Administrative Draft

Habitat Management Plan
Lake Hodges/San Pasqual Valley Open Space

Prepared for

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1.0 INTRODUCTION

1.1 PURPOSE OF THE MANAGEMENT AND MONITORING PLAN

The Lake Hodges/San Pasqual Valley open space is owned by the City of San Diego and serves as a major core resource area of the Multiple Species Conservation Program (MSCP) preserve system (Figure 1). The MSCP is a subregional conservation plan prepared under California's Natural Community Conservation Planning (NCCP) program. The goals of the MSCP are to conserve native vegetation communities and rare, threatened, and endangered species and to protect the overall biodiversity of the region. The MSCP requires that a habitat management and monitoring plan be prepared for all conserved lands that includes area-specific directives for the land and the species it supports, especially species listed as "covered" under the take authorizations of the MSCP. Implementation of the management plan must be adaptive to respond to changing conditions on the preserve. This management plan does not cover City of San Diego-owned lands in Boden Canyon or those lands bordering the San Diego Wild Animal Park that are leased to the San Diego Zoological Society.

Under the MSCP Plan, each preserve unit must be managed to maintain and enhance habitat for covered species and other natural communities within the preserve. The MSCP goal is to manage the preserve by allowing natural ecological processes to continue with minimal impact from humans. This requires the preserve manager to know the locations and condition of various resources in the open space at all times and to understand how natural environmental processes, management practices, and land uses affect these resources. The preserve manager will be identified at the time the land is conserved. However, we do not currently have a good understanding of the natural fluctuations of the resources in the open space and how they respond to disturbances such as fire, potential management actions, and adjacent land uses. Therefore, this plan and its implementation must evolve with our understanding of the resources and their responses to various environmental and man-induced conditions (i.e., the management plan must be adaptive).

1.2 HISTORY OF THE PROPERTY

The San Pasqual Valley has been inhabited by humans for thousands of years, first by indigenous peoples and later by Mexican and American settlers. Agricultural operations in the valley began to expand beyond subsistence farming in the late 1870s (Rustvold 1968). Lake Hodges was constructed in 1917-1918 by the San Dieguito Mutual Water Company (later replaced by the San Dieguito Water Company). In 1925, the City of San Diego leased the San Dieguito Water Company system, consisting of Lake Hodges and its reservoir lands in the San Pasqual Valley, and purchased it in 1939 (Fowler 1953). The City of San Diego acquired the majority of the land in San Pasqual Valley from private landowners between 1958 and 1959 (Rustvold 1968) and has designated the San Pasqual Valley as an agricultural preserve. Approximately 40% (4,400 acres) of the

City-owned land in the San Pasqual Valley Community Planning Area is in agricultural land uses (City of San Diego 1995).

In 1997, the City adopted the MSCP, which identified lands around Lake Hodges and in the San Pasqual Valley as part of the City's Multi-Habitat Planning Area (MHPA). The MHPA is the portion of the MSCP planning area within which conservation and management will occur. The City-owned lands in the San Dieguito River watershed are surrounded by other publicly owned lands, other conserved lands, and lands in other jurisdictions that are the subject of ongoing NCCP planning efforts.

1.3 Description of the Property/MSCP SIGNIFICANCE

The Lake Hodges/San Pasqual Valley open space is approximately 9,036 acres in size and is located in the northernmost portion of the City of San Diego, approximately 26 miles from downtown San Diego. Lake Hodges is located approximately 10 miles from the coast, and the preserve extends about 15 miles upstream along the course of the San Dieguito River and Santa Ysabel Creek (Figures 1 and 2).

