

**VOLLMAR NATURAL LANDS  
CONSULTING  
NATURAL RESOURCE  
SPECIALISTS**



**STATEMENT OF QUALIFICATIONS**

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**Plant and Wildlife Surveys, Habitat Assessments, Wetland Delineations  
Large-scale Conservation Planning and Development Studies  
Conservation Land Establishment and Management  
Mitigation Bank and Mitigation Preserve Projects  
Advanced GIS Analysis and Cartography  
Impact Assessment and Permitting**

<http://www.vollmarconsulting.com>



**November 2018**

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**CONTACT INFORMATION**

**BERKELEY OFFICE**

1720 Solano Avenue  
Berkeley, CA 94707  
Office Phone: 510/559-9603  
Office Fax: 510/559-9605

Office Director: John Vollmar  
Email: [jvollmar@vollmarconsulting.com](mailto:jvollmar@vollmarconsulting.com)  
Mobile Phone: 510/220-9001

Office Manager: Jake Schweitzer  
Email: [jake@vollmarconsulting.com](mailto:jake@vollmarconsulting.com)  
Mobile Phone: 510/593-9027

Website: <http://www.vollmarconsulting.com>

# COMPANY PROFILE

**VOLLMAR NATURAL LANDS CONSULTING** is a natural resources consulting company providing expertise on the technical and regulatory aspects of natural resource assessment, impact analysis, mitigation, conservation, restoration, and land stewardship. We have completed more than 400 projects ranging from small site assessments to large-scale conservation, mitigation, and development projects. We work throughout California and other western states providing expertise in the following key areas:

- **Rare Plant and Wildlife Surveys, Habitat Assessments, and Wetland Delineations**
- **Large-scale Conservation Planning and Development Studies**
- **Conservation Land Management, Rangeland Management, and Invasive Species Control**
- **Biological Constraints Analysis, Impact Assessment, and Permitting**
- **Mitigation Bank and Mitigation Preserve Establishment and Management**
- **Vernal Pool Ecology, Restoration, and Management**
- **Ecological Restoration and Invasive Plant Control**
- **Native Grassland Ecology, Conservation, and Management**
- **Forest Ecology, Dynamics, and Management**
- **Advanced GIS Analysis and Cartography**

**VOLLMAR NATURAL LANDS CONSULTING's** staff have expertise in botany and vegetation ecology, wildlife biology, range ecology, forest ecology, water quality, geology, soil science, and GIS/remote sensing. We have particular expertise with California's vernal pools, grasslands, oak woodlands, Sierra Nevada and Cascade forests, estuarine marshes, and riparian habitats. We hold federal survey permits for California tiger salamander, California red-legged frog, and vernal pool fairy and tadpole shrimp. Our staff are certified in the California Native Plant Society methods for conducting Vegetation Rapid Assessment surveys as well as California Rapid Assessment Method (CRAM) surveys. We have employed these methods throughout California as well as in northern central Tanzania.

**VOLLMAR NATURAL LANDS CONSULTING's** clients include private landowners, small businesses, corporations, conservation groups, land trusts, non-profits, and governmental agencies. We have worked with numerous land trusts and other conservation groups to establish, restore, and manage conservation lands. We have worked with numerous ranchers to establish and monitor conservation easements and mitigation sites. We have worked with crop and dairy farmers, conducting surveys, obtaining permits, and developing plans to incorporate resource conservation and management into their operations. We have also assisted private developers, local governments, and state agencies with biological surveys, permitting and mitigation for development of commercial and residential buildings, roads, and utilities.

**VOLLMAR NATURAL LANDS CONSULTING** has excellent working relationships with a range of federal and state resource agencies including U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, U.S. Army Corps of Engineers, State Water Quality Control Board, and U.S. EPA. We have worked with a range of non-profit conservation organizations including The Nature Conservancy, California Rangeland Trust, Great Valley Center, John Muir Land Trust, Peninsula Open Space Trust, Sonoma Land Trust, Solano Land Trust, and Merced County Farmland and Open Space Trust.

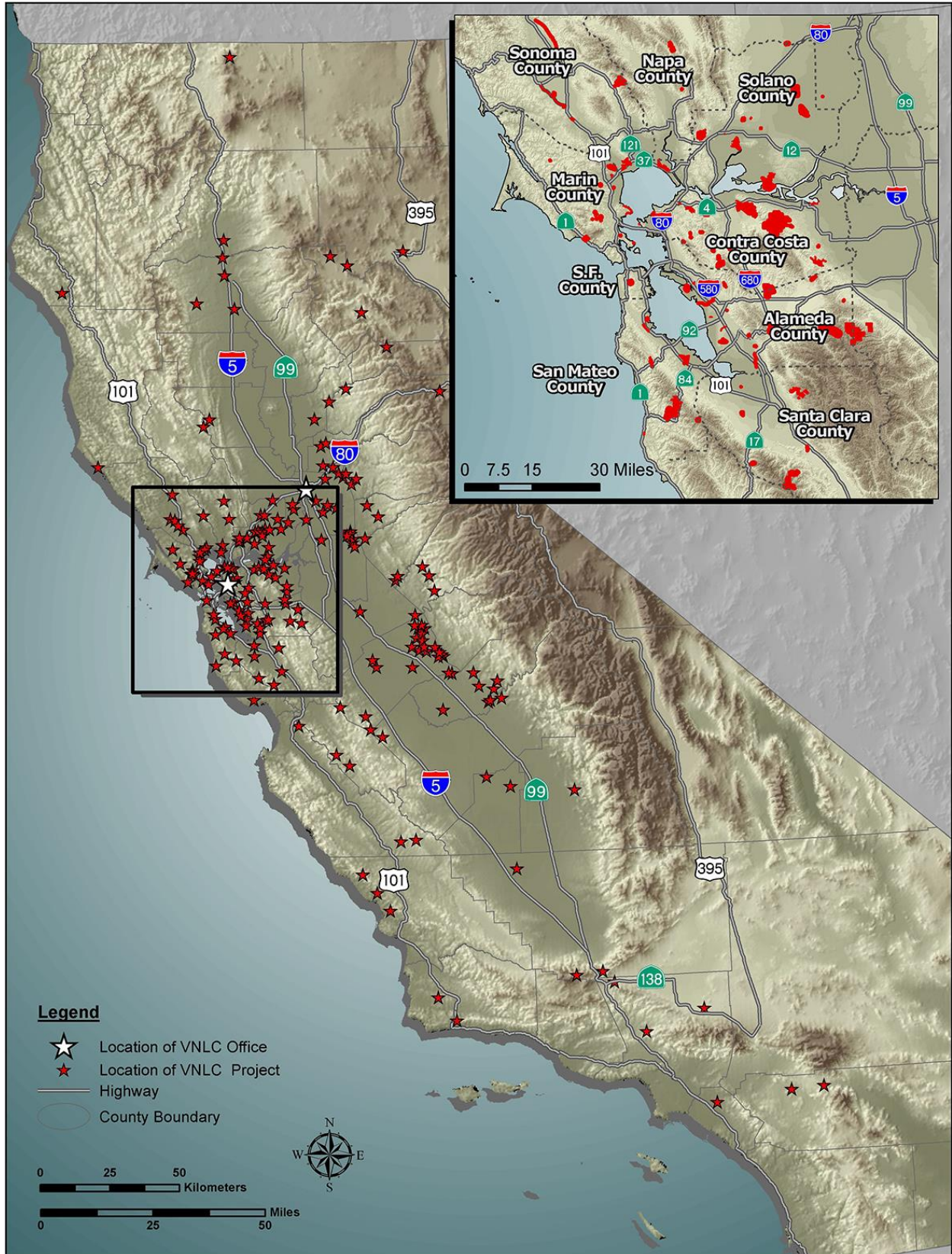
**VOLLMAR NATURAL LANDS CONSULTING** has the necessary office and field equipment to support large-scale conservation planning and development projects. We have full in-house GIS capabilities. Our office equipment includes top-level GIS software, large-format plotters, and high-quality 11"x17" color laser printers. Our field equipment includes 4x4 vehicles, ATVs, professional GPS units, water quality sampling instruments, field laptop computers, and a variety of field sampling equipment.

**VOLLMAR NATURAL LANDS CONSULTING** is committed to providing high-quality consulting services at competitive costs to our clients. We look forward to assisting you with your projects.

# SERVICES AND REPRESENTATIVE PROJECTS

**VOLLMAR NATURAL LANDS CONSULTING** has completed more than 400 projects ranging from small parcel assessments to large-scale conservation, mitigation, and development planning projects. Project budgets have ranged from a few hundred dollars to more than one million dollars. Project areas have ranged from a few acres to more than 150,000 acres. Our expertise and project experience are summarized below under the following key areas:

- **Rare Plant and Wildlife Surveys, Habitat Assessments, and Wetland Delineations**
- **Large-scale Conservation Planning and Development Studies**
- **Conservation Land Management, Rangeland Management, and Invasive Species Control**
- **Biological Constraints Analysis, Impact Assessment, and Permitting**
- **Mitigation Bank/Mitigation Preserve Establishment, Management, and Monitoring**
- **Vernal Pool Ecology, Restoration, and Management**
- **Native Grassland Ecology, Conservation, and Management**
- **Forest Ecology, Dynamics, and Management**
- **Advanced GIS Analysis and Cartography**



# Rare Plant and Wildlife Surveys, Habitat Assessments, and Wetland Delineations

Vollmar Natural Lands Consulting's staff includes expert botanists, vegetation ecologists, and aquatic and terrestrial wildlife biologists. We have conducted numerous rare plant and wildlife surveys, wetland delineations, and habitat characterization and vegetation mapping surveys throughout California. Vollmar Natural Lands Consulting has managed projects involving complex biological issues for both public and private sector clients ranging from small parcel assessments to regional surveys. The list of company projects presented at the end of our Statement of Qualifications shows the geographic and technical range of our species survey, habitat assessment, and wetland delineation projects.

**BOTANICAL SURVEYS.** Our botanists have in-depth knowledge of plant taxonomy throughout most of California. We are recognized experts in the flora of vernal pools, other seasonal wetlands, grasslands, and oak woodlands and various special-status plants associated with these habitats. We have expertise in many other habitat types including coastal and estuarine marshes, riparian wetlands, and coastal, Sierra, and Cascade scrub and forest communities. We have a strong background in geology, soil science, and geomorphology and a unique capacity for relating the distributions of special-status plants and their potential habitats to underlying substrate conditions. Through our surveys, we have documented hundreds of new rare plant occurrences in a range of wetland and upland habitats. We have also conducted numerous noxious weed mapping surveys and developed weed eradication plans as part of the development of conservation and mitigation land management plans.

Some highlights of our botanical surveys include:

- Regional ecological study of the endangered Contra Costa goldfields (*Lasthenia conjugens*) in Solano County, California, and development of a habitat model for creation of mitigation habitat.
- Discovery of hundreds of new rare plant occurrences throughout eastern Merced County including the majority of current known occurrences of succulent owl's-clover (*Castilleja campestris* ssp. *succulenta*) and Hoover's calycadenia (*Calycadenia hooveri*), an occurrence of the rare pincushion navarretia (*Navarretia myersii*), and numerous occurrences of the very rare San Joaquin Valley Orcutt grass (*Orcuttia inaequalis*).
- Discovery of most of the current known occurrences of saline clover (*Trifolium depauperatum* var. *hydrophilum*) in the north Suisun Bay region and discovery of a disjunct occurrence of the species in the north San Pablo Bay region.
- Discovery of the majority of current known occurrences of the very rare Fort Tejon woolly sunflower (*Eriophyllum lanatum* var. *hallii*) and Piute Hills navarretia (*Navarretia setiloba*) on the northern slope of the western Tehachapi Ranges.
- Range extensions for Mojave spineflower (*Chorizanthe spinosa*) and Piute Hills navarretia in the western Mojave Desert.
- Discovery of over 300 occurrences of 31 rare plant species, including one State Rare and one State Endangered species, on the Bureau of Land Management's Walker Ridge property along the border of Lake and Colusa Counties.
- Discovery of most known occurrences of Janish's beardtongue (*Penstemon janishiae*) in the Diamond Peak region of the northern Sierra Nevada Mountains.
- Discovery of the largest known occurrence of Gentner's fritillary (*Fritillaria gentneri*) in California near the Oregon border.
- Discovery of numerous new occurrences of the very rare Hartweg's golden sunburst (*Pseudobahia bahiifolia*) during 2010 status surveys, including all known occurrences in Merced County.
- Management of a reintroduction project for the critically endangered large-flowered fiddleneck (*Amsinckia grandiflora*), which is currently known from only one natural population.

**LARGE BRANCHIOPOD/AQUATIC INVERTEBRATE SURVEYS.** Vollmar Natural Lands Consulting holds a federal permit to conduct surveys for federally-listed large branchiopods (fairy shrimp and tadpole shrimp). We have surveyed more than 4,000 vernal pools, seasonal ponds, perennial ponds, and seasonal streams for these and other aquatic invertebrate taxa throughout the Central Valley, Delta and Coastal regions of California. As part of our surveys, we use a semi-quantitative approach to inventory the abundance of all aquatic invertebrate taxa present. We also often collect data on water quality using high-end sampling instruments. We use combined data on the type and density of aquatic invertebrates and water quality to assess habitat quality within surveyed sites and the potential for the sites to support target special-status large branchiopods and amphibians.

Some highlights of our aquatic invertebrate surveys include:

- Discovery of the majority of documented occurrences of federally-listed large branchiopods in eastern Merced County.
- Discovery of majority of the documented occurrences of midvalley fairy shrimp (*Branchinecta mesovallensis*) in the San Joaquin Valley.
- Discovery of two of the 20 known state-wide occurrences of the federally endangered Conservancy fairy shrimp (*Branchinecta conservatio*) in Solano and Merced Counties.

**AMPHIBIAN AND REPTILE SURVEYS.** Vollmar Natural Lands Consulting holds federal and state permits to conduct surveys for California tiger salamander (CTS) and California red-legged frog (CRF). We have surveyed numerous sites for these species as well as the special-status western spadefoot toad. Our surveys have employed a variety of survey methods including aquatic larval dip-net and seine surveys, adult night spotlight surveys, upland aestivation habitat assessments, and spadefoot night vocalization surveys. We have conducted CTS surveys and assessments throughout California's Central Valley and Delta regions as well as localized areas in the Coast Ranges.

We have conducted a variety of surveys for California red-legged frog, including habitat assessments, egg mass surveys, larval surveys, and adult visual surveys. We have prepared several management plans for conservation lands supporting the species. These plans included recommendations for conserving and enhancing the species through construction or restoration of breeding ponds, control of bullfrogs, and other measures.

Additionally, we have conducted numerous surveys and habitat assessments for special-status reptiles including the San Francisco garter snake, Alameda whipsnake, and western pond turtle. Our management plans for conservation lands have included restoration recommendations designed to improve habitat for these reptiles, including riparian restoration and the expansion of scrub habitat.

Some highlights of our amphibian and reptile surveys include:

- Discovery of the westernmost known occurrence of California tiger salamander in Solano County, extending its range to the eastern edge of the City of Fairfield.
- Surveys and development of a pond management plan for the conservation and enhancement of California red-legged frog and San Francisco garter snake on the 6,000-acre Cloverdale Coastal Ranch located in a critical habitat area along the San Mateo County coast.
- Surveys and development of a management plan for the conservation of California red-legged frog, Alameda whipsnake, western pond turtles, and other sensitive amphibian and reptile species on the 700-acre Fernandez Ranch Open Space Preserve in northern Contra Costa County.
- Conducting a study funded by a Section 6 grant on California tiger salamander in the eastern San Joaquin Valley. The objective is to establish long-term monitoring of the species in the region, focusing on the breeding, movement and population dynamics, as well as the potential influence of environmental factors (abiotic and biotic) on the long-term persistence of this species in the region.



**BIRD AND MAMMAL SURVEYS.** Vollmar Natural Lands Consulting (VNLC) staff and associates include experienced ornithologists and wildlife biologists who have conducted numerous biological inventories and monitoring programs focused on documenting the distribution and abundance of avian and mammal species. We have conducted avian monitoring programs for management, conservation planning, and development projects. VNLC is experienced in conducting surveys for raptors, waterfowl, shorebirds and passerines, as well as assessing potential on site habitat distribution. We are familiar with all laws and regulations pertaining to impacts on special-status avian and mammal species, and their associated habitats. We have also prepared a variety of management plans for project sites that support special-status avian and wildlife species.

Some highlights of our avian and wildlife surveys and management plans include:

- Preparation of a management plan for the Honey Lake Wildlife Area in Lassen County, a state wildlife area specifically established for waterfowl and shorebird conservation and management; the plan assessed the habitat needs and defined management objectives for migratory and resident waterfowl and migratory shorebirds.
- Surveys and development of a management plan for the conservation of white-tailed kite, yellow warbler, loggerhead shrike, northern harrier, pallid bat, San Francisco dusky-footed woodrat, American badger and other sensitive avian and mammal species on the 700-acre Fernandez Ranch Open Space Preserve in northern Contra Costa County.
- Point count and area surveys correlating avian diversity and abundance with habitat types and landscape features across 45,000 acres in Merced County in support of a regional conservation planning effort (surveys lead by Todd Sloat).
- Directed small mammal trapping and San Joaquin kit fox surveys across 45,000 acres in Eastern Merced County (in association with Ibis Environmental Consulting and BioSearch Associates).
- Numerous nesting raptor and burrowing owl surveys throughout the San Francisco Bay, Delta, Central Valley, and other regions in California.

**WETLAND DELINEATIONS, HABITAT ASSESSMENTS, AND VEGETATION MAPPING.**

Vollmar Natural Lands Consulting has conducted numerous wetland delineations involving a variety of wetland habitats including: vernal pools; perennial freshwater, brackish and salt marsh; alkali seasonal wetlands; seasonally-saturated grasslands; and riparian woodlands. We have expertise in the laws and permitting requirements pertaining to wetlands, streambeds, and other waters. We have conducted numerous upland and wetland vegetation mapping projects using both field survey and remote mapping techniques. We have characterized plant communities following a variety of different classifications approaches including CDFW, Holland, Keeler-Wolf, and others. We have also conducted numerous habitat assessments to determine the potential for sites to support special-status species.

## Large-scale Conservation Planning and Development Studies

Vollmar Natural Lands Consulting (VNLC) specializes in large-scale biological studies in support of regional conservation planning and development projects. We are experts in designing and building GIS data sets to be used for regional surveys and conservation planning. We understand how to interpret regional geology, topography, and other physical landscape features and their influence on the regional distribution of sensitive habitats and species. We have the specialized project management and field survey skills necessary for conducting large-scale surveys and targeting the specific data needs of a project. We possess the office and field equipment necessary for these surveys including 4x4 vehicles, ATVs, sub-meter and sub-foot precise GPS units, advanced GIS capabilities, and large format plotters. Through our experience, we have developed an acute sensitivity to land owner issues pertaining to livestock, ATV impacts, fire hazards, and the disclosure of confidential information.

Below are summaries of representative large-scale conservation and development projects, as well as sample graphics from each project.

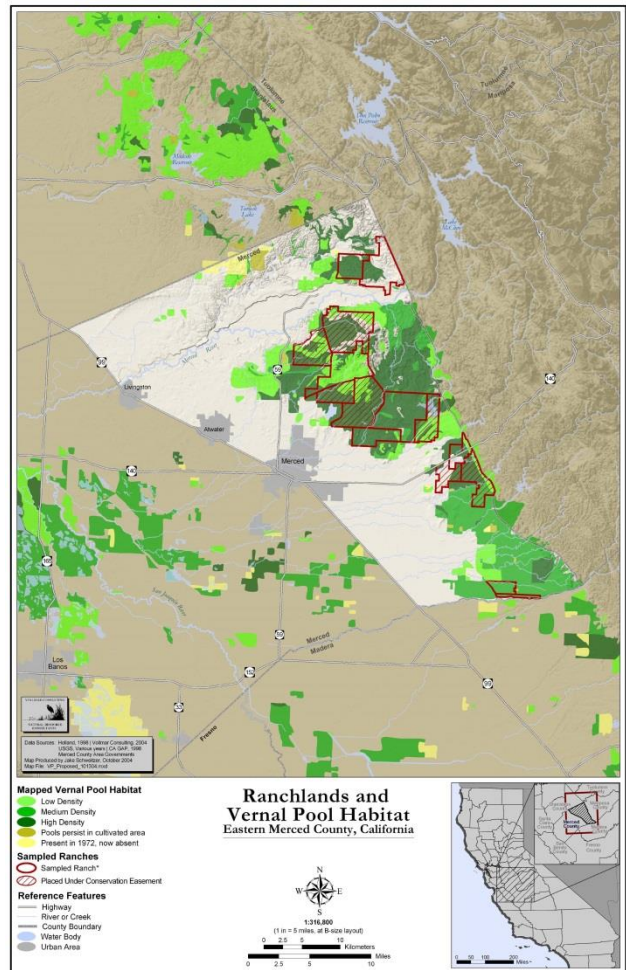
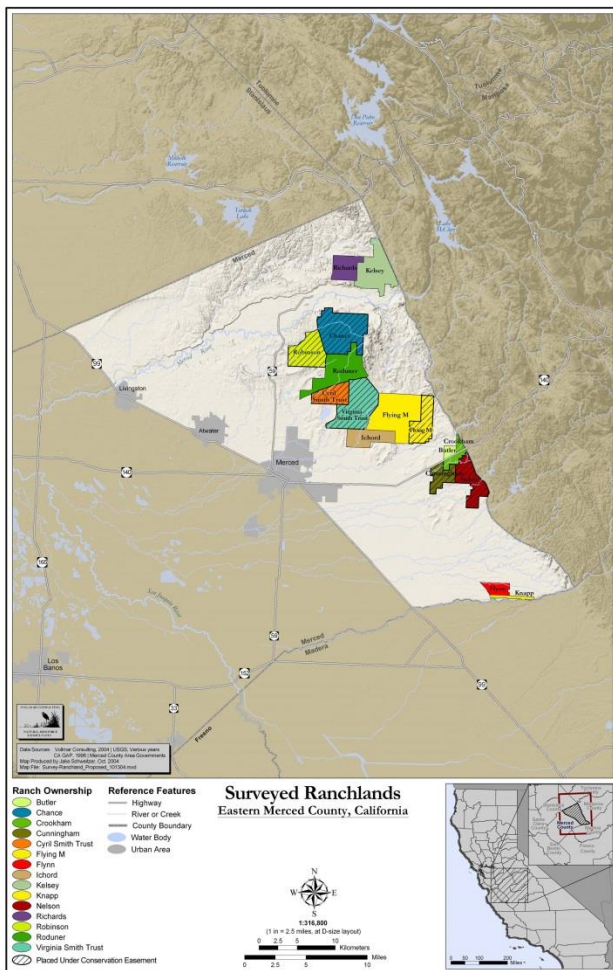
# EASTERN MERCED COUNTY REGIONAL CONSERVATION PLANNING STUDY

## Eastern Merced County, California

Client: CDFW/Merced County Planning Department

Contact: Bob Smith, County U.C. Merced Planning Director: 209/725-3700

VNLC conducted a multi-faceted regional conservation planning study for Merced County incorporating more than 100,000 acres of high quality vernal pool grasslands. We surveyed 45,000 acres of private rangelands for more than 40 special-status wildlife and plant species; developed a comprehensive GIS database with multiple data layers (i.e. topography, geology, hydrology, rare species occurrences, etc.); analyzed GIS and field data to correlate landscape features and pool characteristics with rare species distribution patterns; and compiled a reference library and database of vernal pool-related literature. Our final report, published as a 12-chapter book with text, GIS-based maps, and photographs, is currently being used by Merced County and expert scientists as baseline information for regional conservation planning.

