clearly spelled out Rohnert Park's violations that the judge did not even hear opening arguments. He told the City of Rohnert Park that they "had serious water problems" and urged both parties to consider a "settlement agreement" or take his decision. Judge Antolini did not disclose what the terms of his decision would include.

We decided to "negotiate" a formal Settlement Agreement which can best be described as a tug of war. The settlement agreement requires the City to reduce groundwater pumping to 2.3 mgd, return identified lands to the Penngrove (County) jurisdiction, monitor the effects of groundwater pumping, not

import groundwater supplies from the Penngrove area, and more.

Our case galvanized Sonoma County around what may be a groundwater crisis. It proved instrumental in the 2004 Grand Jury report, *Got Water?*, that urged the County and each of its cities to implement groundwater management plans pursuant to AB 3030.

As a result of the lawsuit and the attention it brought to local groundwater issues, the O.W.L. Foundation (Open space, Water resource protection, and Land use), was formed. A 501(c) 3 non-profit organization, O.W.L. continues to guard against threats to groundwater and destruction of open spaces that serve as groundwater recharge lands.

John E. King is a farmer and rancher in Penngrove, California. He filed the 2000 CEQA suit against the City of Rohnert Park and continues to work for sound groundwater management in Sonoma County.

CEQA, the Carmel River, & September Ranch

By Fran Farina

September Ranch is located in Carmel Valley just east of the Monterey Peninsula. The property has almost 900 acres, only a small portion of which is visible from Carmel Valley Road. An equestrian center operated there for years. Locals boarded their horses in the quaint red barn. Drivers enjoyed seeing the horses graze in the lower terrace pasture.

In 1995, September Ranch Partners proposed to develop over 100 houses on September Ranch. Several local organizations, including the Sierra Club and Save Our Carmel River, were concerned that this new development would increase the demand for water, further impairing the Carmel River.

Home to steelhead trout and red-legged frogs, both of which are listed as threatened species under the federal Endangered Species Act, the Carmel River has suffered tremendously in recent years due to overdrafting of its groundwater sources. Because there was no history of irrigation on September Ranch, determining if additional water would be required above the baseline of current water use was critical to protect the river.

Hoping to quickly increase the level of water use on September Ranch

to influence the outcome of the Environmental Impact Report (EIR), the property owner began drenching the property with water cannons. The owner also per-



In 1995, September Ranch Partners proposed to develop over 100 houses on this site. Attempting to obscure the current water usage, the property owner began drenching the ranch with water cannons.

sued Monterey County planning staff and the EIR consultant that they should credit September Ranch with the quantity of water that could be used for irrigation, instead of that which was actually used for irrigation. When even this was not enough to meet the project demand, the owner bought additional land three miles up Carmel Valley Road, which was currently

Home to steelhead trout and red-legged frogs, both threatened species, the Carmel River has suffered tremendously in recent years due to overdrafting of its groundwater sources.

irrigated, and offered to reduce some of that pumping as mitigation to offset increased pumping for his project. No environmental review of the offset parcel was conducted. The water baseline was a moving target up to the day the EIR was certified.

Public comment from local residents confirmed there was no historical irrigation on September Ranch, and that the water cannons were a new activity which coincided with the development application. Nevertheless, in December 1998 the Board of Supervisors approved the project, using the most recent water use statistics—including the water cannons—as the baseline, rather than historical water use numbers.

Ultimately, the County's approval of the project

was overturned by the courts, which held that CEQA requires an accurate description of the existing environment (baseline) in order to assess the environmental impacts of a project and determine appropriate mitigation measures.

The September Ranch property owner is currently preparing a new EIR to comply with CEQA. Hopefully, the new EIR adequately analyzes and mitigates for impacts of the proposed project on the Carmel River.

Fran Farina is a member of the California and Florida Bars specializing in water law. Ms. Farina formulated the water issues on behalf of Sierra Club, Save Our Carmel River and Patricia Bernardi in the September Ranch litigation. Ms. Farina recently served as General Manager of the Monterey Peninsula Water Management District.