The bulk of the Lake Hodges/San Pasqual Valley open space is designated as 90-95% conserved in the MSCP, with parcels adjacent to Cloverdale Creek and southeast of the "Narrows" designated as 70-75% conserved (City of San Diego 1998). The City-owned land around Lake Hodges and in the San Dieguito River Valley upstream to the Narrows (approximately 3,400 acres) is part of the Lake Hodges Cornerstone Lands Segment Area. The MSCP Cornerstone Lands are City Water Department-owned lands that were used as primary building blocks for creating the MSCP preserve system (City of San Diego 1997a). Per the Cornerstone Lands Mitigation Bank Agreement (City of San Diego 1997b), the City's Cornerstone Lands will be established as mitigation banks, with conservation easements conveyed for each Cornerstone Segment Area when the credits for that Segment Area of the Cornerstone Lands Mitigation Bank are converted for sale. The Cornerstone Lands Mitigation Bank Agreement was developed to comply with San Diego City Charter requirements for the use and disposition of Water Utility assets, which requires that the Water Department be compensated for any title restrictions placed on the Cornerstone lands and for any financial burdens that do not directly benefit the City's water utility rate payers (City of San Diego 1997a). The parties to the Agreement include the City of San Diego, California Department of Fish and Game, and U.S. Fish and Wildlife Service.

The Lake Hodges Cornerstone Lands are currently designated as the Phase 2 Segment Area of the Cornerstone Lands Agreement (City of San Diego 1997b). This means that the Lake Hodges Cornerstone mitigation bank will be opened and conservation easements will be conveyed afeeter sufficient credits in the Phase 1 Segment Area (Marron Valley) are sold to fund management activities. However, the Cornerstone Lands Agreement stipulates that the order of the Phase 2 and Phase 3 (Otay Reservoirs) Segment Areas can be reversed with the mutual consent of the parties to the Agreement (City of San Diego 1997b). The sale of mitigation credits for the Cornerstone Lands is

intended to provide an endowment for the costs of managing the respective Cornerstone Segment Areas. Thus, complete implementation of the management plan in the Lake Hodges Cornerstone Lands is not required until the mitigation credits for the Lake Hodges Segment Area are sold.

The remaining portion of the Lake Hodges/San Pasqual Valley open space upstream of the Narrows will be conserved when current leases on City-owned land in the MHPA expire or when mitigation credits are sold. As City lease lands are primarily in the floodplain, aquatic and riparian habitats will be conserved and managed as leases are renewed. Appendix A includes a map of lease holdings and lease expiration dates. The remaining upland areas of the MHPA will be conserved to offset take of habitat outside of the MHPA and managed at the time they are conserved.

1.4 MSCP OBLIGATIONS

The Lake Hodges/San Pasqual Valley open space supports a rich diversity of regionally sensitive habitats and species. The San Dieguito River and Lake Hodges are prominent features in the area. The conserved lands form one of the largest contiguous blocks of habitat in the MSCP and provide connections to habitat in adjacent planning areas (i.e., Multiple Habitat Conservation Program and North County MSCP Subarea).

Significant management targets in the Lake Hodges/San Pasqual Valley open space include:

- Coastal sage scrub supporting core breeding populations of coastal cactus wrens and California gnatcatchers, rufous-crowned sparrows, orange-throated whiptails, and San Diego horned lizards.
- Stream and riparian systems supporting high numbers of breeding arroyo southwestern toads and least Bell's vireos.
- Twenty-one recorded species of raptors that utilize the conserved habitats for foraging and breeding, including recent nesting sites and foraging territories of golden eagles.
- Significant populations of Encinitas baccharis and wart-stemmed ceanothus.

2.0 COORDINATING ORGANIZATIONS AND APPLICABLE PLANS

2.1 CITY WATER DEPARTMENT

Lake Hodges serves as one of the City's water supply reservoirs. As the primary landowner in San Pasqual Valley (Figure 2), the City of San Diego Water Department is responsible for ensuring that there is a high quality drinking water supply for City of San Diego residents. Much of the land owned by the Water Department has the potential to influence the quantity and quality of source water that reaches Lake Hodges. The Water Department is responsible for managing these watershed lands and the groundwater basin to meet their water supply objectives. The Water Department leases land in the valley for agricultural uses. These leased lands are managed by the Real Estate Assets Department for the Water Department.