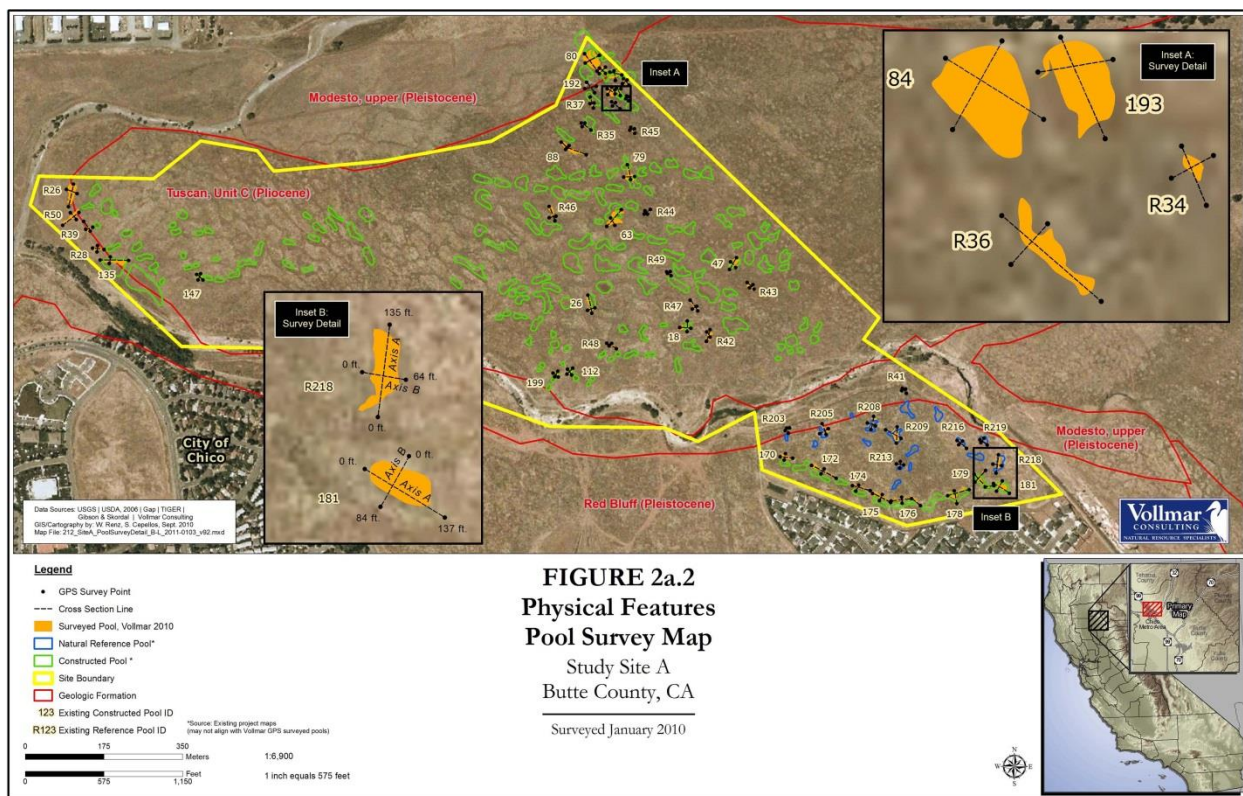


# CONSTRUCTING VERNAL POOLS FOR ECOLOGICAL FUNCTION: A HISTORICAL STUDY OF TEN VERNAL POOL CREATION SITES IN THE NORTHERN CENTRAL VALLEY, CALIFORNIA

## *Sacramento Valley, California*

Client: Bureau of Reclamation (with technical oversight from U.S. Fish & Wildlife Service)  
 Contact: Rosemary A. Stefani, Ph.D. Natural Resources Specialist: 916/978-5045

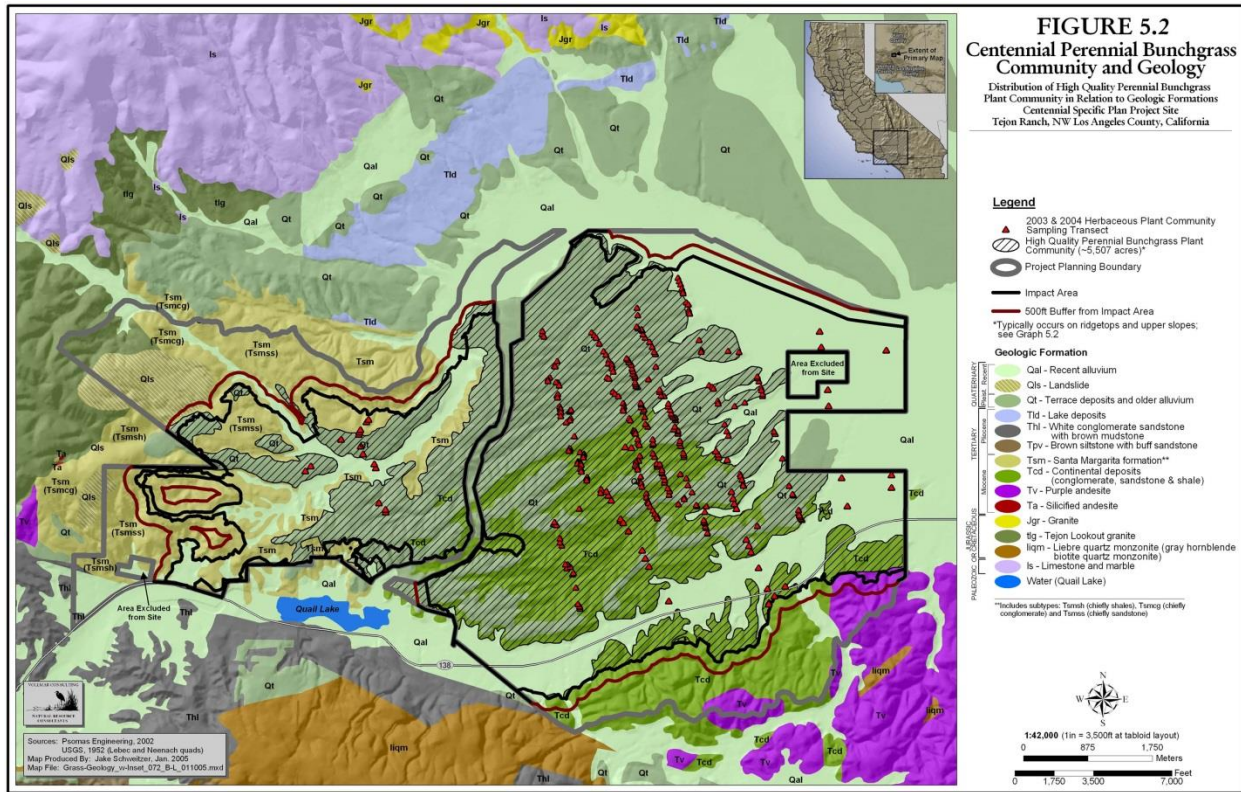
VNLC is conducting a two-year study being funded by the Bureau of Reclamation under the Central Valley Improvement Act grant opportunity (with technical oversight by the U.S. Fish and Wildlife Service) that is examining historic trends and success of vernal pool restoration and creation at ten project sites (~500 pools) in the Sacramento Valley. VNLC completed the first year of this study in which we analyzed the physical characteristics of created versus natural vernal pools, pool design and construction methods, and management and monitoring requirements over the last twenty years. VNLC collected data on the hydrology, invertebrates, water quality, vegetation and site condition by several methods during the second year, which we are now in the process of analyzing. Our final report will provide a set of scientifically-based monitoring criteria (methods, schedules, and time frames) that are best suited to evaluate ecological function for vernal pool creation and restoration projects, and make specific recommendations for vernal pool design and construction.



**CENTENNIAL DEVELOPMENT PROJECT**  
*Western Edge of the Mojave Desert, Los Angeles County, California*

Client: Tejon Ranch/Impact Sciences, Inc.  
 Contact: Keith Babcock, ISI Project Manager: 916/653-6300

The 11,000-acre proposed Centennial Development Project incorporates a mix of grasslands, oak woodlands, chaparral, and desert scrub. VNLC conducted intensive botanical studies on the site in 2003 and 2004. We developed a GIS database incorporating aerial photography, geology, soils, and topography and used this database to assess the site for sensitive biological resources and to develop a survey approach. During field surveys, we identified and mapped dozens of special-status plant occurrences and correlated their distribution with site geologic and geomorphic features. We also discovered one of the largest intact stands of native perennial bunchgrasses known in the state. We established 300 sampling plots to characterize this community in relation to site geomorphic features. Our data are being used by the project proponent and the L.A. County Significant Ecological Area Technical Advisory Committee (SEATAC) to develop an appropriate conservation plan for this community.

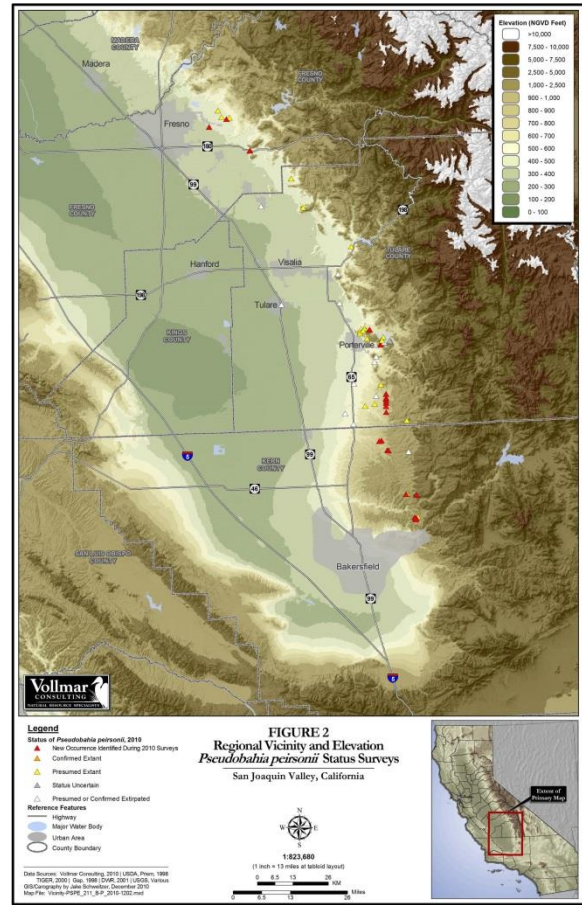
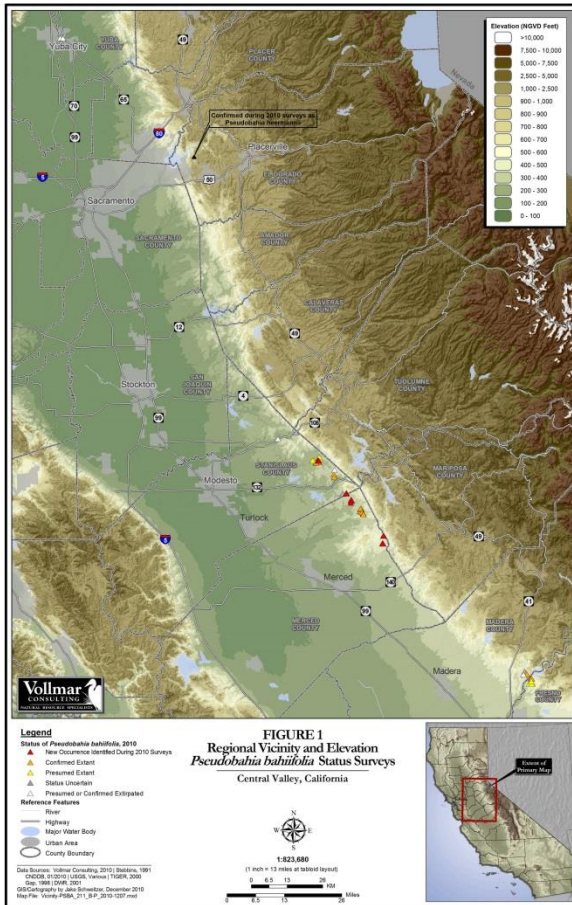


# PSEUDOBAHIA HABITAT STUDY AND STATUS SURVEYS

## Eastern San Joaquin Valley, California

Client: U.S. Fish and Wildlife Service (USFWS), CVPIA Habitat Restoration Program  
 Contact: Caroline Prose, Project Manager: 916/414-6575

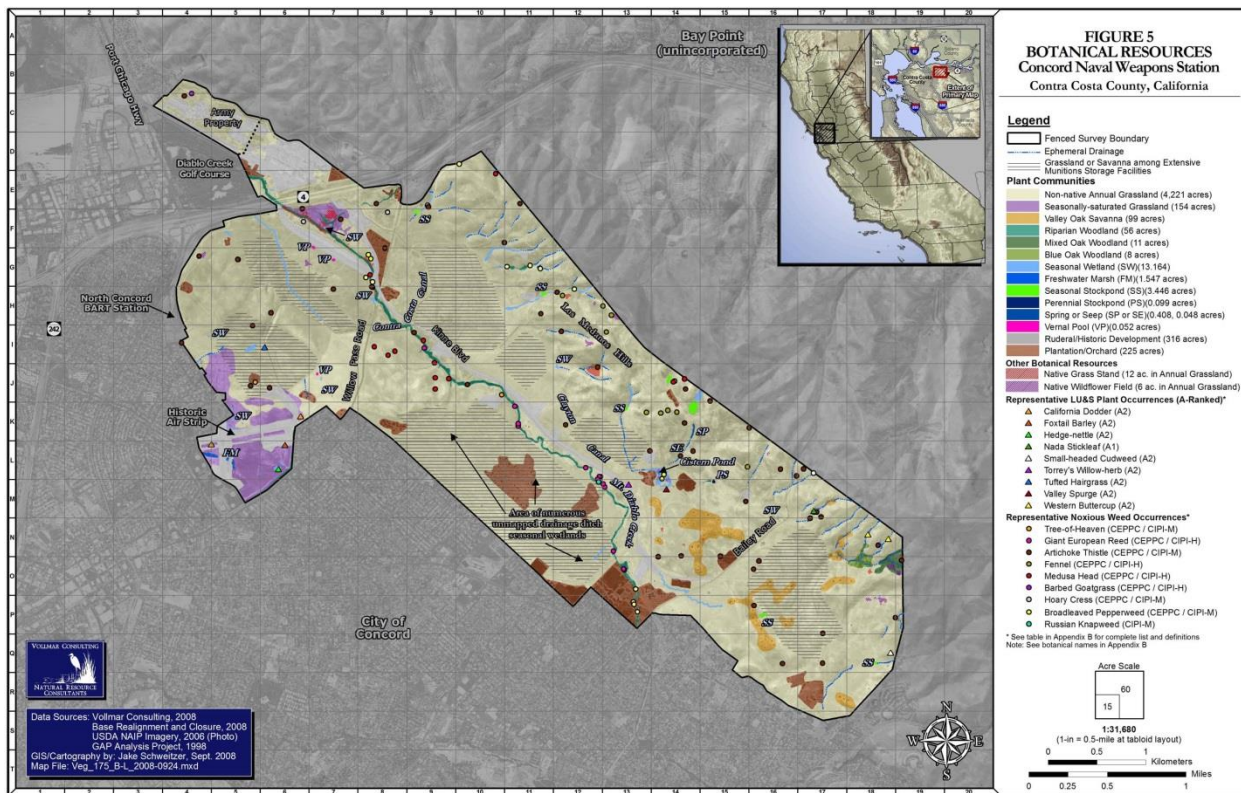
VNLC was awarded a USFWS grant to conduct updated status surveys of two federal and State listed species: Hartweg’s golden sunburst (*Pseudobahia bahiifolia*) and San Joaquin adobe sunburst (*Pseudobahia peirsonii*). Both species are local soil endemics restricted to annual grassland habitats along the eastern edge of the San Joaquin Valley. The status surveys updated an original status survey conducted in 1990 by Dr. John Stebbins. As part of the project, we obtained and reviewed all available information on documented extant and extirpated occurrences, gained landowner access and visited nearly all known occurrences and surveyed several thousand acres of additional suitable habitat, and collected in-depth field data on microhabitat characteristics, population, land use and threat characteristics. The surveys documented more than 20 new occurrences of the two species. Upon completion of the field surveys, we prepared a comprehensive report with supporting GIS-based maps. The report included a discussion of the taxonomy, evolution and preferred microhabitat characteristics of the two species as well as individual accounts and maps of each documented occurrence. The report is being used as the primary data source by USFWS and California Department of Fish and Wildlife for the long-term management and recovery of the species.



**CONCORD NAVAL WEAPONS STATION**  
*Northern Contra Costa County, California*

Client: Arup  
 Contact: Lucy Morgans: 415/946-1682

VNLC conducted botanical resource surveys and reconnaissance wetland surveys on the 5,000-acre inland portion of the Concord Naval Weapons Station, which was transferred from the U.S. Military to the City of Concord. Information from our report is being used for long-term site development and conservation planning. As part of the surveys, we mapped all habitats present on the project site and completed a floristic inventory that resulted in the documentation of nearly 400 plant taxa, including 56 "Rare, Unusual and Significant Plants of Alameda and Contra Costa Counties" (compiled by the California Native Plant Society's East Bay Chapter).

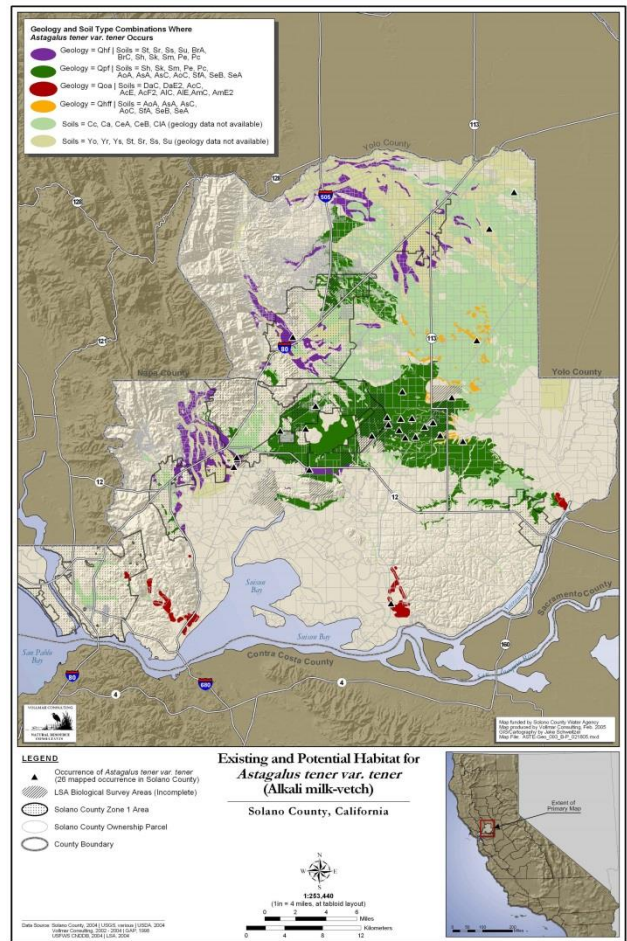
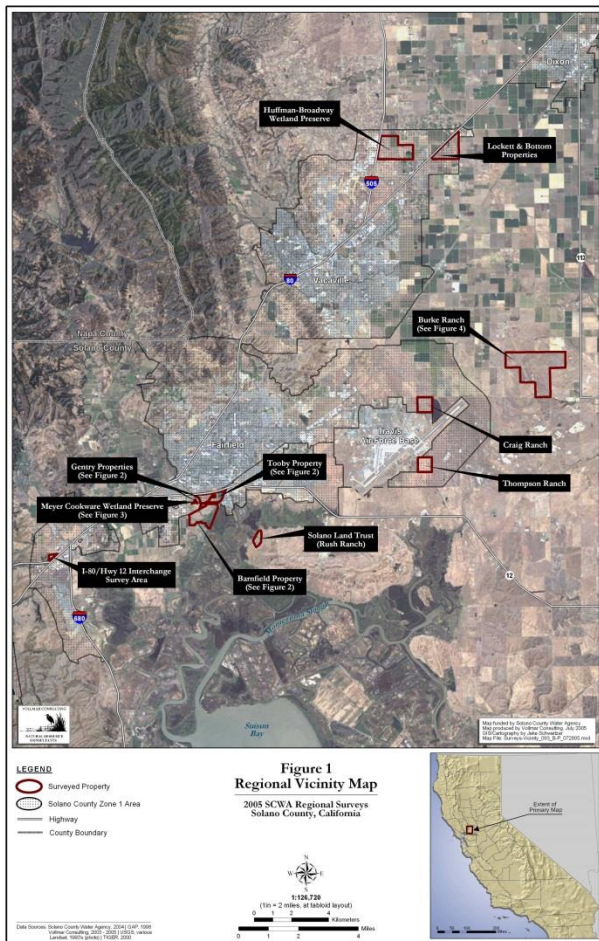


# SOLANO COUNTY WATER AGENCY HCP PLANNING AREA SURVEYS

## Solano County, California

Client: Solano County Water Agency (SCWA)  
 Contact: Chris Lee, HCP Conservation Director: 707/455-1105

VNLC contracted to the SCWA to identify target survey lands within a 50,000-acre portion of its HCP planning area. The project involved contacting landowners to obtain survey access and conducting surveys for California tiger salamander and several vernal pool special-status plant species. The surveys were intended to provide more complete information on the target species for improved regional conservation planning. We surveyed more than 2,500 acres throughout central and southern Solano County as part of the project.