Lakeside: All-American River Town

By Suzanne M. Michel

The San Diego River flows directly through the center of Lakeside, a primarily low-income community of 50,000, seventeen miles east of San Diego. Beneath this river is the largest alluvial aquifer in the south-central part of San Diego County. Two water districts pump water from this alluvial aquifer to supply low-cost drinking water to Lakeside residents.

During the late 1970s and early 1980s, local politicians promised Lakeside residents a river park, primarily to address flooding concerns, but also to protect water quality. However, in 1998 the Environmental Impact Report (EIR) for Lakeside's "Upper San Diego River Improvement Project (USDRIP) Specific Plan"

proposed to zone most of the San Diego River region for heavy industrial development—a complete reversal of the river park plan designed in 1983.

Over 100 Lakeside residents showed up to the CEQA hearing, advocating for a river park and protection of their drinking water supply—the groundwater beneath the San Diego River. Lakesiders felt dumped upon with toxins and poor planning. To make matters worse, in 1999, groundwater samples near wells in the San Diego River Region revealed unsafe amounts of methyl tertiary butyl ether (MTBE), a gasoline additive.

Despite local protests, the land was zoned for heavy industrial development. In addition, Lakeside residents were informed by the San Diego County land use planning authority that heavy industrial development would continue to intensify in the river region, despite resident opposition, and despite the fact that groundwater wells were already contaminated by local sandmining and commercial activities in the riverbed.

One group of mothers who attended the CEQA public hearings decided to research and document Lakeside's poor water quality. Due to their efforts, the State of California listed Lakeside's San Diego

The CEQA process mobilized Lakeside residents to reject the proposal to create yet another polluted, industrial zone along the San Diego River. Instead the community will benefit from a new San Diego riverpark.

River as an impaired water body under the Clean Water Act in 2000.

Things turned around when advocates for the San Diego River watershed, together with a large coalition of Lakeside residents, formed the San Diego River Park-Lakeside Conservancy to acquire land for the river park. The Lakeside Conservancy got its first break when the California Coastal Conservancy provided \$800,000 dollars to acquire river habitat.

However, it was protection of local groundwater that finally crystallized Lakeside's river park movement.

In 2002, the Riverview Water District (RWD), a local water district that produces 32 percent of its water supply from groundwater wells located in the San Diego River floodplain, partnered with the Lakeside Conservancy in a grant application to create wetlands for groundwater recharge and purification. In addition, RWD donated office space and equipment to the Lakeside Conservancy.

Within three years the Lakeside Conservancy and the RWD partnership has resulted in over \$15 million dollars raised for a San Diego riverpark in Lakeside.

The CEQA process mobilized Lakeside residents to reject the proposal to create yet another polluted, industrial zone along the San Diego River.

For the first time in decades, Lakesiders feel positive about the future of a riverpark and clean water resources in the San Diego River, as indicated by the popular bumper sticker: "Lakeside: All-American River Town USA."

Susan M. Michel holds a Ph.D. in water resources geography. Currently, Ms. Michel is an adjunct faculty of the Department of Marine Science and Environmental Studies at the University of San Diego, where she teaches environmental law and policy.

The Keller Canyon Landfill:

How CEQA mitigations prevent groundwater contamination through improved design

By John Thelen Steere

Garbage. It's a topic that few like to talk about, but we all are responsible for. And becoming more responsible about *how* we dispose of our garbage, coupled with increasing awareness about environmental and public health concerns, have been drivers for the design of modern "sanitary landfills," which are far cry from the "garbage dumps" of yore.

Contra Costa is and has been one of the San Francisco Bay Area's fastest growing counties for at least twenty years. More people have meant more refuse—and a burgeoning need for more places to put it. By the mid 1980s Contra Costa County woke up to the realization that it was running out of room in its existing landfill to put its residents' solid waste and began to look for new landfill. Time was of the essence, as a new one had to be fully ready in several years.

More stringent regulations and new technologies made landfills far cleaner and more fully contained than in the past, but the public largely still regarded them as *garbage dumps*

that they didn't want anywhere near their communities. So a new landfill site was about as controversial a project as one could possibly

conjure up, evoking the epitome of the "not in my back yard" mentality.