2.2 CITY MSCP DIVISION

The City of San Diego's MSCP Division of the Department of Planning and Development Review is focused on reviewing project proposals for consistency with the MSCP and other applicable City ordinances and land use regulations. The MSCP Division also administers the biological monitoring program for the MSCP and coordinates with the City Park and Recreation Department on management activities related to covered species. The MSCP Division also supervised the development of this management plan.

2.3 CITY PARK AND RECREATION DEPARTMENT

The Park and Recreation Department is responsible for tasks such as trash removal, maintenance of physical structures (e.g., fences, signs, and trails), natural resource management, and brush management. Additionally, the Park and Recreation Department provides park rangers whose primary responsibilities include enforcement of City and state regulations, overseeing small enhancement and restoration efforts, interpretive activities, and coordination of volunteers. These latter activities will be coordinated with the San Dieguito River Park ranger staff.

2.4 SAN DIEGUITO RIVER PARK JOINT POWERS AUTHORITY

The San Dieguito River Park Joint Powers Authority (JPA) plans and maintains the San Dieguito River Park. The Focused Planning Area (FPA) for the River Park includes the viewshed of the San Dieguito River Valley, its major tributary canyons, and a high desert linkage to Anza Borrego State Park. The member agencies of the JPA include the County of San Diego and the Cities of Del Mar, Escondido, Poway, San Diego, and Solana Beach. These member agencies have empowered the JPA to acquire, hold, and dispose of property for park purposes and to plan, design, improve, operate, manage, and

maintain the San Dieguito River Park. The JPA is further empowered to establish land use and development guidelines for the park's FPA. Following are the goals included in the Joint Powers Agreement adopted by the JPA's member agencies (San Dieguito River Park JPA 2002):

- Preserve and restore land within the FPA of the San Dieguito River Park as a regional open space greenway and park system that protects natural waterways, natural and cultural resources, and sensitive lands and provides compatible recreational opportunities, including water-related uses, that do not damage sensitive lands;
- Provide a continuous and coordinated system of conserved lands with a connecting corridor of walking, equestrian, and bicycle trails, encompassing the San Dieguito River Valley from the ocean to the river's source.
- Use public land only for the benefit of the public and for uses consistent with the goals of the park.

The JPA park rangers are responsible for trail maintenance and construction, nonnative species control, habitat restoration, habitat monitoring, cultural resources protection, education, and enforcement. Other JPA staff, contract staff, and volunteers assist in these activities. The JPA also has volunteer docents that lead interpretive walks. JPA park rangers have no citation or arrest authority, and they rely on the "Authority of the Resource" technique (explaining the reasons for the rule to rule violators) to address most enforcement problems. They rely on the San Diego Police Department, Animal Control Department, or the City of San Diego Water Department to resolve issues that are beyond their capaCity.

2.5 SAN DIEGUITO RIVER VALLEY CONSERVANCY

The San Dieguito River Valley Conservancy, formed in 1986, is a private, nonprofit organization with more than 1,500 members. The conservancy is governed by a 15-member citizen board of directors. The conservancy collaborates with the JPA to acquire lands in the San Dieguito River Park. In addition to fund-raising for acquisition, the conservancy provides environmental education programs and works cooperatively with landowners in the river valley to protect natural resources. The conservancy also strives to raise public understanding of and support for the river park and resource protection in the San Dieguito River Valley. The conservancy does not manage land but rather relies on the JPA or, by agreement, another appropriate entity (e.g., City of San Diego).