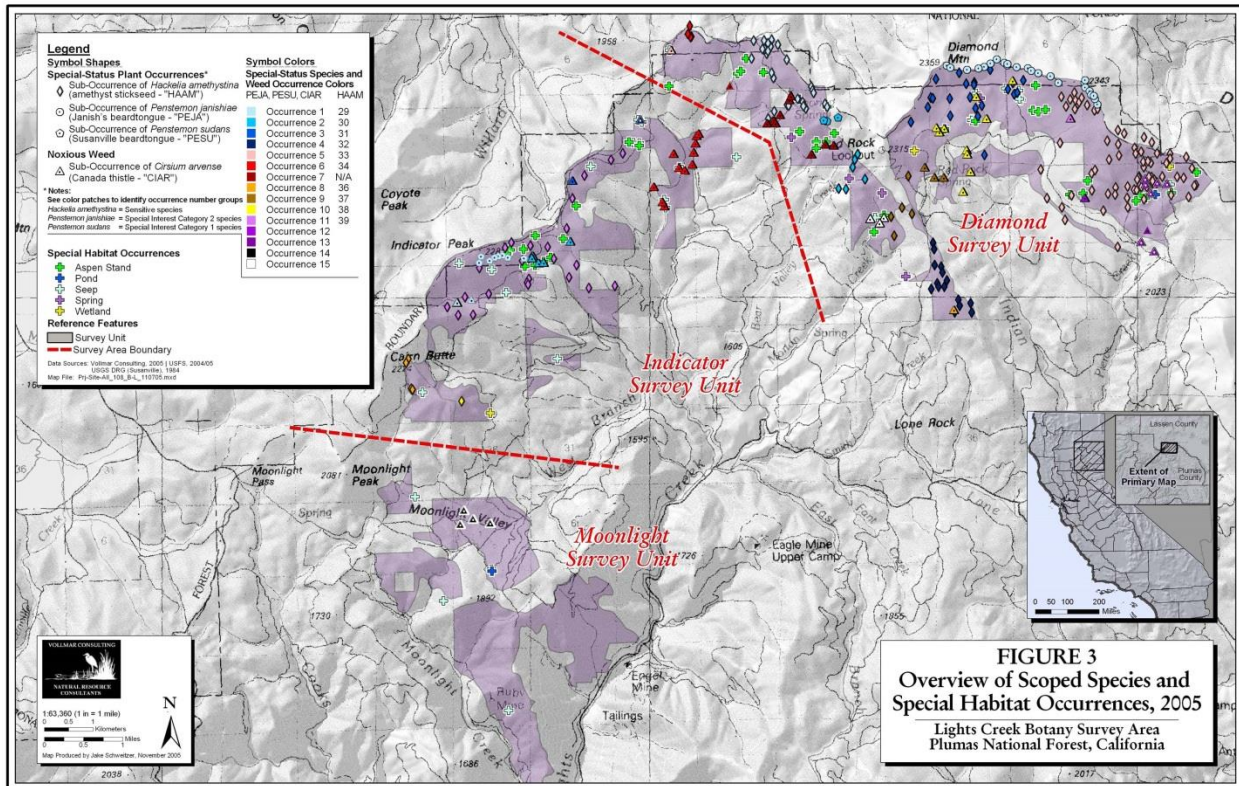




**LIGHTS CREEK BOTANICAL SURVEY**  
*Plumas National Forest, Lassen County, California*

Client: U. S. Forest Service, Sierra-Cascade Province  
 Contact: Jim Belsher-Howe, District Botanist: 530/283-7657

VNLC conducted surveys for rare plants, invasive weeds, and sensitive habitats within 9,600 acres in the Mt. Hough Ranger District, Plumas National Forest. Surveys provided botanical resource information for use in planning and implementing fuels reduction projects. We organized and coordinated a project team of ten botanists and developed and implemented a survey approach that met the rigorous standards of the Plumas National Forest.



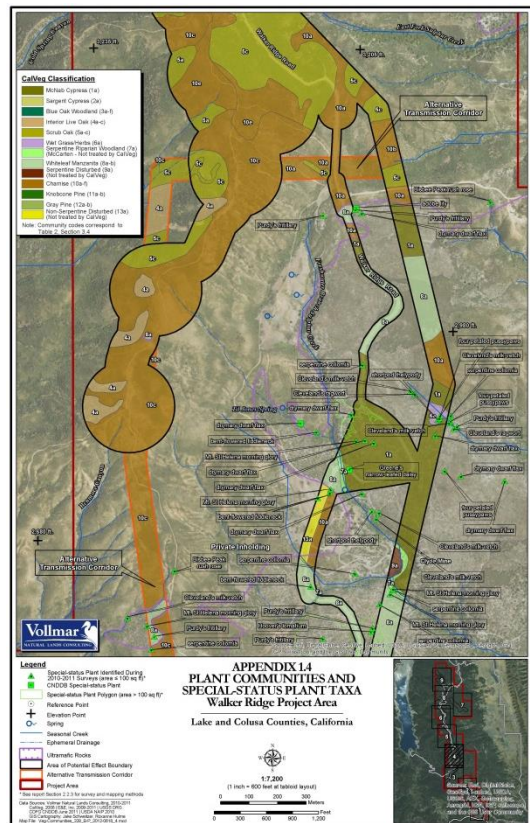
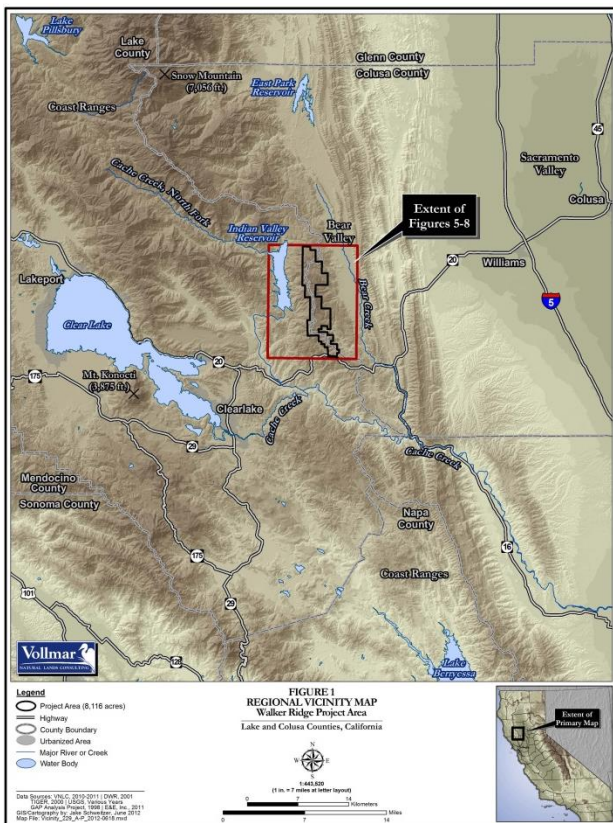
# WALKER RIDGE BOTANICAL RESOURCES STUDY

## Lake and Colusa Counties, California

Client: Ecology and Environment  
 Contact: Erec DeVost, Project Manager: 415/398-5326

Walker Ridge, located in a remote area within the interior Coast Ranges east of Clear Lake, represents one of the preeminent serpentine landscapes in California. It is also the highest ridge in the region and thus is subject to high winds. The property is owned by the Bureau of Land Management (BLM), which was looking to permit a wind energy project along the ridge that had potential to impact the serpentine habitats and associated rare species. Approximately 2,500 acres (one third of the site) had burned in a wildfire just prior to the onset of the project.

VNLC was hired by Ecology and Environment to conduct an in-depth study as part of the project planning phase. Over nearly three years, VNLC's senior botanists conducted surveys over the entire 8,000-acre study area, documenting more than 500 plant taxa and 383 occurrences of 31 different rare plant taxa, the large majority of which are serpentine endemics or associated with post-fire conditions. We also mapped and characterized 13 different plant communities (grasslands, scrub, woodlands, forest, and various wetland types) by combining field surveys with aerial image and DEM analysis. The results were presented in a series of high-quality GIS maps and an accompanying report which are being used to plan and modify the proposed project. BLM state botanist Christina Lund commented that this was the best such report for BLM lands that she had ever received.



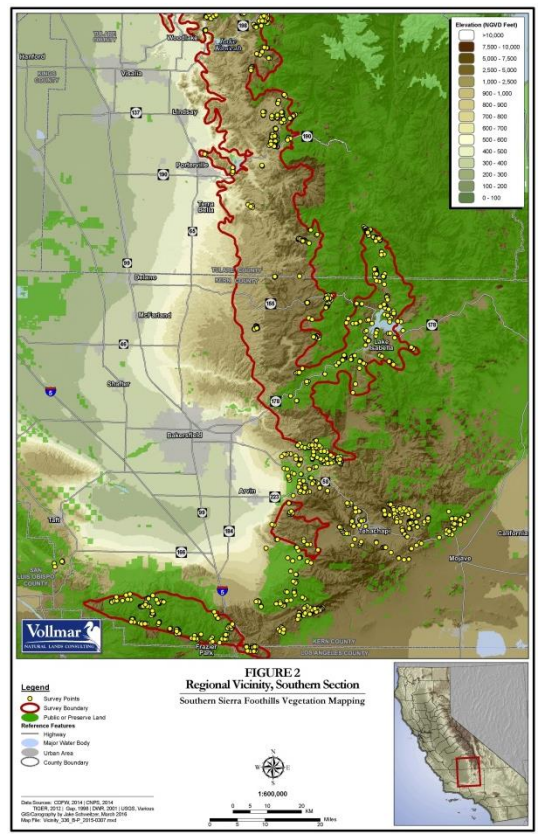
# SOUTHERN SIERRA NEVADA FOOTHILLS VEGETATION MAPPING PROJECT

## Mariposa County to Kern County, California

Client: California Department of Fish and Wildlife (VNLC hired as a sub to CNPS)  
 Contact: Julie Evens, Senior Vegetation Ecologist: 916/447-2677

VNLC senior botanists John Vollmar and Jake Schweitzer collaborated with the CNPS on this project involving the collection of vegetation data in support of classification and mapping of the southern Sierra Nevada Foothills eco-region. The study area encompasses over two million acres and extends from western Mariposa County south to eastern Kern County, within an elevation range of 500 to 4,000 feet.

Our team utilized climate data, DEMs, geologic maps, and aerial photography to distinguish the range of unique vegetation types within the region. Using our network of contacts within the ranching community in the region, we contacted landowners of targeted habitats in order to gain access to survey their properties. Over two spring and summer field seasons, our combined teams (VNLC and CNPS) surveyed and are currently processing over 700 relevé and rapid assessment vegetation plots from throughout the region. The plots encompassed the full range of habitats within the region, from riparian forest, to open grassland, to the many forms of chaparral and oak woodlands. At each plot, we collected detailed information pertaining to floristics as well as information related to geology and soils, slope and aspect, litter and thatch, level and nature of disturbances, observed wildlife use, and fire characteristics. The data will provide the foundation for the refinement of the Manual of California Vegetation (‘MCV’) classification system for the region. In turn, the classification will be used to produce a region-wide vegetation map with a minimum mapping unit of one acre. The map will provide baseline conditions for the detection of habitat changes related to disease, fire, climate change, and other environmental conditions. The map will also facilitate current analyses related to fuel loads and wildlife habitat.

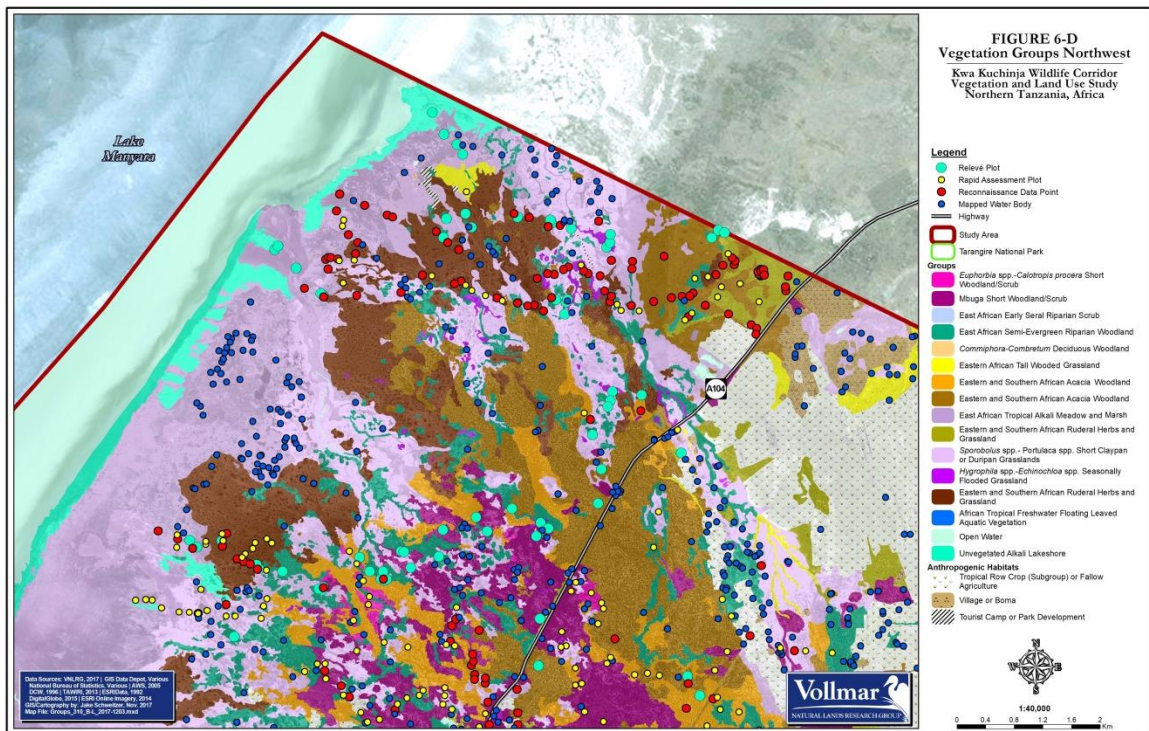


**VEGETATION CLASSIFICATION AND MAPPING WITHIN THE THREATENED KWA KUCHINJA WILDLIFE CORRIDOR**  
*Northeast Tanzania, Africa*

Client: Tanzania Wildlife Research Institute  
 Contact: Dr. Victor Kakengi, Principal Research Officer, Tanzania Wildlife Research Institute  
 (TAWIRI): kakengi1@yahoo.com

VNLC is serving as the project lead for the development of a vegetation classification and map based on current International Vegetation Classification (IVC) protocols. We are working in collaboration with the Tanzania Wildlife Research Institute (TAWIRI), the main wildlife conservation and research agency of the Tanzanian government, as well as Dr. Todd Keeler-Wolf, head vegetation ecologist for the state of California, and Jennifer Buck, senior botanist with the California Native Plant Society.

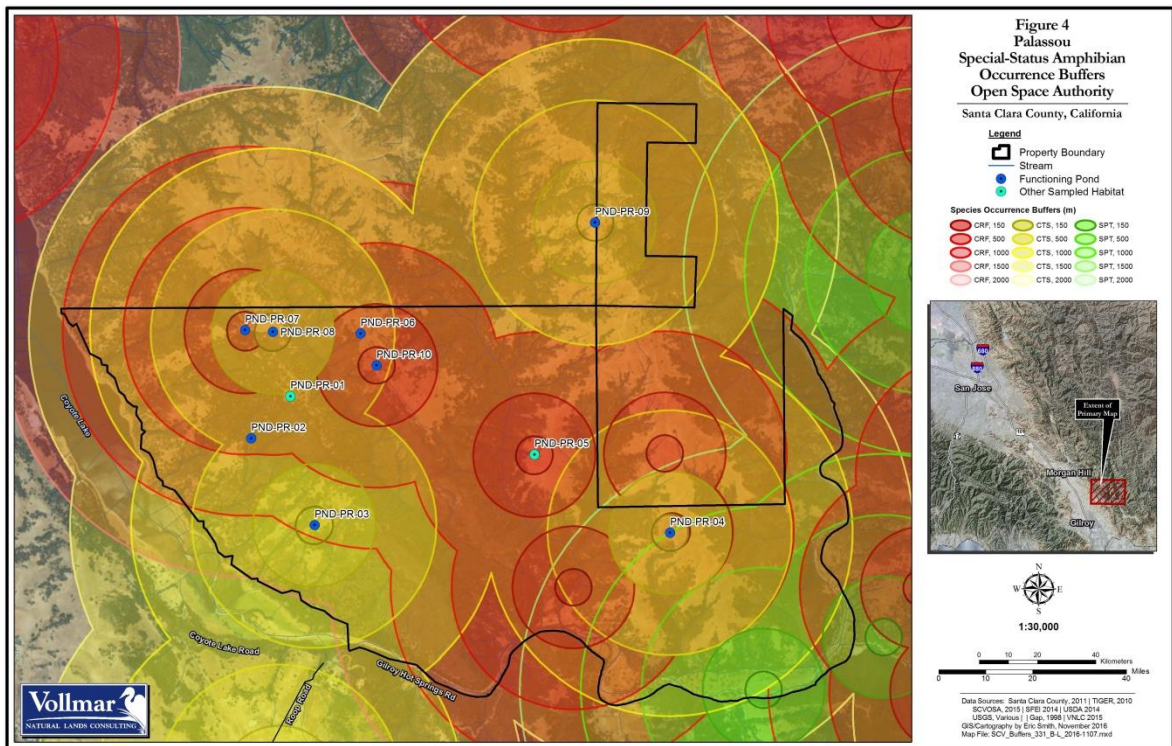
The project site is within the Kwa Kuchinja Wildlife Corridor, linking Tarangire and Manyara National Parks. The corridor is threatened by land conversion to subsistence agriculture and the project report will be used for improved wildlife conservation and land use planning. The project has involved three field visits to identify the study area, collect vegetation plot data, and ground-truth preliminary classification and mapping. Field crews have consisted of a combination of California and Tanzanian botanists as well as armed rangers to provide protection from lions, buffalo, and other large mammals that inhabit the study area. The final report from the first project phase was completed in 2017 and the project team presented the study results at the biennial TAWIRI Science Conference in Arusha, Tanzania in late 2017.



**OPEN SPACE PRESERVE AQUATIC HABITAT SURVEYS**  
*Santa Clara County, California*

Client: Santa Clara Valley Open Space Authority  
 Contact: Galli Basson, Resource Management Specialist: 408/224-7476

VNLC conducted pond and stream surveys for special-status reptiles and amphibians at six large preserves owned or managed by the Santa Clara Valley Open Space Authority. At each site, we evaluated potential habitat and conducted species surveys. We prepared profiles of each of the more than 50 ponds, summarizing species presence and potential. For each preserve, we analyzed species distribution, potential improvements, and management concerns, and made recommendations for the Authority to protect and enhance their species' habitat and populations. We collaborated with the Authority staff to create a database to summarize and track the results of our initial surveys and the Authority's ongoing monitoring and management.

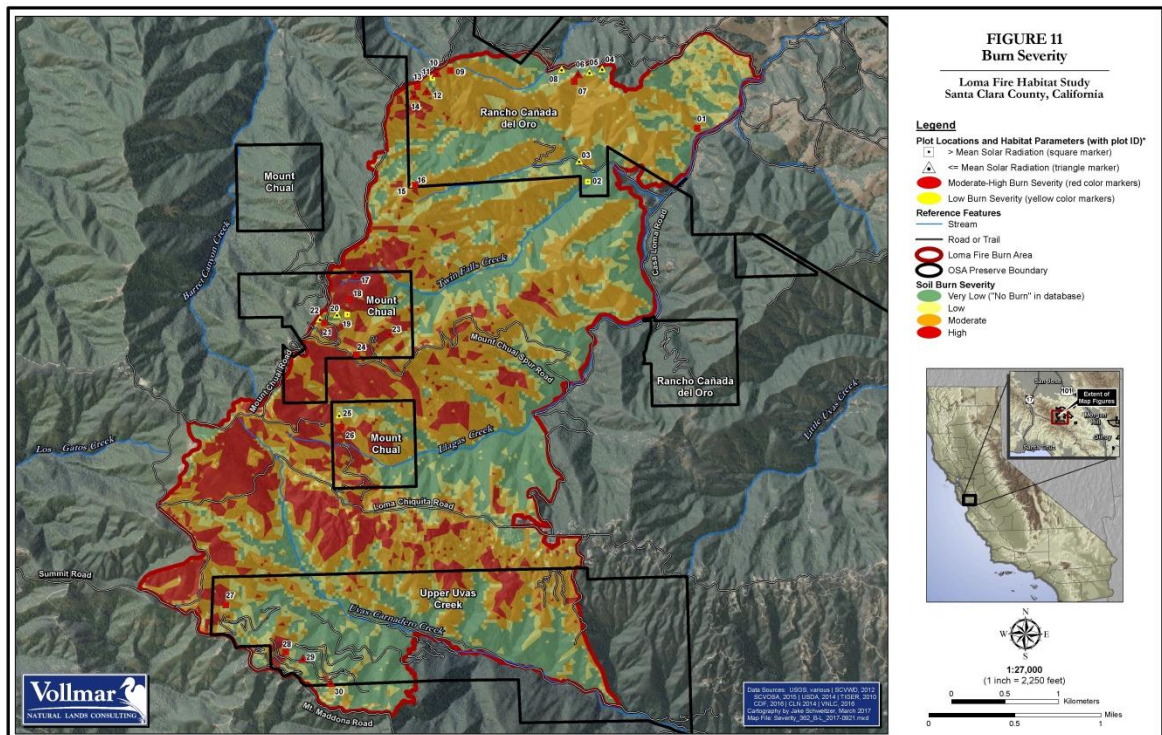


**LOMA FIRE HABITAT STUDY**  
*Santa Clara County, California*

Client: Santa Clara Valley Open Space Authority  
 Contact: Galli Basson, Resource Management Specialist: 408/224-7476

VNLC is preparing three annual monitoring reports for a post-fire habitat study of areas burned by the Loma Fire in the Santa Cruz Mountains. The OSA's primary goals are to preserve open space, protect natural resources, and provide opportunities for education and recreation to the public. Environmental data collection and analysis is required to perform well-informed, strategic land management practices. The Loma Fire started on September 26, 2016 and burned 1,811 hectares (4,474 acres), primarily burning natural wildland habitats, but also affecting additional structures and landscape features. Due to previous conditions, a majority of the affected area burned with a moderate to high soil burn severity. The burned area is also characterized by steep slopes that feature highly erosive soil, and are dissected by streams that supply water to regionally important reservoirs. The natural habitats burned have evolved in the presence of fire, but the area has not had any record of fire in over 100 years. Given this, some plant species and plant communities will benefit from the fire, including oak woodlands, hardwood forests, chaparral, in addition to many native California wildflowers. However, the newly available or otherwise disturbed habitat conditions will also be suitable for invasive plant species.