County Community Development Department staff identified five alternative solid waste sites, and



Using a programmatic EIR, the County evaluated five possible landfill sites in Contra Costa County. Keller Canyon was chosen in part for its central location and its proximity to existing roadways.

evaluated them through a programmatic Environmental Impact Report (EIR) on the County Solid Waste Management Plan (CoSWMP). While none of them were terribly

A new landfill was about as controversial a project as one could possibly conjure up. Among the primary environmental issues were fluids leaching out of the solid wastes and their potential impacts to ground water quality.

popular, the County selected the site that was among the most central, based on evaluation factors that included the lowest haul times, transportation and air quality

impacts. That site was Keller Canyon, a 1,590-acre site tucked away in the hills behind Pittsburg near the Sacramento River Delta. The project's facilities would process countywide solid waste and provide a thirty year disposal capacity.

CEQA analysis for the Keller Canyon Landfill was tiered off of the programmatic EIR for the CoSWMP. The CEQA preparation and review process was extensive, spanning almost two years from 1988 to 1990. The EIR that resulted was rigorous and thoroughly scrutinized by regulatory agencies, the City of Pittsburg, and the public alike.

Among the primary environmental issues were "leachate" (the fluids leaking or leaching out of the solid wastes) and their potential impacts to surface and ground water quality. Given that the City of Pittsburg and the San Francisco Bay-Delta were downstream, preventing leachate from contaminating either surface or groundwater was a key public and environmental health concern. Project mitigations in the EIR were

designed to prevent just such pollution and well contamination. The mitigation approaches to stop leachate contamination of ground water were translated into design

modifications to the landfill. They consisted of: 1) surface drainage system modifications and daily cover provisions that would limit the creation of leachate; 2) a leachate containment system under the entire landfill composed of clay liner overlain by a sixty millimeter thick polyethelene (plastic) membrane; and 3) a leachate collection system made up of drainage below the base of the refuse piping system and collection sumps to channel the leachate to a treatment facility.



CEQA review led to important environmental mitigations such as this sedimentation basin which collects stormwater run-off and prevents sediment from leaving the site.

The CEQA process helped modify the engineering and design, creating a state-of-the-art facility that remains today a model of an environmentally sound landfill.

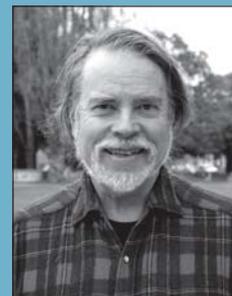
This composite leachate control system thoroughly protected the groundwater from contamination. However, for added assurance, a monitoring well system on the downhill side of the landfill was proposed as part of the

mitigation program, in order to detect any off-site leaking. These monitoring wells could be converted to extraction wells in the event of leachate migration.

As result of a thoroughgoing planning process, culminating in an EIR that identified and mitigated all of the landfill's issues – from leachate control, to litter abatement, to almost complete avoidance of visual quality im-

pacts, the Keller Canyon Landfill was approved and constructed in the early 1990s. The CEQA process helped modify its engineering and design, creating a state-of-the-art facility that remains today a model of an environmentally sound landfill.

John Thelen Steere is an environmental planner whose eighteen year career spans public, private, and non-profit sectors of conservation and land planning. Mr. Steere was Project Manager of the Keller Canyon Landfill EIR. Currently an ecological consultant, Mr. Steere is the author of the award-winning Restoring the Estuary and numerous articles on habitat partnerships.



David Tam has served as the Solid Waste and Recycling chair and a member of the Executive Committee of the Sierra Club's San Francisco Bay Chapter for many years. When Contra Costa County had to phase out a landfill in wetlands and choose among five uplands sites, the Club endorsed Keller Canyon.

"Of the two final sites, Keller Canyon was environmentally superior, although politically vulnerable. It was 18 miles nearer major waste sources and served by State Road 4. It also had unique geologic features that greatly reduced risks to water quality," he explains. "That's why the Sierra Club supported Keller Canyon in the face of a referendum, funded by \$3 million from the competitor.

The competing Marsh Canyon landfill site was visible from two regional parks and served only by a two-lane blacktop road, meaning new highways and more sprawl. Keller Canyon's EIR was upheld in court, the rival site's EIR was not.

"CEQA helped discredit the backroom deals and the negative ad campaigns. In the end, 55 percent of the voters and most local decision makers agreed that Keller Canyon was the right choice."