Our team will be collecting and analyzing habitat data over three years of monitoring, in order to illuminate the patterns and trends of post-fire habitats and thereby clarify the challenges and opportunities resulting from the Loma Fire. The data being collected focuses on the following: trends in re-vegetation; plant community succession; habitat type conversion; and the presence, distribution, and population trends of special-status, fire-following, and invasive plant species. The primary focus of the study is vegetation composition and structure, but additional data are being collected on an opportunistic basis to document other issues of management concern, including soil erosion, changes in hydrology, and human trespassing.



## Conservation Land Management, Rangeland Management, and Invasive Species Control

Over the past decade, there has been a tremendous growth in the number of lands placed under conservation easements. The easements, typically held by non-profit land trusts or federal or state agencies, often involve long-term management, enhancement and/or restoration. Vollmar Natural Lands Consulting (VNLC) has assisted numerous ranchers, non-profit environmental groups, land trusts, and government agencies in establishing, surveying, restoring, and managing conservation lands. Through our knowledge of geology, geomorphology, and biology, combined with our advanced GIS capabilities, we have honed a unique, landscape-level approach to land assessment that provides a fundamental ecological understanding of the land. We apply this understanding towards developing effective approaches for habitat restoration, sensitive resource management and enhancement, and invasive species control.

We have worked with our clients to help establish conservation easements on tens of thousands of acres, including securing funding to pay for easements and developing agreements with third party easement holders. We have prepared numerous 'Easement Documentation Reports' documenting biological and site conditions at the time an easement is established. We have conducted baseline surveys and have prepared and implemented management plans for conservation lands. These plans have focused on the management and enhancement of sensitive habitats and species, soil and water conservation, management of fuels loads, and control of detrimental invasive species including weeds, bullfrogs, trespass livestock, and feral pigs through the implementation of a variety of land management practices. We have also conducted on-going monitoring and adaptive management of conservation lands to insure that recommended land management practices are effective. Nearly all of our plans have included rangeland management as a principle component. We have particular expertise in developing grazing management plans that address the conservation and enhancement of target special-status species and habitats including San Joaquin kit fox, western burrowing owl, California tiger salamander, and vernal pools.

Our clients have included numerous ranchers, Sonoma Land Trust, Peninsula Open Space Trust, Solano Land Trust, Merced County Farmland and Open Space Trust, Muir Heritage Land Trust, East Merced Resource Conservation District, Placer Land Trust, City of Roseville, Environmental Stewardship Foundation, Midpeninsula Regional Open Space District, The Nature Conservancy, Great Valley Center, California Department of Fish and Wildlife, and the U.S. Environmental Protection Agency.

Below are summaries of representative projects involving conservation land management, rangeland management, and invasive species control, as well as sample graphics from each project.

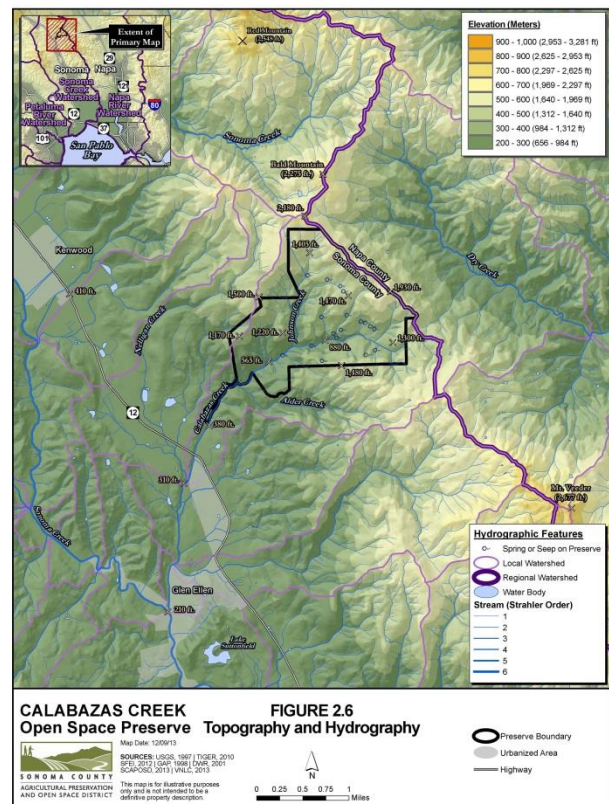
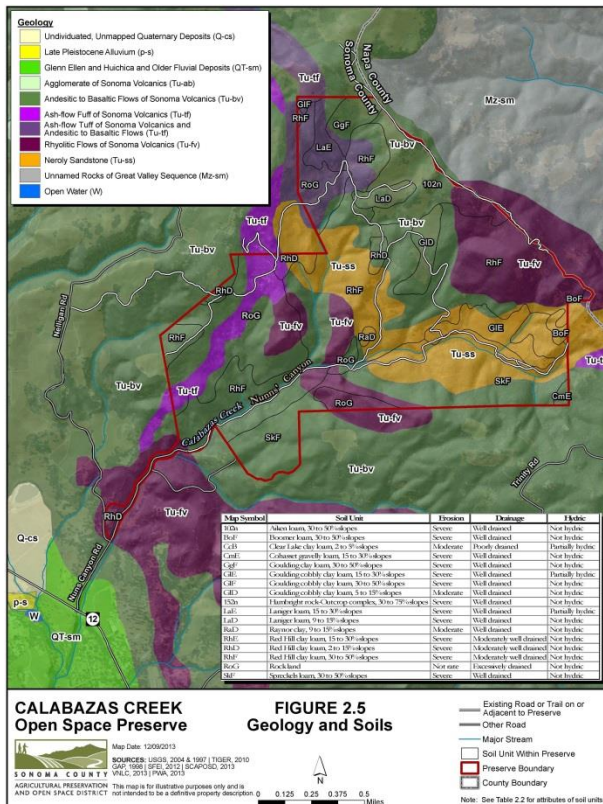
# CALABAZAS CREEK OPEN SPACE PRESERVE PROPERTY MANAGEMENT PLAN

## Sonoma County, California

Client: Sonoma County Agricultural Preservation and Open Space District  
 Contact: Kim Batchelder, Natural Resources Planner: 707/565-7355

Located at the northeastern edge of Sonoma Valley, Calabazas Creek Open Space Preserve encompasses wild and scenic open space with regional significance. Rising from the valley bottom to the crest of the Mayacamas Mountains, the site features a wide range of natural habitats, which in turn support an exceptional diversity of native plants and animals.

VNLC prepared a comprehensive management plan befitting this magnificent, complex, and challenging landscape. Our team conducted exhaustive surveys of natural resources and potential public access routes on this preserve. We combined high-resolution color infrared aerial photography and digital elevation models with intensive botanical field surveys to delineate the boundaries of all plant communities using the Manual of California Vegetation (MCV) classification system. We identified and mapped 20 unique plant communities (Alliance level of classification), consisting of over 400 plant taxa and including seven special-status habitats and four special-status plant species. We documented six special-status animal species inhabiting the preserve, as well as multiple species of interest in need of management considerations. Our team also identified and mapped a host of significant management issues that threaten the sensitive resources and that may also be relevant to the proposed project area, including habitat succession, invasive plants, and soil erosion. We conducted intensive surveys of fire hazards throughout the property, focusing on fuel ladders in the form of dead trees and shrubs, many of which are the result of succession of chaparral to woodland and forest habitats, and from Sudden Oak Death syndrome. Following thorough analyses of these resources and threats, we developed and presented a range of site-appropriate management strategies for protecting and enhancing sensitive resources and ecosystem functions.



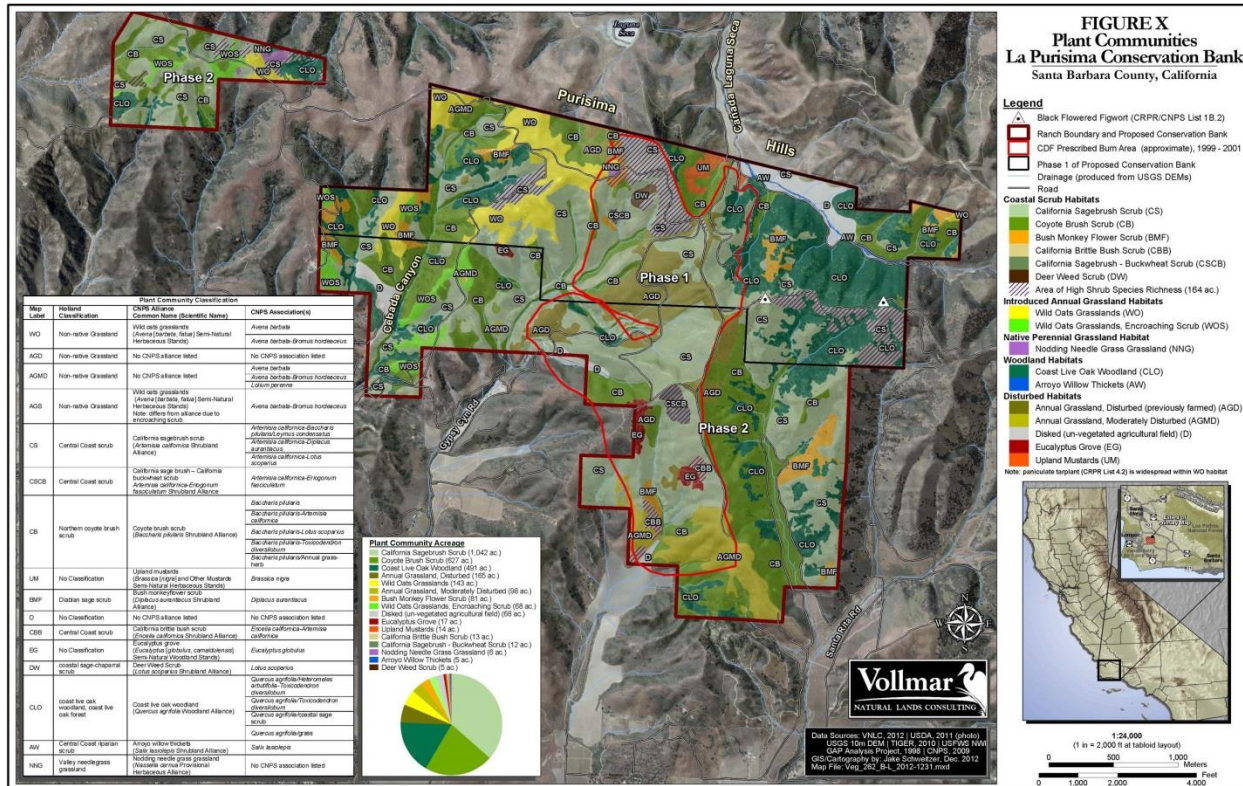


# LA PURISIMA CONSERVATION BANK MANAGEMENT AND MONITORING PLAN

## Santa Barbara County, California

Client: Conservation Land Group (CLG)  
 Contact: Kevin Knowles, President: 415/331-3130

The 2,700-acre La Purisima Conservation Bank is located in the Purisima Hills of northwestern Santa Barbara County. The predominant vegetation communities on the Ranch are coastal sage scrub, oak woodland, and native and introduced annual grasslands. It also supports a network of 15 cattle ponds, nearly all of which provide breeding habitat for the endangered Santa Barbara Distinct Population Segment of the California tiger salamander (CTS)(*Ambystoma californiense*). Western spadefoot toad (*Spea hammondi*), a California Species of Special Concern, and other native amphibians also breed in many of the ponds. The upland areas of the ranch support multiple special-status vertebrate and plant species, as documented during VNLC's biological inventories. VNLC was hired by the property owner to perform comprehensive pond and upland habitat surveys, and develop a Ranch-wide management and monitoring plan. The plan will be a guiding document for the Conservation Bank being established on the Ranch. VNLC used innovative sampling techniques including amphibian trawl nets, in addition to standard methods such as haul seines, to document the diversity and abundance of amphibian larvae in the ponds, and then performed in-depth evaluations of each pond, including water quality measurements and structural analysis by a geotechnical engineer. These evaluations were used to develop a plan for structural improvements and long-term management which are now being incorporated into the management and monitoring plan. The plan also includes prescriptions for managed grazing, invasive weed management and erosion control.

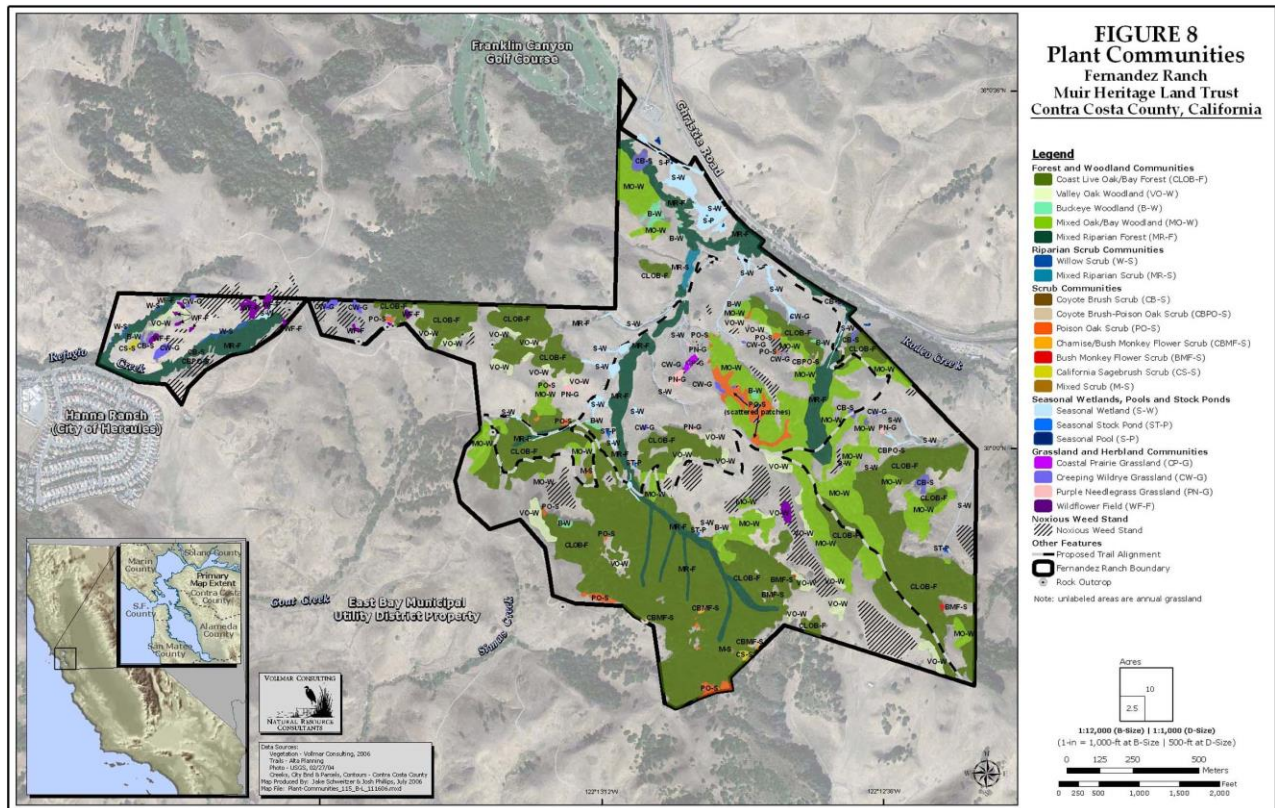


**FERNANDEZ RANCH MANAGEMENT PLAN**  
*Contra Costa County, California*

Client: John Muir Land Trust (JMLT)  
 Contact: Linus Eukel, Executive Director: 925/228-5460

Fernandez Ranch incorporates 700 acres of grasslands, oak woodlands, and riparian corridors representative of northern Contra Costa County’s beautiful open lands. It is also within designated critical habitat for the threatened Alameda whipsnake. The Ranch was acquired by JMLT as an open space preserve. VNLC conducted biological surveys and prepared a land management plan for the site. Work on the site involved site geologic, soil and geomorphic assessments; vegetation, sensitive habitat and special-status species surveys; wetland delineation; and invasive species surveys and mapping. We used survey data to develop a comprehensive site management plan addressing conservation and enhancement of Alameda whipsnake, California red-legged frog, and several special-status plants; conservation and management of oak and riparian woodlands; enhancement of native wildlife and plants including native bunchgrasses within annual grasslands; and noxious weed and invasive wildlife control. We worked with the project’s creek restoration team, trail planners, range manager and CEQA specialist to insure that the management plan integrates with all project issues.

Subsequent to preparing the Fernandez Ranch management plan, we have surveyed numerous other properties for the JMLT in support of their efforts to preserve high-priority properties throughout Contra Costa County.



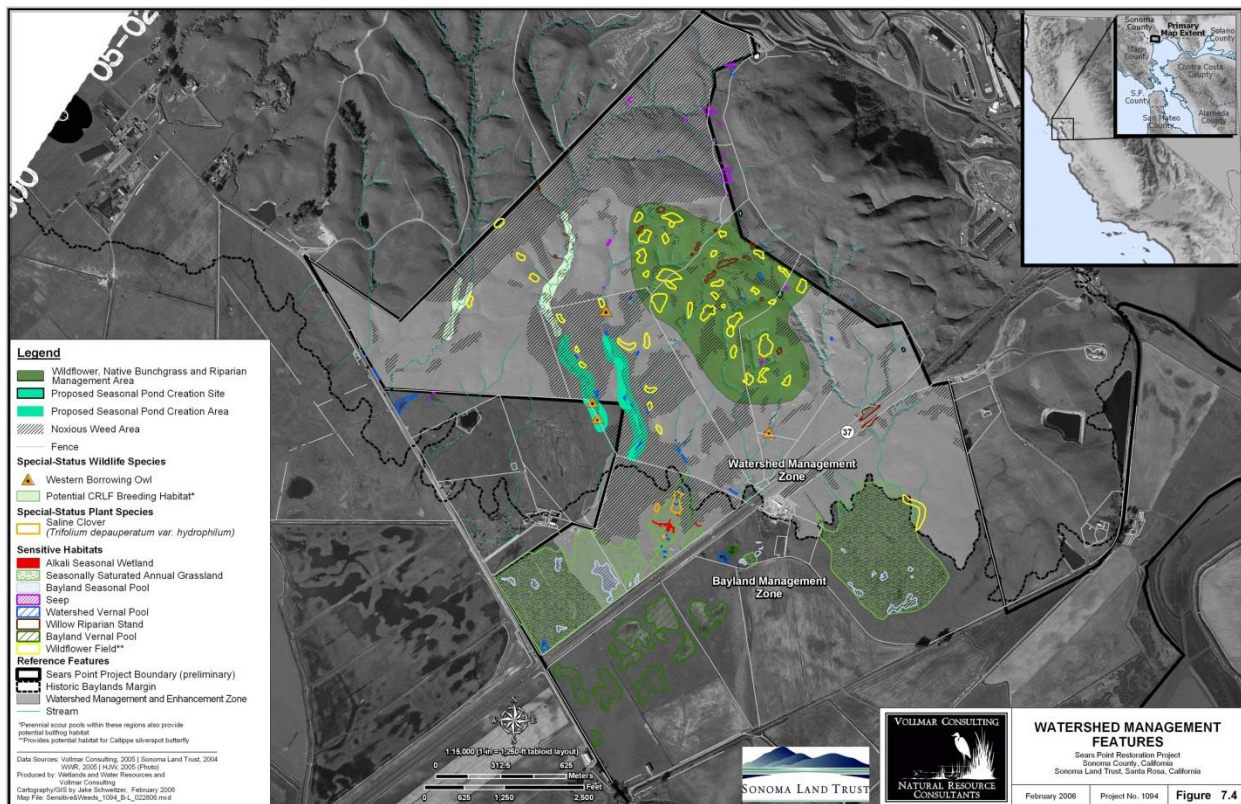
# SEARS POINT RESTORATION AND STEWARDSHIP PROJECT

## Sonoma County, California

Client: Sonoma Land Trust/Wetlands and Water Resources

Contact: Julian Meisler, Baylands Program Manager: 707/526-6930

The 2,300-acre Sears Point project site, situated along the northern edge of San Pablo Bay, incorporates diked baylands and adjacent uplands extending up the western and southern flanks of prominent Sears Point. The site offers a unique opportunity to restore and enhance the full suite of wetland and upland habitats that historically occurred in the region including tidal marsh, marsh-upland transitional habitat, and upland grassland and wetland habitats. VNLC developed the upland management and enhancement plan for the site. The plan was developed in the context of site geology, geomorphology, and soils which together were found to exert a primary influence on the distribution of sensitive resources and invasive species. Our efforts focused on recovery of California red-legged frog (CRF) through creation of breeding sites and bullfrog control, re-establishment of riparian woodlands within heavily degraded stream corridors, and watershed-wide management. We also designed plans for the enhancement of a variety of sensitive habitats and species including native wildflower fields, the associated endangered Callippe silverspot butterfly, native bunchgrass and coastal prairie stands, vernal pools, alkali seasonal wetlands, western burrowing owl, and saline clover. We also identified and mapped primary noxious weed species and developed recommendations for control based on site-wide distribution patterns and protection of nearby sensitive resources. We worked closely with a range manager and pest control advisor to implement our recommendations.

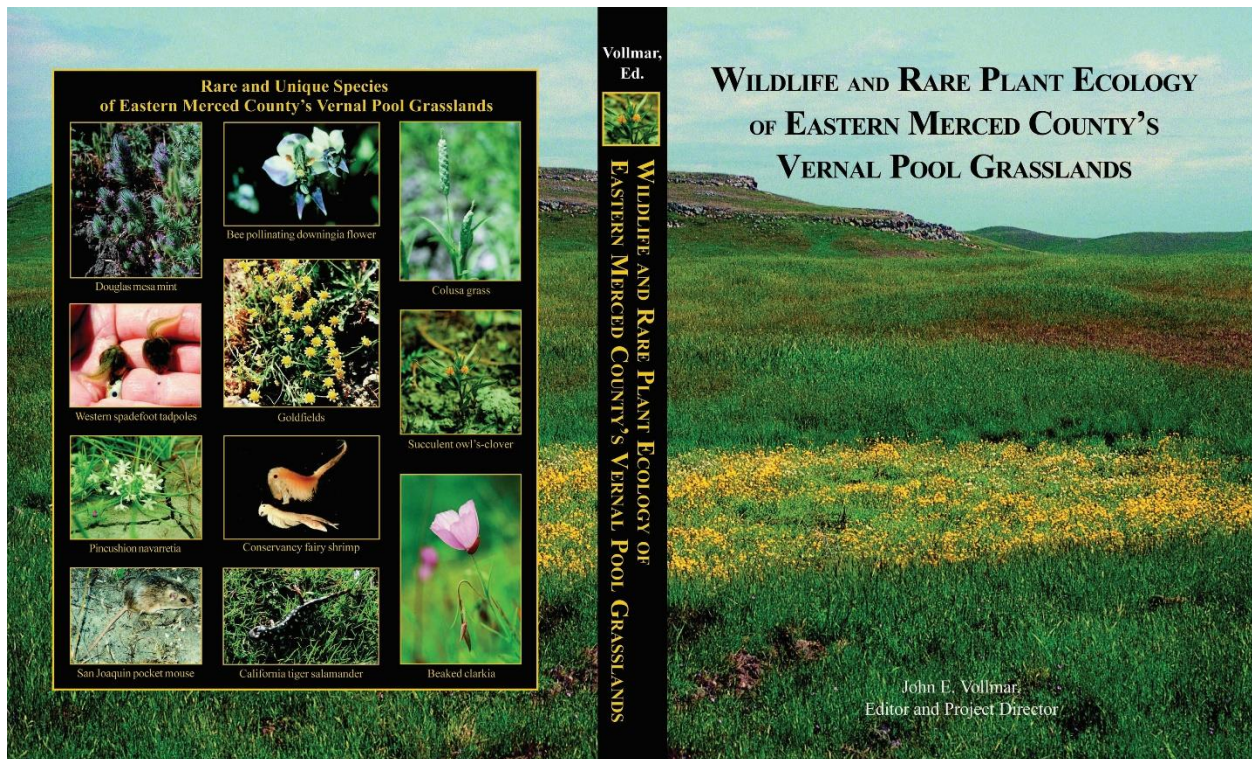


**EASTERN MERCED COUNTY VERNAL POOL GRASSLANDS CONSERVATION PROGRAM**  
*Eastern Merced County, California*

Client: USEPA/Eastern Merced Resource Conservation District  
 Contact: Jon Kelsey, Former RCD President: 209/563-6573

Eastern Merced County supports the largest remaining tracts of vernal pool grasslands in California, along with a high concentration of vernal pool-associated endangered and threatened plant and wildlife species. Most of these vernal pool grasslands are on large, privately-owned ranches. From 1998-2005, VNLC directed a regional vernal pool conservation and outreach program. We presented public workshops on regulatory, mitigation, and conservation issues pertaining to vernal pools and rangelands. We convened groups of expert scientist and government officials to develop a regional conservation planning approach. We conducted baseline biological surveys and identified target conservation lands. We worked with numerous ranchers and assisted interested ranchers in obtaining financial compensation for establishing conservation easements. We prepared Easement Documentation Reports for all ranches placed under easement. We conducted a state-wide review of existing information and developed grazing guidelines for the conservation and enhancement of vernal pool special-status plants, large branchiopods, and amphibians. We conducted post-easement residual dry matter (RDM) and photopoint monitoring of easement lands.

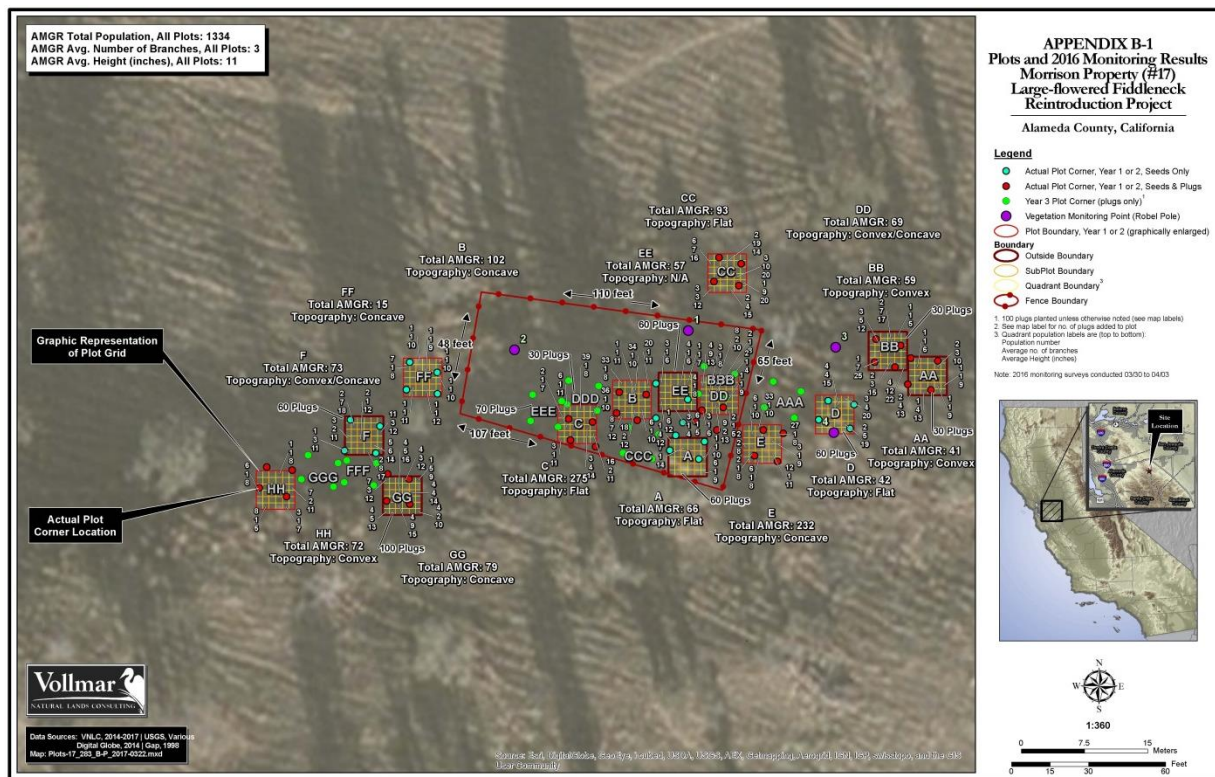
The crowning achievements of this program were the establishment of conservation easements on more than 15,000 acres of high-quality vernal pool grasslands (working cooperatively with The Nature Conservancy) and the publication of a 12-chapter book entitled 'Wildlife and Rare Plant Ecology of Eastern Merced County's Vernal Pool Grasslands' which provides lasting information on the unique and critical importance of the region's natural resources.



# CAPTIVE PROPAGATION AND REINTRODUCTION OF LARGE-FLOWERED FIDDLENECK *Contra Costa, Alameda, and San Joaquin Counties, California*

Client: CVPCP/U.S. Bureau of Reclamation  
Contact: Rosemary Stefani: 916/978-5045

Large-flowered fiddleneck (*Amsinckia grandiflora*) is a critically endangered plant species that is a California endemic wildflower presumed extant at only one known natural population and one reintroduced population. The project team consists of VNLC, University of California Botanical Garden, and Roger Raiche of Planet Horticulture Garden Design. VNLC is overseeing this federally funded project to propagate and reintroduce the species into its historic range at 10 suitable sites, and is responsible for the study design, analysis, and implementation. Sites were selected through remote sensing and ground surveys that best match the habitat of the existing population. This includes a presumed historical range within eastern Contra Costa, Alameda, and western San Joaquin Counties, at elevations ranging from 800 to 1,800 feet above sea level (244 to 550 meters). The species occupies a very narrow ecological niche characterized as transitional grassland habitats on very steep, primarily north-facing and well-shaded hill slopes, with moist, rich clay or clay-loam soils.



## **STATE WILDLIFE AREA MANAGEMENT PLAN UPDATES** *Lassen and Siskiyou Counties, California*

Client: California Department of Fish and Wildlife  
Contacts: Bob Smith and Pamela Cherney: 530/225-2300

VNLC updated management plans for the 5,017-acre Horseshoe Ranch Wildlife Area (HRWA) in northern Siskiyou County, and the 7,800-acre Honey Lake Wildlife Area (HLWA) along the shore of Honey Lake in eastern Lassen County. HRWA was established to provide wintering habitat for the Klamath interstate deer herd and to protect sensitive species. Major issues we addressed were management of deer browse, control of trespass livestock, noxious weed control, and conservation of the endangered Gentner's fritillary. HLWA was established to provide alternative forage crops for waterfowl and shorebirds to reduce feeding on nearby private farmlands. Major issues addressed are enhancement of waterfowl habitat; and control of perennial pepperweed, Canada thistle, and other invasive weeds; water management.

## **CLOVERDALE COASTAL RANCHES POND MANAGEMENT PLAN PROJECT** *San Mateo County, California*

Client: Peninsula Open Space Trust  
Contact: Jeff Powers, Land Manager

VNLC prepared a management plan for 30 ponds on the 6,000-acre Cloverdale Ranch situated along the San Mateo Coast between Pescadero Marsh Preserve and Año Nuevo State Reserve. The ponds provide important breeding and foraging habitat for the endangered San Francisco garter snake, the threatened California red-legged frog, and other sensitive wildlife species. We conducted field assessments of all ponds, identified regulatory issues pertaining to pond management, and developed specific management actions to be implemented for each pond, with the goal of preserve and enhancing suitable habitat for the target species.

## **BIG BREAK MARSH PROJECT** *Oakley, Contra Costa County, California*

Client: Natural Heritage Institute  
Contact: Jon Cain, Project Manager: 415/693-3000

VNLC conducted baseline vegetation and management studies on a property owned by East Bay Regional Parks District along the southern edge of Big Break Marsh, eastern Contra Costa County. The site incorporates tidal sloughs, perennial and seasonal marsh habitats, and upland grassland and dune habitats. The site is being considered for long-term mixed habitat conservation and public recreation as well as possible construction of a regional Delta Science Center. Project work included rare plant surveys, classification and delineation of wetland and upland habitat types, and development of management protocols for controlling invasive weeds identified on the site.

## **Mitigation Bank and Mitigation Preserve Establishment, Management, and Monitoring**

Vollmar Natural Lands Consulting (VNLC) is experienced with establishing and managing all types of mitigation lands including mitigation banks and on-site and off-site mitigation preserves. Through our combined knowledge of different mitigation approaches, we effectively advise clients on the best and most cost-effective approach for achieving mitigation for a particular project. From the perspective of the mitigation bank operator, we understand the types of land most suited for mitigation banking, we are experienced with the technical and regulatory complexities of establishing mitigation banks and off-site mitigation preserves, and we understand how to effectively gain agency approval. We also understand the market forces driving mitigation demand and can assist bank operators with mitigation sales.

Wetland creation and habitat restoration are fundamental aspects of most mitigation sites. VNLC has in-depth experience with the design and construction of a variety of wetland types including vernal pools, seasonal ponds, perennial marshes, and riparian woodlands. We have successfully created vernal pools that have come to support target special-status species including vernal pool shrimp, California tiger salamander, and numerous rare plant species. Our approach stresses the careful integration of created and restored habitats into the existing landscape. One of our primary goals in habitat creation and restoration is to create habitats that over time become virtually indistinguishable from natural habitats.

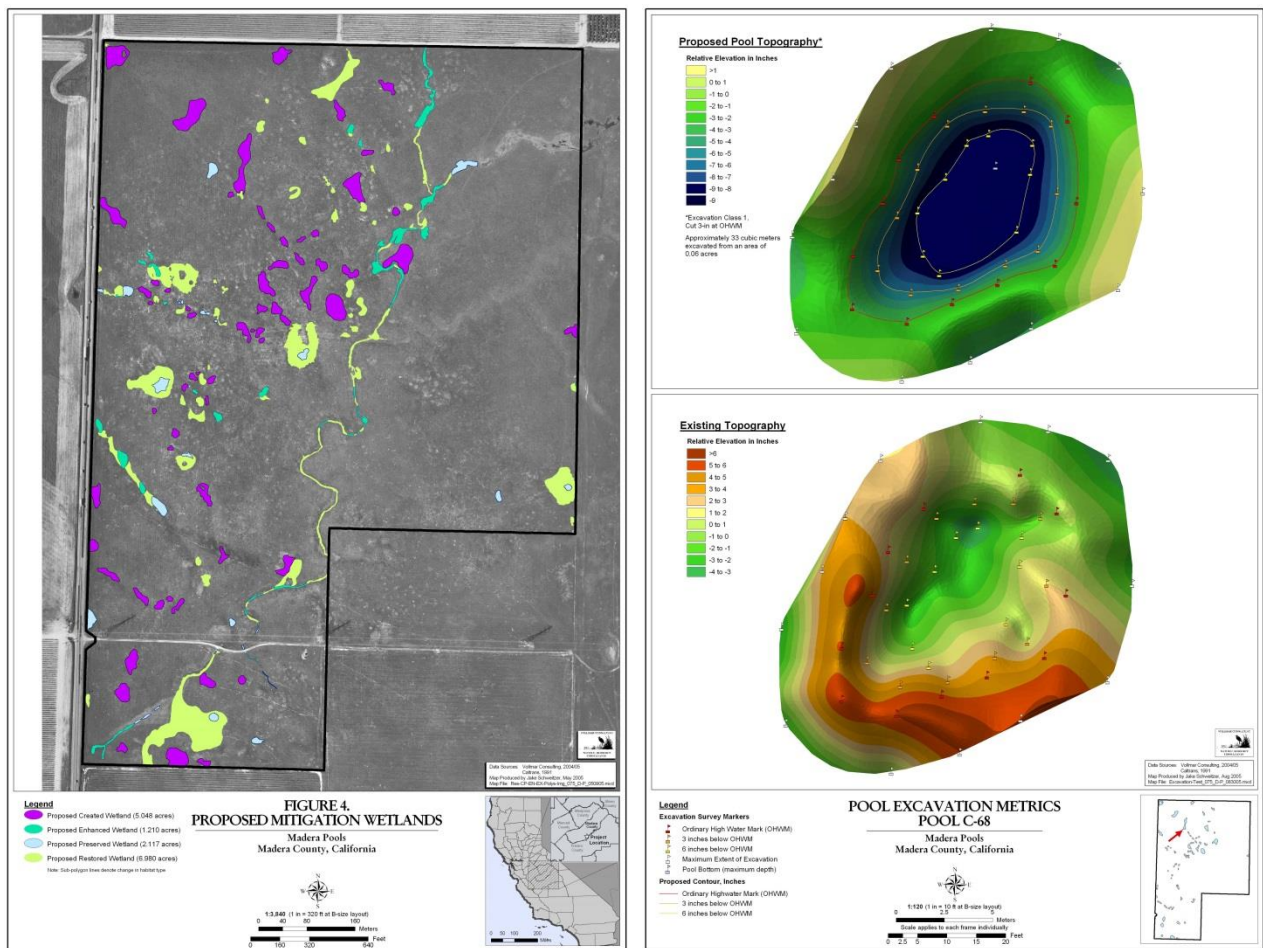
On a broader level, VNLC is experienced with the integration of regional conservation and land use planning and the identification of target mitigation lands. In a given region, mitigation preserves are ideally established in areas with high concentrations of rare species or sensitive habitats and should also consider linkages between other conservation and mitigation lands. We have assisted State and federal agencies, County planning departments, and non-profit conservation groups in identifying target mitigation lands within the context of regional conservation and land use planning.

Below are summaries of representative mitigation bank and mitigation preserve establishment, management, and monitoring, as well as sample graphics from each project.

**CALTRANS 'MADERA POOLS' IN-HOUSE MITIGATION BANK**  
*Eastern Madera County, California*

Client: California Department of Transportation, District 6  
 Contact: Virginia Strohl, Project Manager: 559/243-8154

VNLC helped to establish a multi-species vernal pool/seasonal wetland mitigation bank for Caltrans on a 200-acre property located northwest of Fresno, California. Caltrans will use the bank as an in-house source of mitigation for impacts from transportation projects in the San Joaquin Valley. The site supports numerous vernal pools and several threatened and endangered species, including vernal pool fairy shrimp, succulent owl's clover, and San Joaquin Valley Orcutt grass. Many of the existing pools and swales were degraded by the previous land owner who tried to eliminate them with a box scraper. Through our expert knowledge of vernal pool landscape ecology, we used historic aerial photos to restore and create more than 90 pools and swales. The pools were specifically designed to provide habitat for the full-suite of special-status species known from the site. Pool construction was completed in the summer of 2009. The mitigation bank development plan included recommendations on appropriate grazing management to preserve and enhance the sensitive resources on site.

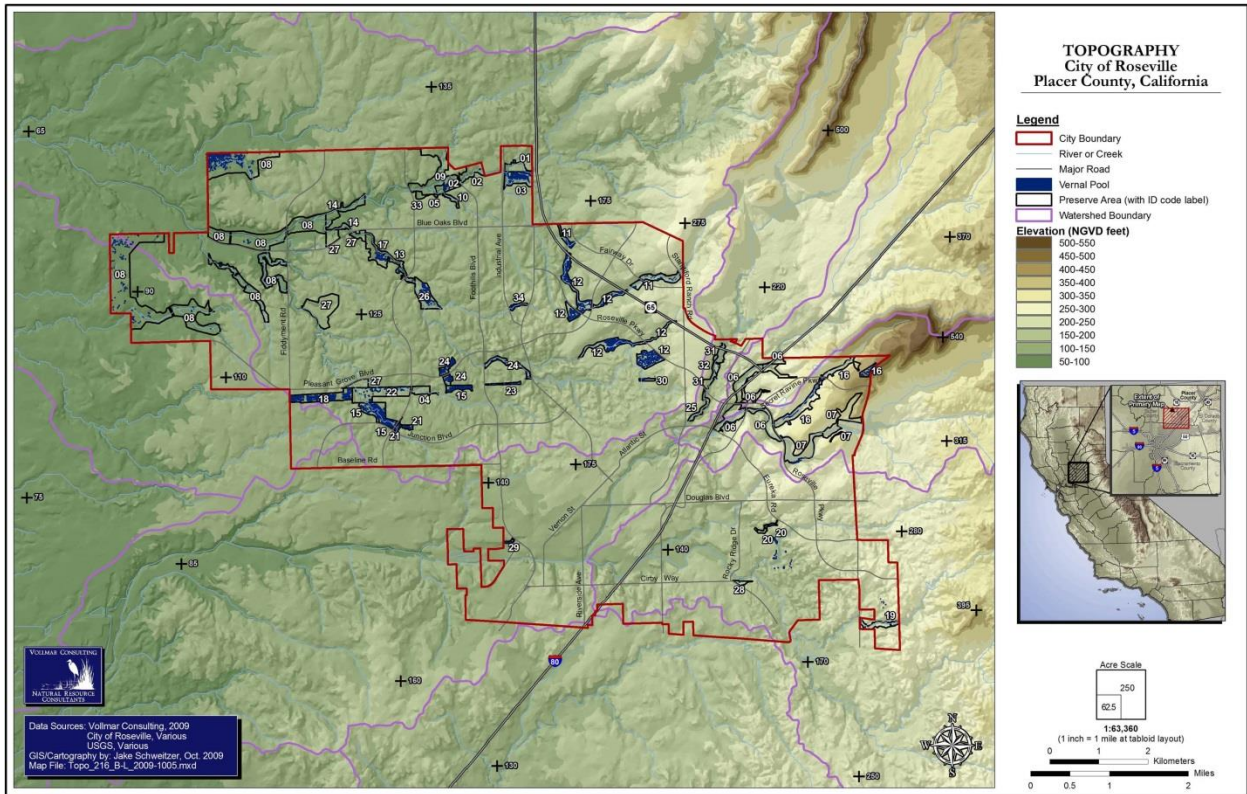




**CITY OF ROSEVILLE OPEN SPACE PRESERVE MONITORING PROJECT**  
Roseville, California

Client: City of Roseville, California  
Contact: Brian Castelluccio, Open Space Manager: 916/746-1755

Since 2010, VLNC has been conducting annual monitoring and providing management recommendations on 25 open space preserves (~1,000 acres) owned by the City of Roseville in Placer County, California. Preserve habitats include vernal pool grasslands, oak woodlands, seasonal and perennial wetlands, and perennial creeks and associated riparian habitats. VLNC conducts on-going biological inspections and general site inspections, as well as long-term large branchiopod, hydrologic, and floristic monitoring on 160 vernal pools annually. We prepare an annual monitoring report that provides an analysis of biological conditions on each preserve and includes management recommendations and priorities. We worked closely with the City to refine the monitoring methods of the Draft Open Space Preserve Overarching Management Plan. We are advising the City on implementation of a grazing plan and are initiating and designing a long-term upland and vernal pool monitoring program related to grazing treatments.

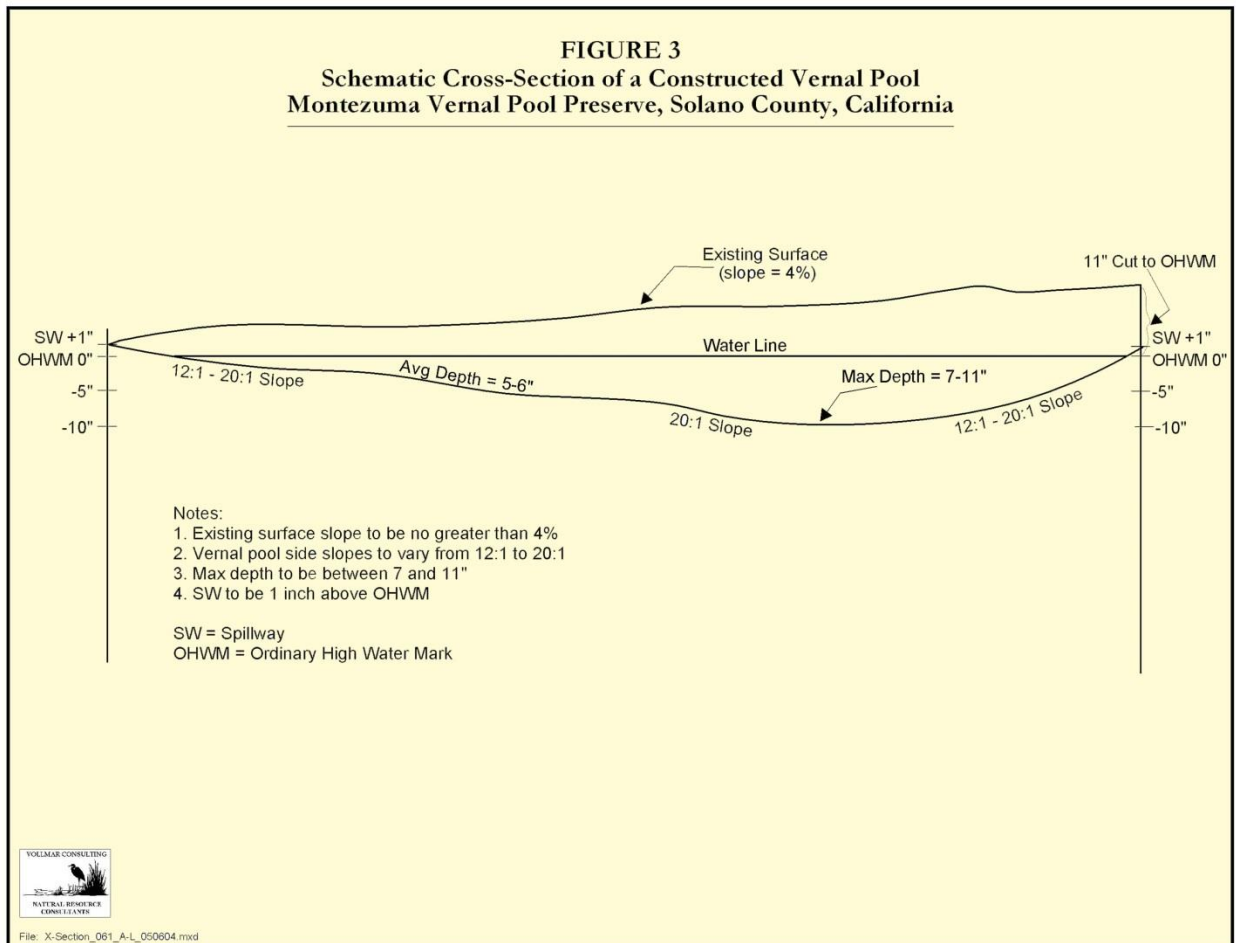


**MONTEZUMA WETLANDS ON-SITE MITIGATION PRESERVE**  
*Southern Solano County, California*

Client: Montezuma Wetlands, LLC  
Contact: Rachel Bonnefil, Project Manager: 415/648-6224

The Montezuma Wetlands Project is using dredge material from SF Bay to restore tidal marsh within diked baylands at a site along the edge of Suisun Bay. This project incidentally impacted western burrowing owl habitat and several man-made seasonal pools supporting listed shrimp species. As mitigation, the project established a 400-acre vernal pool grasslands mitigation preserve just east of the baylands. The preserve supports vernal pool tadpole shrimp, vernal pool fairy shrimp, and several rare plant species. The preserve also supports a robust population of the very rare and endangered Conservancy fairy shrimp which we discovered on site in 2001. The upland grasslands have unusually dense stands of native perennial bunchgrasses.

VNLC has been managing this preserve since 2001. We have designed and supervised the construction of several mitigation pools. Some of these pools have come to support target special-status shrimp and plant species. We conduct annual monitoring to assess and compare hydrology, water quality, aquatic invertebrate diversity and abundance, and floristics within created and preserved pools. We also conduct annual monitoring within the grasslands and are advising the project on appropriate grazing to benefit burrowing owls, upland rare plants, and native bunchgrasses.



**CALIFORNIA HIGH SPEED RAIL MITIGATION PRESERVE**  
*Madera County, California*

Client: California High Speed Rail Authority

Contact: Mark McLoughlin, Director of Environmental Services: 916/403-6934

The 1,500-acre Lazy K Ranch incorporates a section of the Chowchilla River with its associated oak and riparian woodlands, and adjacent 100,000-year old terraces supporting vernal pool grasslands. The diversity of habitats and the wealth of special-status species make it an ideal mitigation site. Special-status species include California tiger salamander, western spadefoot toad, vernal pool fairy and tadpole shrimp, burrowing owl, San Joaquin kit fox, Valley elderberry longhorn beetle, and Swainson's hawk. In 2008 we worked with the Knapp Family to establish a 93-acre preserve to provide off-site mitigation for a local development project as a first step in the development of a larger multi-species, multi-habitat mitigation bank. We constructed eight mitigation vernal pools on the preserve, which are now in their third year of performance success monitoring.

VNLC undertook a first-of its-kind landscape-level restoration of a formerly leveled vernal pool landscape. Based on LiDAR data, historical aerial photos, and extensive soil pit studies, we designed a complete pool-swale-mound system. Full topographic complexity was restored to the site using GPS-controlled earth-moving equipment. Our licensed UAV (drone) pilots conducted drone-based topographic surveys during and after the earthwork to track progress and create exceptionally high-resolution as-built drawings. The intense soil studies have led to >100% hydrologic function in the restored pools, and the pools have been colonized by multiple special-status species in their first wet year.

VNLC is also constructing a 4.09-acre riparian restoration zone along the Chowchilla River, which has endured a long history of human impacts that have degraded the quality of the original riparian habitat. These impacts have essentially reversed the hydrologic regime on this stretch of the river such that flows are absent in winter months and mainly restricted to the summer months. Our restoration primarily involves establishing the zone with valley oak woodland.

## **MEYER COOKWARE ON-SITE MITIGATION PRESERVE** *Fairfield, Solano County, California*

Client: Meyer Cookware Corporation  
Contact: Todd Gemmell, Project Manager: 707/694-9455

VNLC established and conducted long-term monitoring on an on-site mitigation preserve on a 59-acre business campus development site in Fairfield, California. As mitigation for impacts to the federally-listed endangered Contra Costa goldfields, we conducted a regional study of ten existing goldfields populations and developed a goldfields habitat model. We used this model to design and create seasonal wetlands providing potential goldfields habitat within the on-site mitigation preserve. As part of the preserve set up, we conducted rare plant surveys, large branchiopod and amphibian surveys, delineated existing wetlands, and obtained all required environmental permits. We conducted annual monitoring of hydrology and vegetation within created pools and also advised Meyer Cookware on appropriate management of the upland grasslands within the preserve.

### **OTHER MITIGATION PROJECTS:**

- **SADDLE CREEK MITIGATION WETLAND MONITORING PROJECT. Calaveras County, California.** Long-term monitoring of created seasonal and perennial marsh wetlands for a residential development project. *Client: Saddle Creek Development Group.*
- **CITY OF FAIRFIELD MITIGATION BANK SITE ASSESSMENT. Fairfield, Solano County, California.** Rare species surveys, wetland delineation, and agency consultations for a potential City-operated 240-acre mitigation bank site. *Client: City of Fairfield Planning Department.*
- **SAN FRANCISCO AIRPORT MITIGATION WETLAND MONITORING PROJECT. San Mateo County, California.** Annual vegetation monitoring of a BART-extension mitigation site supporting San Francisco garter snakes and California red-legged frogs. *Client: San Francisco Airport/Ibis Environmental Consulting.*
- **REDWOOD CITY SALT MARSH MITIGATION PROJECT. San Mateo County, California.** Annual monitoring of a salt marsh mitigation site. *Client: Redwood City/Andrews Environmental Consulting.*

## **Biological Constraints Analysis, Impact Assessment, Permitting**

Vollmar Natural Lands Consulting (VNLC) has extensive experience analyzing the effects of development on biological resources. Our comprehensive understanding of the environmental planning process (including CEQA, the State and federal Endangered Species Acts, the federal Clean Water Act, and the California Fish and Wildlife Code), coupled with our expertise in the flora and fauna of California, guides our approach to identifying potential biological constraint to development. We promote an approach that involves identifying sensitive biological resources early in the planning process; working closely with the client to understand the regulatory implications (e.g., permit requirements, additional surveys) of these biological resources; and to avoid or mitigate for these resources. It is our goal to inform the client of all the steps necessary for project approval and to ensure that no surprises are encountered during the process.

Following identification of biological constraints, we design and conduct studies and surveys to support the impact assessments required by the State and federal regulations. These surveys/studies include jurisdictional wetland delineations, focused plant and wildlife surveys, and the preparation of Biological Assessments (pursuant to Section 7 of the Endangered Species Act). We maintain strong relationships with staff from the U.S. Fish and Wildlife Service, the California Department of Fish and Wildlife, and the Army Corps of Engineers, and regularly consult with, and submit permit applications to, these agencies. We also understand how to effectively design and implement mitigation plans to meet the regulatory requirements.

We also work closely with specialists in the preparation of biological resources sections of EIRs and other impact analysis documents. Our associate Josh Phillips has completed such documents for the cities of Hercules, Richmond, Pinole, Mountain View, Burlingame, Santa Cruz, Scotts Valley, Capitola, Watsonville, and Calistoga, as well as Caltrans, U.C. Santa Cruz, the San Francisco Department of Public Works, Del Webb, Verizon, Newhall Ranch, and Tejon Ranch. Representative projects include:

### **NEWHALL RANCH, DRAFT LANDMARK VILLAGE BIOTA REPORT** *Los Angeles County, California*

Client: Newhall Ranch/Impact Sciences

The report analyzed impacts to Significant Ecological Area (SEA) 23, which was identified by the Los Angeles Planning Department in consideration of the biological resource values associated with the Santa Clara River. Issues evaluated included impacts to state and federally-listed plant and wildlife species (i.e., San Fernando spineflower, arroyo toad, unarmored three-spine stickleback, least Bell's vireo), wildlife movement corridors, and the overall biological functions and values of the Santa Clara River and associated riparian habitats. The report served as the basis for the biological resources section of the draft EIR.

### **DRAFT NATURAL ENVIRONMENTAL STUDY (NES), CALTRANS SONOMA 116 PAVEMENT OVERLAY PROJECT** *Sonoma County, California*

Client: Caltrans/Impact Sciences

The report identified biological constraints and analyzed impacts to biological resources resulting from the proposed widening of SR 116 between Cotati and Sebastopol. Focused surveys were conducted for special-status plant species, California tiger salamander (CTS) larvae, native trees, and jurisdictional wetlands. All suitable CTS habitat within and bordering the project boundaries

was mapped, Biological Assessments were prepared for CTS, steelhead, and California freshwater shrimp, and a GIS database was developed.

**SUN CITY TEHAMA SPECIFIC PLAN EIR, BIOLOGICAL RESOURCES SECTION**  
*Tehama County, California*

Client: Del Webb/Impact Sciences

Focused surveys were conducted for special-status plant species, vernal pool fairy/tadpole shrimp, western spadefoot, western pond turtle, burrowing owl, and valley elderberry longhorn beetle. The results of these surveys, and the results of a jurisdictional delineation and a fisheries and aquatic resources evaluation, were incorporated into the biological resources section of the EIR. Mitigation measures were developed to address project impacts.

**RANCH VIEW TERRACE AND MCHENRY LIBRARY EIR, BIOLOGICAL RESOURCES SECTION**  
*Santa Cruz County, California*

Client: University of California at Santa Cruz/Impact Sciences

The biological resources EIR chapters analyzed impacts to seeps and associated special-status plant species, the effect of altered surface runoff on special-status cave dwelling invertebrates, and potential impacts to the federally-listed Ohlone tiger beetle and California red-legged frog.

**BREUNER MARSH MITIGATION BANK EIR, BIOLOGICAL RESOURCES SECTION**  
*Alameda County, California*

Client: City of Richmond/Impact Sciences

The site borders San Pablo Bay, contains extensive tidal marsh habitat, and supports the Endangered salt marsh harvest mouse and clapper rail. The biological resources chapter evaluated direct impacts to special-status wildlife species and wetlands as well as indirect impacts resulting from a proposed boardwalk traversing the marsh.

**BIOLOGICAL CONSTRAINTS EVALUATIONS FOR VERIZON CELL SITES**  
*Throughout California*

Client: Verizon/Clayton Group Services

Biological constraints evaluations were conducted for numerous proposed cell tower sites, including sites in Alameda, Contra Costa, Fresno, San Francisco, San Mateo, Santa Clara, and Sonoma Counties. The suitability of onsite habitats to support special-status plant and wildlife species was evaluated and, as appropriate, the need for focused surveys and consultation with state and federal agencies was identified.

## Vernal Pool Ecology, Restoration, and Management

Vollmar Natural Lands Consulting (VNLC) provides recognized expertise in the ecology, restoration, and management of vernal pool habitats. We are also leading experts in the use of livestock grazing as a primary tool for managing and enhancing these communities. Our staff includes botanists, aquatic invertebrate and amphibian biologists, water quality and hydrology specialists, and a certified range manager all with specific expertise in vernal pool grassland communities. We hold federal permits for conducting surveys for federally-listed large branchiopods (fairy and tadpole shrimp) and California tiger salamander. Over the past ten years, we have conducted dozens of vernal pool-related surveys and discovered hundreds of new special-status plant, large branchiopod, and amphibian occurrences. These projects are listed under the 'Rare Species Surveys, Habitat Assessments, and Wetland Delineations' section above.

VNLC has pioneered a landscape-level approach to vernal pool habitat studies. In 2001-2002, we conducted a major ecological study of the vernal pool grasslands of eastern Merced County as part of regional planning for the new U.C. Merced. This region supports the largest and most pristine tracts of vernal pools remaining in the state with the highest diversity and density of associated special-status species. Our study focused on understanding the region-wide distribution of 40+ special-status species (including plants, large branchiopods, amphibians, reptiles, and mammals) and correlating their distributions with underlying ecological conditions related to topography, geology, soils, geomorphology, pool hydrology and water quality characteristics, and land use. We conducted intensive field surveys on 12 private ranches incorporating more than 45,000 acres and spanning the range of ecological conditions in the study region. We published our study results as a 12-chapter book complete with more than 80 GIS-based color maps and photographs of regional habitat features and special-status species. Our study is currently being used as the primary basis by Merced County and federal and State resource agencies for regional conservation planning within the entire 150,000-acre region east of Highway 99 within Merced County. We have applied our knowledge gained through this project to numerous other vernal pool conservation, mitigation, restoration and management projects, including regional vernal pool surveys in support of the Solano County HCP, development of a Caltrans Mitigation Bank in eastern Madera County, development of a 1,500-acre private land mitigation bank in eastern Merced County, and management of a 400-acre vernal pool preserve in eastern Solano County.

VNLC has also pioneered an ecological approach to vernal pool creation, restoration, and monitoring. Our approach is based on our thorough knowledge of vernal pool grassland landscape ecology and the specific habitat requirements of associated special-status plant and wildlife species. We have successfully created vernal pools that have come to support target special-status plant and large branchiopod species. In 2008 we designed and constructed more than 13 acres of restored, enhanced, and created pools of various size on a 200-acre in-house mitigation bank for Caltrans in southeastern Madera County. This site is rich in special-status species, supporting California tiger salamander (CTS), western spadefoot, vernal pool fairy shrimp, midvalley fairy shrimp, California fairy shrimp, San Joaquin Valley Orcutt grass, and succulent owl's-clover. The previous land owner used a scraper to try to eliminate the native pools. We are using historic aerial photos to restore the site's original topography and vernal wetlands. In 2008 we designed and constructed eight new vernal wetlands on the Lazy K Ranch 93-acre off-site mitigation preserve in Madera County with a range of ponding depths and durations to provide habitat for the suite of special-status species present on the site. In eastern Solano County, we successfully created claypan pools on a site with vernal pool fairy shrimp, vernal pool tadpole shrimp, and the endangered Conservancy fairy shrimp. Some of the created pools have come to support listed large branchiopods. We also successfully created several pools on a small preserve for the endangered Contra Costa goldfields near Fairfield in southern Solano County.

Our various landscape-level surveys, conservation planning projects, and mitigation projects involving vernal pools are summarized in the sections above. Numerous other vernal pool-related projects are shown in the projects list at the end of the Statement of Qualifications.

## **Native Grassland Ecology, Conservation, and Management**

Prior to European arrival, California's grasslands were dominated by a mix of native perennial bunchgrasses and native wildflowers. These native grasses have been almost entirely replaced through competition by a variety of annual grasses including bromes, barleys, and oats introduced from Europe and elsewhere. The cover of native wildflowers has also been reduced. Over the past few decades there has been great environmental and scientific interest and effort to conserve or enhance remaining native grasses and wildflowers within the current annual grasslands.

Vollmar Natural Lands Consulting (VNLC) provides expertise on the ecology, conservation, and management of native perennial bunchgrass communities and native wildflower fields in the context of site geology, soils, geomorphology, and other landscape features, and in relation to competing non-native annual grasses. In 2003-2004, VNLC discovered and documented one of the largest contiguous stands of intact perennial bunchgrass land known in California on the Centennial project site just east of Gorman, Los Angeles County. This community includes four different native perennial grasses and over 70 native wildlife species. We established more than 300 plots to document and characterize this community. Our data showed predictable distribution patterns of the different bunchgrass and wildflower species related to differences in slope, aspect, geology type, and soil depth. Taken together, these data provide one of the most complete pictures developed to date of the complex plant species relationships and plant community characteristics of pre-European California grasslands. We have worked on numerous other project sites throughout the state supporting more limited or remnant perennial bunchgrass stands. On most sites, we have found distribution patterns related to specific geomorphic features such as soil depth and moisture, slope, and aspect.

We have applied our ecological knowledge to the management and enhancement of native perennial bunchgrass and wildflower communities on conservation and mitigation lands. Among our various projects, the Sears Point Project, Fernandez Ranch Project, and Montezuma Wetlands Project all involve conservation management of significant stands of native perennial bunchgrasses (primarily purple needlegrass) and native wildflower fields. Our proposed management activities for these sites address conservation and possible enhancement of these communities through various land management techniques including prescribed grazing and burning, and herbicide treatments. These projects are profiled above under the Conservation Land and Mitigation Land sections.

## **Forest Ecology, Dynamics, and Management**

Vollmar Natural Lands Consulting's biologists are practiced in the natural resource issues of several forested ecosystems of Northern California, including the Sierra Nevada, southern Cascades, and Klamath/Siskiyou mountains. In these ecosystems, we have conducted rare plant and invasive species surveys, floristic inventories, vegetation mapping, and surveys for sensitive animals such as the northern spotted owl and northern goshawk. In 2005, we conducted floristic surveys on nearly 10,000 acres on the Plumas National Forest, resulting in the documentation of 200 new sensitive and invasive plant occurrences. Several of our staff members have worked for the U.S. Forest Service in both management and research capacities. We are cognizant of the complex history and current state of forest management practices and are familiar with the best science related to disturbance ecology in western forests.



## Advanced GIS Analysis and Cartography

Vollmar Natural Lands Consulting's services include high-end GIS database design and development, GIS-based data analysis, and GPS and GIS mapping capability. We bring to every project our extensive library of vector and raster base data, ortho-rectified aerial photography, and satellite imagery collected over the past 10 years and covering significant portions of California. We overlay existing data sets with our high-resolution field data, collected using professional, sub-meter accurate GPS units (post-processed for maximum accuracy). Our two GIS specialists work with the most advanced software on high-speed computers to integrate existing and collected data into professional, high quality cartographic and GIS database output. We take pride in producing clean, well-documented GIS data, and in presenting the data in a clear, professional cartographic manner.

### List of Core GIS and GPS Software

- ArcMap 10.1
- ESRI Spatial Analyst, 3D Analyst, Network Analyst, and Image Analyst
- ArcIMS (Internet Map Server)
- ENVI 3.6
- Surfer 10
- DeltaGraph 6
- R2V (raster to vector digitizing/conversion software)
- GPS Pathfinder 5
- AutoCad 2005
- CNDDDB RareFind 4 (latest version)
- MrSID Generation 3
- Adobe PhotoShop CS and Illustrator CS
- Assorted GIS software extensions, plugins and scripts

### List of GIS and Surveying Hardware

- Trimble GeoXH sub-foot GPS units (3) and GeoXT sub-meter GPS units (2)
- Access to Trimble real-time kinematic (RTK) GPS
- Topcon RL-H4C Laser Ranger, LaserMark Universal Laser Ranger
- High-speed GIS computer servers (4 gb ram, dual core processors)
- HP 5500 laser printer (11-in x 17-in)
- HP DesignJet 800ps plotter (42-in W x unlimited L)

# STAFF AND ASSOCIATES

Vollmar Natural Lands Consulting's core staff and associates include the following individuals. Professional summaries for these individuals are presented below. Resumes are available upon request.

<b>STAFF</b>	<b>EXPERTISE</b>
John Vollmar	Principal; Botany, Vegetation Ecology, Aquatic Wildlife Biology, Wetland Delineation, Landscape Ecology, Habitat Creation/Restoration, Rangeland Ecology, Regional Conservation Planning, Mitigation Banking
Jake Schweitzer	Botany, Wetland Ecology, Restoration Ecology, Geographic Information Science, Cartography
Cassie Pinnell	Wetland Ecology, Terrestrial Ecology, Botany, Geographic Information Science, Environmental Permitting
John Hale	Botany, Wetland Ecology
Eric Smith	Wetland Ecology, Herpetology, Geographic Information Science, Cartography
Vir McCoy	Wildlife Biology, Botany, Wetland Ecology, Habitat Monitoring
Linnea Neuhaus	Wetland Ecology, Botany, Geographic Information Science
Gillian Seymour	Botany, Forest Ecology, Wetland Ecology, Geographic Information Science
Rebecca Wang	Wetland Ecology, Geographic Information Science, Cartography
Kristen Chinn	Wetland Ecology, Geographic Information Science
<b>ASSOCIATES</b>	<b>EXPERTISE</b>
Josh Phillips	Wildlife Biology, Aquatic Invertebrate Biology, Environmental Permitting
Kevin Knowles	Conservation Real Estate, Mitigation Planning
Dr. Stuart Siegel	Tidal Wetland Ecology and Restoration
Dr. Brent Helm	Aquatic Wildlife Biology, Vernal Pool and Wetland Ecology, Mitigation Banking
Roger Raiche	Botany, Vegetation Ecology, Landscape Architecture
Todd Sloat	Ornithology, Fisheries Biology, Water Quality
Jim Chance	Rangeland Ecology, Rangeland Management, Livestock Operations
Dave Clendenen	Ornithology, Botany, Restoration Ecology
Don Bucknor	Information Technology

## **John Everett Vollmar, President and Senior Ecologist**

**B.S. University of California, Berkeley: Natural History and Evolution, 1990**

- **Vollmar Natural Lands Consulting: President, Senior Ecologist, 1996–present**
- **CytoCulture BioTechnology: Wetland Research Associate, 1996–1998**
- **Garcia and Associates: Botanist / Wetland Ecologist, 1995–1997**
- **BioSystems Analysis: Botanist, 1992–1995**
- **WESCO Ecological Services: Botanist, 1991**
- **Eldorado National Forest: Botanist, 1990**

Mr. Vollmar is the founder of Vollmar Natural Lands Consulting (VNLC). As principal-in-charge, he is responsible for overall management and quality control of all company projects. Mr. Vollmar has more than 15 years' professional experience. He has managed more than 150 projects during the course of his career ranging from small parcel assessments to large, multi-disciplinary regional conservation studies.

Mr. Vollmar is an expert botanist, vegetation ecologist, and wetland ecologist. He is also experienced with aquatic invertebrate and amphibian surveys in seasonal wetlands. His background combines strong technical experience and training with a thorough understanding of current environmental regulations pertaining to botanical and wetland resources. As a botanist, he has managed and conducted rare plant surveys, floristic inventories and habitat assessments throughout California and other western states. He has worked with dozens of rare plant species. He is familiar with the plant taxonomy of central California from the coast to the eastern Sierra as well as other regions in California, Nevada and New Mexico. As a wetland ecologist, Mr. Vollmar has managed and conducted numerous wetland delineations and habitat assessments, developed and implemented mitigation, restoration, and creation plans and monitoring plans for several wetland types including vernal pools, perennial and seasonal marsh, riparian habitats, and alkali sink scrub. Mr. Vollmar regularly advises clients on the requirements of Sections 7 and 10 of the Federal Endangered Species Act, Sections 401 and 404 of the Clean Water Act, CEQA, and various state and local environmental regulations. Mr. Vollmar holds a federal survey permit for federally-listed vernal pool fairy and tadpole shrimp and California tiger salamander and has surveyed more than 3,000 vernal pools and other seasonal wetlands for these species.

In recent years, Mr. Vollmar has applied his skills to regional conservation planning, mitigation banking, natural resources management, and land stewardship. From 1998-2005, he directed a vernal pool conservation program in eastern Merced County. Program elements included public workshops, working with ranchers to establish conservation easements, preparing easement documentation reports, and co-authoring a report on the effects of livestock grazing on vernal pools. In 2001-2002, he directed a major study of the ecology of eastern Merced County involving surveys of 45,000 acres of private rangelands for 40+ special-status species. Over the past two years, he has directed large-scale biological surveys, mitigation banking projects, and conservation land management projects in Merced, Madera, San Mateo, Sonoma, Contra Costa, Lassen, Siskiyou, Kern, and Los Angeles Counties.

## Jake Schweitzer, Senior Ecologist and Geographic Information Science Specialist

**B.A. University of California, Berkeley: Physical Geography (concentration in geological and botanical sciences), 1995**

- **Vollmar Natural Lands Consulting: Senior Ecologist and GIS Specialist, 2003–present**
- **Wetlands and Water Resources: Ecologist and GIS Consultant, 2001-2005**
- **UC Berkeley College of Natural Resources, CAMFER Lab: Research Assistant, 2000-2001**
- **Applied Geographics, Boston, MA: GIS Technical Manager, 1997-2000**
- **City of Oakland: GIS Technician, 1996-1997**

Mr. Schweitzer combines 13 years of experience as a professional vegetation and wetland ecologist with over 18 years of experience in cartography and geographic information science (GIS, remote sensing/image analysis, and GPS technology). His ecological focus has been in botanical and wetland sciences. He holds federal and state permits to survey for listed fairy shrimp, California red-legged frog, and California tiger salamander and is certified in the vegetation mapping techniques developed by the California Native Plant Society and California Department of Fish and Wildlife. He has conducted surveys and produced vegetation and wetland maps at various scales for numerous projects throughout California. Mr. Schweitzer has been a docent for the past nine years at the East Bay Regional Park Botanic Garden, teaching native California plant ecology to the public.

Mr. Schweitzer has applied his skills to a wide array of projects, from surveying and modeling threats posed by Sudden Oak Death Syndrome, to performing large-scale botanical and aquatic wildlife surveys, to designing habitat restoration projects. He has served as lead field ecologist and GIS specialist for many of VNLC's regional conservation and land use projects from the Bay Area to the San Joaquin Valley and Sierra Nevada Foothills. He has most recently led survey and mapping efforts at the 8,000-acre Walker Ridge Proposed Wind Energy Site (Colusa and Lake Counties), the 1,600-acre Tres Vaqueros Wind Energy Site (Contra Costa County), the 1,300-acre Calabazas Creek Open Space Preserve (Sonoma County), and the 16,000-acre Rancho Arroyo Seco Land Use and Mitigation Bank Project (Western Amador County). He is currently overseeing a federally funded project involving the propagation and reintroduction of the critically endangered large-flowered fiddleneck (*Amsinckia grandiflora*) into its historic range, and is also managing a project involving surveys and mapping biological resources on private ranchlands throughout California's Central Coast Ranges.

## Cassie Pinnell, Senior Ecologist and Sacramento Office Lead

**M.S. San Francisco State University, Romberg Tiburon Center: Biology, 2016**

**B.A. Mills College: Environmental Studies and Ethnic Studies (double major), 2004**

- **Vollmar Natural Lands Consulting: Senior Ecologist, Sacramento Office Lead, 2017–present**
- **Mattole Restoration Council: Executive Director, 2013-2017**
- **San Francisco State University: Graduate Researcher, 2011-2016**
- **Vollmar Natural Lands Consulting: Senior Ecologist, 2005-2013**
- **BMP Ecosciences: Biologist, 2003-2005**

Ms. Pinnell combines over 12 years as a professional ecologist with over four years as Executive Director of a watershed restoration NGO in California. Her work has included managing large-scale restoration projects, and conducting statewide surveys for special-status plant and wildlife species, using a variety of survey techniques in both wetland and upland environments. She has experience in assessing effectiveness of wetland, intertidal, and upland restoration projects, and using GIS and statistical software (R, SPSS) to determine community-level responses to habitat modification and restoration. Ms. Pinnell has also worked on large-scale species distribution assessments and habitat analyses to supplement conservation planning in California. Ms. Pinnell has worked on the preparation of multiple Land and Resource Management Plans and regulatory permitting on projects in the Central Valley and larger Bay Area regions. She is experienced with permitting under Sections 404, 401, and 1602, and has prepared multiple Biological Assessments for Section 7 Consultations.

Ms. Pinnell has strong botanical experience, and since 2004 has conducted special-status species surveys, vegetation classification studies, and noxious weed surveys on sites ranging from small to over 16,000 acres throughout California. Ms. Pinnell has worked throughout California within seasonal and perennial wetlands, riparian corridors, coastal marshes, native and non-native grasslands, forests, desert and montane bioregions. She has completed trainings in the California Native Plant Society's "Rapid Assessment" survey protocol, and has attended numerous workshops, hikes, and additional trainings in California's rare plants.

## **John S. Hale, Senior Botanist**

**M.S. Botany, California State University, Chico, 1997**

**B.S. Botany, California State University, San Francisco, 1974**

- **Vollmar Natural Lands Consulting: Senior Botanist, 2001 – present**
- **Jones and Stokes Associates: Field Botanist, 1990-2001**
- **CA Dept. of Fish and Game, Shasta County, CA: Vegetation Specialist, 1993**
- **U.S. Forest Service, Modoc National Forest, CA: Seasonal Botanist, 1990-1991**

Mr. Hale is a botanist and wetland ecologist with more than 15 years of professional experience. He is an expert on California's flora and plant communities with particular knowledge of California's Sierra Nevada and Central Valley regions. Mr. Hale has conducted botanical surveys throughout California in many plant communities including vernal pool, salt marsh, riparian, alkali and desert habitats. He recently took a specialized course in the Flora of the Northern Siskiyou through the U.C. Berkeley Jepson Herbarium and has served as a botanist for the Modoc National Forest. His expertise includes special-status plant surveys, floristic inventories, noxious weed surveys, vegetation mapping, wetland delineations, and vegetation/biological monitoring. Through his project work, Mr. Hale has discovered numerous rare plant occurrences including several significant range extensions.

Mr. Hale served as the Designated Biologist, approved by the California Energy Commission, for Sacramento Municipal Utility District's Cosumnes Power Plant and Pipeline Project. He was responsible for conducting and supervising the implementation of the biological resources Conditions of Certification for the project. Mr. Hale has also served as the lead botanist on many large utility line projects including the Williams fiber optic installation from Pt. Arena to Sacramento, the Qwest fiber optic installation from Dunsmuir to Redding, and the Southern California Edison Big Creek hydroelectric relicensing.

## **Eric Smith, Geographic Information Science Specialist, Herpetologist**

**B.A. University of California, Davis: Biology (concentration in Evolution and Ecology), 2006**  
**GIS Certificate, San Jose State University, 2009**

- **Vollmar Natural Lands Consulting: Staff GIS Analyst, Herpetologist, 2011-present**
- **FRP Games: Database Administrator, 2009-2011**
- **Stepping Stone Tutors: Tutor, 2009-2011**
- **Lindamood-Bell Learning Processes: Tutor, 2007-2009**
- **Franklin-McKinley School District: Substitute Teacher, 2006-2008**

Mr. Smith's educational background is in terrestrial and wetland ecology, and the use of spatial data to understand and present biological information. His educational background includes graduate coursework in ecological study design and geographic information science, with research experience using GIS to investigate the dispersal dynamics of plethodontid salamanders.

Mr. Smith was a science and math educator for four years, and he retains those communication skills for presenting technical data to both scientific and lay audiences. After completing his certificate in GIS, he moved on to spend two years as a database administrator, managing a 30,000+ record database. He now applies those database administration skills to the analysis of large biological datasets. He has been the data organization and processing lead on an analysis of the hydrology, botany, water quality, and invertebrate biology of over 450 created and natural vernal pools in California's central valley. He is also the lead cartographer on an ongoing project to create ca. 7 acres of vernal pools in Madera County. His primary duties at VNLC are as a staff cartographer and GIS analyst, where he has analyzed survey data and produced maps for several projects set in the San Joaquin valley and the Coast Range.

## Vir McCoy, Field Ecologist

**B.A. University of California, Berkeley: Physical Geography, 1992**

- **Vollmar Natural Lands Consulting: Field Ecologist, 1998-present**
- **Chambers Group, Inc.: Biologist, 1995-1996**
- **Ecosystems: Biologist, 1993-1995**
- **U.C. Santa Cruz, Predatory Bird Group: Research Assistant, 1991-1992**

Mr. McCoy has over 20 years of professional experience in the fields of wildlife biology, habitat restoration, ecology, botany and geography. Mr. McCoy received a B.S. in Biology and a B.A. in Geography from the University of California, Berkeley in 1992.

During his professional career, Mr. McCoy has been an integral part of numerous wildlife and ecological field studies, habitat assessments, large restoration projects, sensitive species surveys, database analysis and interpretation projects, species natural history summaries, ecological risk assessments, long-term monitoring plans, wetland delineation and other habitat evaluations. As a wildlife biologist, he has conducted surveys for a range of species, including many State and Federally Threatened and Endangered species throughout California and Arizona. These surveys have been conducted in a variety of habitat types including fresh and salt marsh, seasonal wetlands, riparian wetlands, and upland annual grassland, shrub, and forest habitats. He has extensive experience with avian, mammalian, reptile, amphibian, fish and invertebrate species (fairy shrimp) including vernal pool and vernal pool associated wildlife surveys on several large ranches in Merced County and on properties in Solano County. Mr. McCoy has conducted surveys for California red-legged frogs, yellow-legged frogs and California tiger salamanders. He has successfully completed a large branchiopod identification course.



## Linnea Neuhaus, Ecologist

**B.S. University of California, Davis: Environmental Science and Management (concentration in Ecology, Biodiversity, and Evolution), 2012**

- **Vollmar Natural Lands Consulting: Staff Ecologist, 2015-present**
- **Zone 7 Water Agency (Alameda County): Technical Field Coordinator, 2015**
- **Urban Creeks Council: Program/Field Manager, 2012-2015**
- **U.C. Davis Herbarium: Intern, 2012**
- **U.C. Davis Botanical Conservatory: Intern, 2012**

Ms. Neuhaus has a unique professional background combining non-profit, public agency, and consulting work. Her educational background focused on ecology, botany, and GIS. Since earning her degree, she spent two years managing the Living Arroyos program, an environmental stewardship program to restore riparian habitat in Alameda County, and trained hundreds of volunteers in stream restoration tasks and native plant care. She has led and coordinated monitoring, reporting, and on-the-ground implementation for multiple riparian restoration projects in the Livermore-Amador Valley. She has experience with many field survey techniques, including CRAM, electroshocking, seining, dipnetting, and water quality testing. She has also conducted large-scale vegetation baseline mapping along with restoration/bank stabilization site mapping in Alameda County. She is proficient in ArcGIS, Microsoft Office, and Adobe Creative Suite software.

Ms. Neuhaus has applied her skills to a variety of projects in Northern California. In her three years with Urban Creeks Council, she was involved in a baseline study of riparian habitat in eastern Alameda County conducting CRAM, vegetation, and fish surveys on thirty sites. She also worked with Point Blue Conservation Science to develop a method of using publicly available citizen science bird survey data to evaluate quality of riparian habitat, and worked on over twenty-five soil bioengineering projects using live willow material for bank stabilization. In cooperation with Dr. Robert Leidy (US EPA) and Dr. Stephanie Carlson (UC Berkeley), Ms. Neuhaus surveyed refugial pools in the upper reaches of Coyote Creek (Henry Coe State Park, Santa Clara Co.) to study the effects of drought conditions on native fish, invertebrates, and turtles.

As an ecologist with VNLC, Ms. Neuhaus has conducted California tiger salamander larval surveys, California red-legged frog surveys, aquatic invertebrate surveys, botanical and rare plant surveys, visual encounter surveys and amphibian spotlight surveys. Ms. Neuhaus holds federal permits to conduct surveys for California red-legged frog, larval California tiger salamander, and large branchiopods.

## Gillian Seymour, Ecologist

**B.S. University of California, Berkeley: Molecular Environmental Biology (concentration in Ecology), 2015**

- **Vollmar Natural Lands Consulting: Staff Ecologist, 2015-present**
- **ACRT, Inc.: Consulting Utility Forester, 2015**
- **U.C. Berkeley College of Natural Resources, Scott Stephens Lab: Biological Technician, 2013-2014**
- **Sulphur Springs Elementary School: Outdoor Educator, 2012-2013**

Ms. Seymour's educational background has focused on ecology, molecular, plant and invertebrate biology. While attending U.C. Berkeley, she conducted a field experiment under the guidance of Plant Ecologist, David Ackerly. The project addressed the effects of fire severity and soil depth on germination of chaparral species (*Adenostoma fasciculatum* and *Ceanothus* sp.) in the Mount Diablo State Park area. She developed hypotheses and experimental design, conducted field work and statistical analyses using R. The project results were then presented to an academic audience.

Professionally, Ms. Seymour gained experience in ecological research and geographic information science (GIS, remote sensing/image analysis, and GPS technology), while working for the Scott Stephens Lab, University of California, Berkeley. She worked with graduate student, Kate Wilkin, in implementing her dissertation research on how pyrodiversity affects biodiversity in the Sierra Nevada range and how chaparral ecosystems are affected by various land management practices in Hopland, California. Ms. Seymour worked on all aspects of these projects and gained experience in research and monitoring methods. She has extensive field experience in a wilderness and urban setting. While doing field work in the Sierra Nevada she gained experience in identifying vascular plant species. She prepared figures using aerial imagery and ArcGIS and utilized a Trimble global positioning system (GPS) unit. She also input, maintained, extracted data using Excel and Access, and conducted thorough quality control and quality assurance. She worked as a Consulting Utility Forester with ACRT, Inc. There, she performed identification, inspection and evaluation of trees and brush along utility lines and submitted inspection results to clients with recommendations. Ms. Seymour is a member of the California Native Plant Society and a Certified Wilderness First Responder. In addition, she is multilingual and speaks Spanish, French, and Thai.

## Rebecca Wang, Ecologist

**B.A. University of California, Berkeley: Geography, 2015**

- **Vollmar Natural Lands Consulting: Staff Ecologist, 2016-present**
- **U.C. Berkeley Geography Department: Cartography Intern, 2016**
- **U.C. Berkeley Museum of Vertebrate Zoology, Lacey Lab: Research Assistant, 2012-2013**

Ms. Wang's undergraduate work focused on integrative biology, geography, and GIS. During her undergraduate degree, Ms. Wang spent a year working under Dr. Eileen Lacey caring for and researching a colony of subterranean Argentinian tuco-tucos. She spent the months after earning her degree assisting her department's graduate students with their cartographic and geospatial needs. Her field survey technique experience includes dipnetting, seining, and water quality testing. She is proficient in ArcGIS, Microsoft Office, and Adobe Creative Suite software, and data collection using Trimble GPS units. She is also a FAA-licensed small Unmanned Aerial Vehicle (sUAV) operator.

Ms. Wang has applied her skills to a variety of projects in Northern California and the Central Valley with VNLC. She has inputted and maintained a database for the purposes of vegetation mapping in Tanzania's Kwa Kuchinja Corridor. She also built and maintained a database for the Loma Fire Habitat Study for the Santa Clara Valley Open Space Authority and assisted in the botanical surveys. She is trained in spatial analysis, aerial imagery interpretation, and has conducted multiple field and remote mapping of wetlands and habitat types. Her field experience includes the following: biological surveys including aquatic invertebrate surveys, California tiger salamander seining, and botanical and rare plant surveys.

## Kristen Chinn, Ecologist

**B.A. University of California, Berkeley: Geography, 2016**

**B.S. University of California, Berkeley: Conservation and Resource Studies, 2016**

- **Vollmar Natural Lands Consulting: Staff Ecologist, April 2018-present**
- **UC Berkeley Soil and Environmental Biogeophysics Lab: Research Assistant, 2016**

Ms. Chinn's undergraduate education focused on agriculture, geography, and GIS. During her undergraduate degree, Ms. Chinn spent a year working under PhD candidate Sarick Matzen studying the ability of *Pteris vittata* to accumulate arsenic in contaminated soils. Her field survey technique experience includes seining and RMA surveys, and she has assisted on wetland delineations. She is proficient in ArcGIS, Microsoft Office, and Adobe Creative Suite software, and data collection using Trimble GPS units.

Ms. Chinn has applied her skills to multiple projects in Northern California and the Central Valley with VNLC. She is trained in spatial analysis and aerial imagery interpretation, and has assisted on multiple mapping projects. Her field experience includes biological inspections, general inspections, fish surveys, nesting bird surveys, and wetland delineation.

## Associates

### Josh Phillips, M.E.S., Permitting Specialist

Mr. Phillips has over twenty years of professional experience as a wildlife biologist and ecologist. He has a comprehensive understanding of the environmental planning process, including expertise in sensitive biological resources and the state and federal regulations protecting these resources (e.g., CEQA, the state and federal Endangered Species Acts, the federal Clean Water Act, and the California Fish and Wildlife Code).

Mr. Phillips has extensive experience analyzing the effects of development projects on biological resources and has prepared numerous biological resource chapters of EIRs, Biological Assessments for Section 7 consultations, and Biological Constraints Evaluations. Mr. Phillips also has conducted special-status species surveys, habitat evaluations, wetland delineations, vegetation mapping, mitigation design and implementation, and coordinating with state and federal resource agencies. He holds a section 10(a)(1)(A) recovery permit to conduct surveys for federally-listed vernal pool branchiopods (i.e., fairy and tadpole shrimp) and has conducted numerous surveys for these species. He has also organized and conducted surveys for special-status plants, California red-legged frog, California tiger salamander, western pond turtle, western burrowing owl, nesting birds, Chinook salmon, and steelhead.

Mr. Phillips has managed and participated in large-scale projects involving complex biological issues throughout northern and southern California. He has worked on projects for a variety of public and private sector clients, including the cities of Hercules, Richmond, Pinole, Santa Cruz, Scotts Valley, Watsonville, and Calistoga, as well as Caltrans, the University of California at Santa Cruz, the San Francisco Department of Public Works, Del Webb, Verizon, Newhall Ranch, and Tejon Ranch.

### Kevin Knowles, B.A., Land Conservation Specialist

Mr. Knowles has acted as a real estate broker, consultant or principal on land conservation projects in California since 1989. He received his B.A. in American Studies from Stanford University in 1987 and is a licensed real estate broker with the State of California. Mr. Knowles is the Founder and President of Conservation Land Group based in Sausalito.

Mr. Knowles' efforts have led to the permanent protection of over 100,000 acres of endangered species habitat, wetlands, wildlife corridors, working farms, coastal properties, and cultural/historic sites in the western U.S. VNLC provided ecological expertise for many of these projects. Mr. Knowles provides guidance to private landowners, non-profit conservancies and public agencies on land conservation priorities, charitable planning related to land preservation and strategies for securing acquisition funding from a variety of federal, state, local and philanthropic sources.

Mr. Knowles has considerable experience working with elected officials and community groups to build partnerships and coalitions on complex, multi-year acquisition projects. His transactional work includes property due diligence, overseeing land appraisers and natural resource specialists, and assisting in the resolution of legal and tax matters. While with The Trust for Public Land between 1989 and 2005, Mr. Knowles served on the City of San Diego's Multiple Species Conservation Program Working Group which oversaw the implementation of a 175,000-acre regional preserve system. Mr. Knowles also handles real estate matters and mitigation credit marketing and sales for several mitigation/conservation banks in California.

### **Stuart Siegel, Ph.D., Environmental Scientist**

Dr. Siegel has devoted his professional career to the conservation and restoration of wetland and aquatic systems with an emphasis on estuarine tidal wetlands. His combined work experience and graduate studies have built his expertise as an integrative physical scientist and geomorphologist with considerable emphasis on the related disciplines of ecology, environmental regulation and policy, contaminant remediation in estuarine environments, management, and business.

Dr. Siegel focuses on the integration of numerous disciplines into a comprehensive systems approach for regional ecosystem planning, ecosystem restoration projects, and scientific research into ecosystem restoration and management issues. His approach is now commonly referred to as "ecosystem-based" management. Dr. Siegel works primarily in the San Francisco Estuary and Sacramento-San Joaquin Delta with other efforts elsewhere in coastal California as well as in the tropical Pacific. Restoration projects range in size from a few acres to a few thousand acres. Science research investigates physical, chemical, and biological processes affecting outcomes of ecosystem restoration efforts and the effects of ecosystem management on water quality and biological resources; Dr. Siegel is the lead principal investigator for CALFED's Integrated Regional Wetland Monitoring pilot project and for a State Board-funded investigation of low dissolved oxygen and methyl mercury production in Suisun Marsh managed wetlands. His current regional planning work includes being the technical lead for Governor Schwarzenegger's Delta Vision Ecosystem Strategic Plan, a science co-lead for the CALFED Delta Restoration Plan, science input for habitat planning as part of the Bay Delta Conservation Plan, and Science Advisor for the interagency Suisun Marsh Plan. Dr. Siegel is a certified Professional Wetland Scientist.

### **Brent Helm, Ph.D., Wildlife Biologist/Wetland Ecologist**

Dr. Helm is a senior biologist and wetland ecologist with over 18 years' experience as a professional consultant, research scientist, and adjunct professor. Dr. Helm received his Ph.D. in Ecology from the University of California, Davis in 1999. He also has an M.S. in Ecology from U.C. Davis (1996) and a B.S. in Wildlife Management from Humboldt State University (1988).

As a consultant, Dr. Helm has served as project manager and principal investigator for a broad range of resource assessment, mitigation and conservation projects including many large-scale, complex, and controversial projects. These have included developing and implementing field surveys for special-status plant and wildlife species; assessing sensitive resource impacts and developing mitigation plans; performing regional status surveys, assessing the relative significance of populations, and evaluating threats and endangerment status of species under consideration for listing; and preparing regional conservation and management plans.

Dr. Helm is an expert on the wildlife, ecology, restoration and creation of vernal pools, and is included on the U.S. Fish and Wildlife Service's (USFWS) list of recognized specialists in fairy shrimp (Crustacea: Anostraca) identification. He developed current USFWS-approved procedures for the dry-season and wet-season sampling for federally listed large branchiopods. He prepared range maps from all known occurrences of California's 23 fairy shrimp species for a book entitled "Fairy Shrimp of California's Pools, Puddles, and Playas" (Ericson and Belk 1999). He has conducted large branchiopod surveys in more than 7,000 vernal pools and other seasonal wetlands throughout 49 counties in California and five counties in Oregon (more than 200 individual projects). He has served as the project manager and principal scientist for broad-scale vernal pool conservation planning, mitigation, and management studies for listed large branchiopods in Merced, Sacramento, San Joaquin, Shasta, Butte, and Yuba Counties. He has also served as a senior scientist and project manager for several Habitat Conservation Plans involving vernal pool resource issues including the North Natomas HCP, San Joaquin HCP, Sacramento HCP, and Yolo HCP.

### **Roger Raiche, Botanist/Landscape Architect**

Mr. Raiche spent 23 years growing California native plants at the UC Botanical Garden at Berkeley (UCBG), where he was involved in seed collection, propagation, establishment and growth of each accessioned collection. At UCBG he grew a wide variety of plants, from grasses and forbs to shrubs and trees. He has continued to grow native California plants in natural settings as part of his independent landscape design business based in Sonoma County. In addition, he has spent the last 30 year botanizing throughout California both professionally and as a hobby, collecting and documenting wild plant occurrences. He is well known for his keen “eye” at seeing plants that others miss, as well as for an acute understanding of where rare plants might be found. Mr. Raiche has discovered at least five plants new to science, several occurring within The Cedars in northern-central Sonoma County, a property he has owned and managed for over ten years. He regularly leads tours of The Cedars, teaching serpentine “geobotany” to researchers and the general public.

In 2011, Mr. Raiche was honored as a California Native Plant Society (CNPS) Fellow. Becoming a Fellow is the highest recognition CNPS awards its members. These members “have accumulated extraordinary accomplishments towards the understanding, appreciation, and preservation of California native plants.”

### **Todd Sloat, M.S., Wildlife and Fisheries Biologist**

Mr. Sloat is a wildlife and fisheries biologist with more than 15 years of experience, and extensive knowledge of biological resources throughout California. He has managed many projects ranging from small private land restoration to region-wide biological inventories. Mr. Sloat received his B.S. in Wildlife and Fisheries Biology in 1988 from the University of California, Davis, and his M.S. in Ecology in 1998 from U.C. Davis.

Mr. Sloat is an expert ornithologist, and also has extensive experience with threatened and endangered terrestrial and aquatic species. He excels at coordinating natural resource improvements by working with a diverse group of stakeholders. He currently coordinates a large-scale water-quality monitoring program focusing on collecting background physical and biological data for the major tributaries of the upper Pit River in northeastern California. Working with private interest groups and state and federal agencies, project activities include the development of a watershed management strategy, and the coordination and management of several restoration projects.

Mr. Sloat’s biological experience covers a wide range of species and projects. He has conducted several large-scale biological inventories in northern California focused on documenting the distribution and abundance of wildlife species including northern goshawk, spotted owl, great gray owl, willow flycatcher, and rare carnivores. He served as the lead ornithologist to develop avian monitoring programs related to the management of Staten Island for waterfowl and shorebirds, and for documenting avian communities and habitat associations in eastern Merced County related to future landscape conservation planning. Mr. Sloat collected baseline data on the distribution and abundance of several anadromous fish species (e.g., coho salmon, king salmon, sea-run cutthroat trout), and developed a long-term monitoring strategy to document population trends of fish using private timberlands. He has also conducted biological surveys, habitat assessments, and impact analysis on a wide variety of utility, gas, and water holding facilities. For his graduate work, he studied waterfowl populations and habitat associations of arctic nesting geese.

### **Jim Chance, B.S., Rangeland Specialist**

Mr. Chance is a successful rancher with more than 40 years of experience ranching in California and Colorado. He received his B.S. in Agricultural Business Management from California State Polytechnic University, San Luis Obispo in 1961.

Mr. Chance owns more than 30,000 acres of ranchlands in northern California and Colorado, and is thoroughly familiar with all aspects of ranching. He brings to our consulting team invaluable knowledge regarding practical considerations of range management and ranching operations such as ranching economics, type of ranching operation (cow-calf, stocker, dairy heifers), season of use, grazing intensity and rotation, and livestock carrying capacity.

Mr. Chance is also familiar with the biological resource and conservation issues pertaining to ranching in an annual grassland environment, especially in regions with vernal pools. His ranches in Merced and Solano Counties incorporate more than 15,000 acres of high-quality vernal pool habitat as mapped by the California Department of Fish and Wildlife. He has placed both of these ranches under permanent conservation easements. For the past three years, he has worked closely with John Vollmar and biologists from The Nature Conservancy to understand the resource issues on his ranches and implement grazing practices that consider the needs of resource conservation as well as economically-viable ranch management. Through the years, Mr. Chance has served as a Board Member of the Ballico (Merced County) Soil Conservation District, President of the Denair (Merced County) Farm Bureau, and Chairman of the Marketing Committee for the California Cattlemen's Association.

### **Dave Clendenen, Ornithology, Botany, Restoration Ecology**

Mr. Clendenen's career has focused on wildlife field biology and conservation land stewardship, with emphasis on ecological restoration, invasive plant control and wildlife habitat management. During his 16-year tenure with The Wildlands Conservancy (TWC), a non-profit public-benefit corporation, Mr. Clendenen served for 11 years as Preserve Manager of the 95,000 acre Wind Wolves Preserve in Kern County, and then five years as the organizational ecologist, serving all 10 preserves in the TWC system. While with TWC, he implemented restoration programs for valley oaks, riparian habitat, endangered Bakersfield cactus, and an experimental restoration project for saltbush scrub habitat, with the goal of determining the most effective and efficient methods for saltbush restoration. He managed a livestock grazing program for 11 years on Wind Wolves Preserve, which was implemented with a focus on ecological goals, to control invasive plants (with emphasis on annual grasses), and manage grassland and scrub habitats for the benefit of native wildlife. He planned and supervised the installation of 48 miles of new fencing for the purpose of excluding riparian and wetland habitats from grazing. Through this process, he gained substantial expertise in rangeland management and ranch infrastructure design and installation, and was effective at working cooperatively and successfully with livestock producers. Mr. Clendenen was instrumental in planning and implementing a successful cooperative reintroduction project for tule elk on Wind Wolves Preserve. He has participated on rare plant surveys in a variety of environs, as well as surveys for least Bell's vireo and southwest willow flycatchers. He planned and implemented a project on Wind Wolves Preserve that resulted in the installation of 22 artificial den sites for the endangered San Joaquin kit fox, and then implemented a photo monitoring effort that documented occurrence of the species for the first time in more than 10 years. Mr. Clendenen also possesses a passion for the control of invasive plants, and implemented control programs for several invasive plant species on three TWC preserves. He was also instrumental in the planning and construction of public use facilities at Wind Wolves Preserve, including restrooms, trails, signage, campgrounds and picnic areas. As a result, he has a solid understanding of the operation of public use facilities, and the management of nature-based outdoor public recreation.

### **Don Bucknor, Information Technology Specialist**

Mr. Bucknor is a computer specialist who maintains the connectivity of networked computers and an intranet system that allows VNLC's employees and associated subcontractors to access project management tools and project files from remote locations.



# SELECTED PROJECTS BY REGION AND COUNTY

## SAN FRANCISCO BAY-DELTA

- **CALABAZAS CREEK OPEN SPACE PRESERVE PROPERTY MANAGEMENT PLAN.** Northern-Central Sonoma County, CA. Special-status plant surveys, plant community and noxious weed mapping, sudden oak death occurrence mapping, encroaching Douglas fir mapping, freshwater shrimp surveys, amphibian surveys, wetland delineations in support of a comprehensive management plan for this 1,300-acre open space preserve. *Client: Sonoma County Agricultural Preservation and Open Space District.*
- **SEARS POINT RESTORATION AND STEWARDSHIP PROJECT.** Southern Sonoma County, CA. Rare plant surveys, plant community studies, sensitive habitat and noxious weed mapping, development of an Upland Enhancement and Management Plan for a 2,300-acre project site. *Client: Sonoma Land Trust/Wetlands and Water Resources.*
- **NORTH PARCEL/LEONARD RANCH WETLAND RESTORATION PROJECTS.** Southern Sonoma County, CA. Rare plant surveys and wetland delineations for two agricultural parcels being restored as seasonal wetlands. *Client: Wetlands and Water Resources.*
- **LAGUNA TREATMENT PLANT PROJECTS.** Southern Sonoma County, CA. Habitat assessments, reconnaissance-level special-status species surveys, and wetland delineation on a 38-acre portion of the Laguna Treatment Plant, owned and operated by the City of Santa Rosa. *Client: GHD.*
- **ALAMEDA COUNTY PUBLIC WORKS AGENCY OPEN SERVICES.** Alameda County. Provide biological services throughout Alameda County as part of an open services contract. *Client: Alameda County Department of Public Works.*
- **MARIN MUNICIPAL WATER DISTRICT.** Marin County. Rare plant surveys, wetland delineations, and habitat assessments throughout central Marin County. *Client: Marin Municipal Water District.*
- **WOOL RANCH PRESERVE POND MANAGEMENT AND MONITORING PROJECT.** San Mateo County, CA. Prepared a comprehensive Pond Management Plan and a separate Monitoring Program for eleven stock ponds providing potential or known breeding habitat for the California red-legged frog and potential habitat for the San Francisco garter snake on a recently acquired preserve. *Client: Midpeninsula Regional Open Space District*
- **CULLINAN RANCH TIDAL MARSH RESTORATION PROJECT.** Southern Napa County, CA. Rare plant surveys and wetland delineation on a 1,500-acre proposed tidal marsh restoration site. *Client: USFWS San Pablo Nat'l Wildlife Refuge/Natural Resources Management.*
- **SAN MATEO COUNTY BAY TRAILS BIKE PATH PROJECT.** Redwood City, San Mateo County, CA. Rare plant surveys, habitat mapping and wetland delineation on a 2000-acre site on the edge of San Francisco Bay. *Client: Ibis Environmental Consulting.*
- **FERNANDEZ RANCH MANAGEMENT PLAN.** Northern Contra Costa County, CA. Rare plant, amphibian, and reptile surveys; vegetation, sensitive habitat and noxious weed mapping; wetland delineation; development of a management plan on a 700-acre conservation site. *Client: Muir Heritage Land Trust.*
- **SAN FRANCISCO AIRPORT VEGETATION MONITORING PROJECT.** Millbrae, San Mateo County, CA. Vegetation surveys within freshwater seasonal and perennial marsh as part of a long-term mitigation monitoring program for San Francisco garter snake and California red-legged frog. *Client: Ibis Environmental Consulting.*
- **CASCADE SEWER REPLACEMENT.** Fairfax, Marin County, CA. Rare plant surveys along a mile long stream corridor as part of a sewer replacement project. *Client: Wetlands and Water Resources.*

- **BIG BREAK MARSH PROJECT. Oakley, Contra Costa County, CA.** Rare plant surveys, plant community mapping, wetland delineation, noxious weed control on a 60-acre site owned by East Bay Regional Parks District along the edge of Big Break Marsh. *Client: Natural Heritage Institute.*
- **CONCORD NAVAL WEAPONS STATION, INLAND AREA. Northern Contra Costa County, CA.** Upland wildlife habitat assessment and botanical surveys of the 5,000-acre inland area of the Concord Naval Weapons Station. *Client: Natural Heritage Institute and Arup*
- **HERCULES FERRY TERMINAL. Hercules, Contra Costa County, CA.** Rare plant and protocol large branchiopod surveys and wetland delineation at proposed ferry terminal and train station site. *Client: Impact Sciences, Inc.*
- **GENTRY COMMERCIAL DEVELOPMENT PROJECT. Fairfield, Solano County, CA.** Rare plant, large branchiopod and California tiger salamander surveys, habitat mapping, and wetland delineation on a 600-acre site on the edge of Suisun Marsh with grassland, seasonal wetland, and estuarine marsh habitats. *Client: Gentry California Company.*
- **PETERSEN RANCH ASSESSMENT. Solano County, CA.** Rare plant and vernal pool habitat assessment of 1,600 acre ranch being considered for purchase and restoration by the Solano Land Trust. *Client: Solano Land Trust..*
- **MONTEZUMA MARSH WETLAND PRESERVE MANAGEMENT PROJECT. Southeastern Solano County, CA.** Large branchiopod, California tiger salamander, and rare plant surveys, vernal pool floristic inventories, grassland monitoring, vernal pool creation on a 400-acre vernal pool-grassland preserve. *Client: Montezuma Wetlands, LLC.*
- **CITY OF FAIRFIELD MITIGATION BANK SITE ASSESSMENT. Fairfield, Solano County, CA.** Large branchiopod, California tiger salamander, and rare plants surveys, habitat mapping, and wetland delineation on a 240-acre site being considered for a mitigation bank. *Client: City of Fairfield.*
- **YOLO RANCH WETLAND RESTORATION. Southwestern Yolo County, CA.** Rare plant and large branchiopod survey and wetland delineation on this 2,300-acre property, which is being proposed for tidal wetland restoration by the State and Federal Contractors Wager Agency. *Client: Wetlands and Water Resources.*
- **SOLANO COUNTY WATER AGENCY HCP SURVEYS. Solano County, CA.** Rare vernal pool plant and California tiger salamander surveys on more than 2,000 acres in support of a regional Habitat Conservation Plan. *Client: Solano County Water Agency.*

## CENTRAL VALLEY

- **STILLWATER PLAINS MITIGATION BANK. Shasta County, CA.** Rare plant surveys and floristic inventories within created and preserved vernal pools on a 1000-acre mitigation bank. *Client: Helm Biological Consulting.*
- **DALES PLAIN MITIGATION PRESERVE SURVEYS. Dales Plain, Tehama County, CA.** Status surveys of *Paronychia ahartii* within a mitigation preserve established for a PG&E pipeline project. Original regional special-status plant surveys conducted by John Vollmar in the 1990s. *Client: Carol Witham.*
- **BUCKEYE MITIGATION BANK. Western Amador County, CA.** Vernal pool and riparian habitat restoration planning for proposed 500-acre mitigation bank. *Client: Amador Ranch, LLC.*
- **DEL WEBB/SAGE MORGAN PROJECT. Tehama County, CA.** Rare plant, large branchiopod, western spadefoot surveys, and perennial bunchgrass mapping on two development sites totaling 3,300 acres with grasslands, oak woodlands, and vernal pools. *Client: Impact Sciences.*
- **MOUNTAIN VIEW PROJECT. Red Bluff, Tehama County, CA.** Rare plant and amphibian surveys on a 300-acre proposed development site. *Client: Impact Sciences, Inc.*

- **AMERICAN RIVER PARKWAY PROJECT. Sacramento, CA.** Habitat and noxious weed mapping along the American River Parkway. *Client: Robison Consulting.*
- **ENVIRONMENTAL STEWARDSHIP FOUNDATION PRESERVE MONITORING PROJECT. Placer, Sacramento, and El Dorado Counties, CA.** Long-term biological monitoring and management recommendations on thirteen riparian and vernal pool grassland preserves. *Client: Environmental Stewardship Foundation.*
- **SHERIDAN PROPERTY ASSESSMENT. East San Joaquin County, CA.** Vernal pool and stream corridor mapping, rare plant, large branchiopod and California tiger salamander habitat assessments for a 1,000-acre proposed mixed use housing and vineyard development site. *Client: Merced Partners Limited.*
- **PLACER LAND TRUST SMALL VERNAL POOL PRESERVE STUDY. Central Valley (several counties), CA.** Conducted a study quantifying the long-term effectiveness of small vernal pool preserves (60 acres or less) for protection and conservation of sensitive species. Published as a white paper for use by agencies and others involved in vernal pool mitigation and management. *Client: Placer Land Trust.*
- **MERCED COUNTY REGIONAL CONSERVATION PLANNING PROJECT. Eastern Merced County, CA.** Rare plant and wildlife surveys targeting more than 40 special-status species on 45,000 acres of vernal pool grasslands. *Client: CDFW/Merced County Planning Department.*
- **LAKEVIEW ESTATES PROJECT. Snelling, Merced County, CA.** California tiger salamander, large branchiopod, and rare plant surveys, habitat mapping, elderberry bush and oak tree inventory, wetland delineation, environmental permitting, on-site mitigation preserve establishment and monitoring for a 59-acre residential subdivision project. *Client: Lakeview Estates Partnership.*
- **BEALE AIR FORCE BASE LARGE BRANCHIOPOD SURVEYS. Yuba County, CA.** Protocol wet season surveys for listed large branchiopods within 300 pools on the air force base. *Client: EDAW.*
- **CALTRANS MITIGATION BANK PROJECT. Eastern Madera County, CA.** Rare plant, California tiger salamander, western spadefoot and large branchiopod surveys, wetland delineation, wetland design and creation, establishment of a mitigation bank on a 200-acre property for Caltrans. *Client: Caltrans, Fresno Office.*

## COAST RANGES

- **ATT FIBER OPTIC PROJECT. Lake and Mendocino Counties, CA.** Rare plant surveys along a proposed fiber optic corridor. *Client: May Consulting Services.*
- **SNOW'S LAKE WETLAND ENHANCEMENT PROJECT. Clear Lake, Lake County, CA.** Rare plant and large branchiopod surveys, vegetation mapping and hydrologic assessments for a wetland and watershed enhancement project. *Client: Esperanza Ranches.*
- **WALKER RIDGE WIND TURBINE PROJECT. Colusa and Lake Counties, CA.** Rare plant surveys and vegetation mapping over two seasons on 8,100-acre property owned and managed by the Bureau of Land Management. The project site is being considered as a wind energy resource area. *Client: Ecology and Environment, Inc.*
- **FOSS CREEK RIPARIAN ASSESSMENT. Healdsburg, Sonoma County, CA.** Assessment of riparian habitat within a proposed development site. *Client: Zitney and Associates.*
- **SKYLAWN MEMORIAL PARK. Western San Mateo County, CA.** Rare plant surveys and wetland delineation on a 200-acre project site being considered for cemetery expansion. The site is located along a ridge top separating San Mateo and Half Moon Bay and is dominated by northern coastal scrub and Douglas fir forest habitats. *Client: Pacific Biology.*
- **CLOVERDALE COASTAL RANCHES POND MANAGEMENT PLAN. Coastal San Mateo County, CA.** Aquatic invertebrate and amphibian surveys, vegetation assessments,

- development of a pond management plan for 30 ponds supporting San Francisco garter snake and California red-legged frog on a 6,000-acre ranch. *Client: Peninsula Open Space Trust.*
- **CRYSTAL SPRINGS RESERVOIR PROJECT. San Mateo County, CA.** Wetland delineation and rare species surveys for a dredging project. *Client: Wetlands and Water Resources.*
  - **ARROYO CREEK HCP PROJECT. Santa Maria, San Luis Obispo County, CA.** Vegetation mapping and rare plant surveys along Arroyo Creek in support of a California red-legged frog/steelhead HCP. *Client: Ibis Environmental Consulting.*
  - **DEER VALLEY RANCH BCR. Monterey County, CA.** Habitat assessment, existing conditions mapping and reporting on approximately 11,000-acre ranch, which is being converted to a conservation easement. One of many ranches in the Coast Ranges surveyed by VNLC for the California Rangeland Trust. *Client: California Rangeland Trust.*
  - **FRENCH RANCH HABITAT ASSESSMENT. Santa Clara, Merced, San Benito Counties, CA.** Adult California red-legged frog survey and habitat assessment for 13,000-acre ranch seeking mitigation funds for conserving habitat. *Client: Center for Natural Lands Management.*

## SIERRA NEVADA/CASCADES/GREAT BASIN/ MOJAVE DESERT

- **HORSESHOE RANCH STATE WILDLIFE AREA MANAGEMENT PLAN UPDATE. Siskiyou County, CA.** Vegetation mapping, rare plant surveys and bird surveys, noxious weed mapping, update of an existing management plan for a 5,000-acre State Wildlife Area. *Client: California Department of Fish and Wildlife.*
- **HONEY LAKE STATE WILDLIFE AREA MANAGEMENT PLAN UPDATE. Eastern Lassen County, CA.** Vegetation mapping, rare plant surveys and bird surveys, noxious weed mapping, update of an existing management plan for a 5,000-acre State Wildlife Area. *Client: California Department of Fish and Wildlife.*
- **LIGHTS CREEK BOTANICAL SURVEYS. Lassen County, CA.** Rare plant, sensitive habitat, and noxious weed surveys on nearly 10,000 acres within Diamond Peak region. *Client: U.S. Forest Service, Sierra-Cascade Province.*
- **PLUMAS NATIONAL FOREST OHV ROUTE DESIGNATION PROJECT. Plumas and Sierra Counties, CA.** Rare plant and invasive plant species surveys on 161 miles of proposed OHV routes and 57 proposed OHV staging areas on the Mt. Hough and Beckwourth Ranger Districts. *Client: Plumas National Forest.*
- **AMADOR CANAL PRESERVATION PROJECT. Amador County, CA.** Vegetation surveys and wetland assessments along the historic Amador Canal. *Client: Alnus Ecological Consulting.*
- **NEW YORK RANCH RESERVOIR. Amador County, CA.** Rare plant and vegetation surveys on 300-acre site which is under consideration as a conservation easement. *Client: Alnus Ecological Consulting.*
- **TRUCKEE REGIONAL PARK PROJECT. Truckee, Nevada County, CA.** Habitat assessment for willow flycatcher and Tahoe yellow cress within Truckee Regional Park. *Client: West Environmental Services and Technology.*
- **SADDLE CREEK WETLAND MONITORING PROJECT. Copperopolis, Calaveras County, CA.** Plant surveys and vegetation monitoring surveys within created perennial and seasonal wetlands as part of a long-term mitigation monitoring project. *Client: Saddle Creek Development Group.*
- **LITTLE JOHN ROAD EXTENSION PROJECT. Calaveras County, CA.** Rare plant surveys, habitat mapping and wetland delineation along a 5-mile road extension corridor. *Client: Sierra Engineering.*
- **TEJON MOUNTAIN VILLAGE PROJECT. Western Tehachapi Range, Kern County, CA.** Rare plant surveys and plant community mapping within a 38,000-acre proposed new town development site. *Client: Tejon Ranch/Impact Sciences, Inc.*

- **CENTENNIAL SPECIFIC PLAN PROJECT. Western Mojave Desert, Los Angeles County, CA.** Rare plant surveys, perennial bunchgrass/wildflower field habitat assessment on an 11,000-acre proposed new town development site. *Client: Tejon Ranch/Impact Sciences, Inc.*
- **LONGVIEW SOLAR PROJECT. Western Mojave Desert, Los Angeles County, CA.** Rare plant surveys and habitat mapping on 300-acre proposed solar energy development project. *Client: Ecology and Environment, Inc.*