2.6 SAN DIEGO WEED MANAGEMENT AREA

The San Diego Weed Management Area was formed in November 2000 in response to the increasing threat of invasive nonnative plant species, particularly perennial pepperweed (*Lepidium latifolium*). The San Diego Weed Management Area is modeled afeeter other community-based weed management programs supported by the California

Department of Food and Agriculture (CDFA). The CDFA funded the 3-year start-up period of the San Diego Weed Management Area. The Lake Hodges/San Pasqual Valley open space has been a focus of the San Diego Weed Management Area, which was recently awarded a grant from the California Department of Parks and Recreation to conduct perennial pepperweed control efforts in San Pasqual Valley. The majority of these control efforts will take place on City of San Diego land.

The San Diego Weed Management Area is comprised of stakeholders that cooperatively develop action plans for weed problems. The stakeholders include: Natural Resources Conservation Service, U.S. Fish and Wildlife Service (USFWS), U.S. Army Corps of Engineers, Bureau of Land Management, CDFA, California Exotic Pest Plant Council, California Department of Fish and Game (CDFG), California Department of Transportation (Caltrans), County of San Diego, City of San Diego, San Dieguito River Park JPA, San Diego Regional Water Quality Control Board (RWQCB), San Diego Farm Bureau, Audubon Society, San Diego County Cattleman's Association, Sierra Club, U.C. Cooperative Extension, California Native Plant Society (CNPS), Mission Resource Conservation District, and private property owners. The San Diego Weed Management Area became an official body once a minimum of two of these stakeholders signed the San Diego Weed Management Area's Memorandum of Understanding (MOU). To date, the City of San Diego has not signed the MOU but has been cooperating with the San Diego Weed Management Area. Although not all of the stakeholders have signed the MOU, the San Diego Weed Management Area is an official body and has the support of all of the stakeholders. A steering committee determines the direction and priorities of the group.

2.7 APPLICABLE PLANS

2.7.1 San Pasqual Valley Plan

The San Pasqual Valley Plan (City of San Diego 1995) is the City of San Diego's adopted statement of policy for growth, development, and conservation of the San Pasqual Valley Planning Area over a 10-15 time frame. The plan describes a course of action considered to be advantageous to the City as a whole. The plan is designed to influence and determine decisions regarding land use and development of land within the valley, as well as management of sensitive resources, and identifies how implementation of the plan will affect public services and facilities such as roads and safety. The plan is divided into two parts: (1) goals, policies, and specific proposals, and (2) a land use map depicting land use designations (scale: 1 inch = 800 feet).

The development of the updated San Pasqual Valley Plan was a cooperative effort involving the San Pasqual Valley-Lake Hodges Planning Group, the Agricultural Advisory Board, the City of San Diego Planning Department, and other City departments and government agencies. The vision of the San Pasqual Valley anticipated by the plan is a pattern of land uses that are compatible with the needs of the region as a whole and will ensure that:

- Water quality and quantity will be optimized within the aquifers and Hodges Reservoir.
- The rural character of the valley will be preserved in part through the retention of agriculture.
- Riparian and sensitive upland habitats will be preserved.
- Sand resources will be preserved and, where feasible, utilized.
- An open space park will be created that provides recreational opportunities for the San Diego region that are compatible with agricultural and habitat preservation.
- Very limited sites at the edge of the plan area will be developed for visitor uses that generate revenue for the City while still maintaining the valley's rural character.

2.7.2 City of San Diego Multiple Species Conservation Program Subarea Plan

The City of San Diego's Subarea Plan (1997a) is part of the multi-jurisdictional MSCP Plan (City of San Diego 1998), which allows participating jurisdictions to maintain development flexibility by proactively planning a regional preserve system. The program focuses on conservation and management of functional habitats rather than addressing species-by-species conservation needs. The MSCP meets the requirements of the NCCP Act of 1992. The City's MSCP Subarea Plan forms the basis for the Implementing Agreement that is the contract between the City and the wildlife agencies (i.e., CDFG and USFWS). The City cooperated with the wildlife agencies, property owners, developers, and environmental groups in developing the City of San Diego MHPA.

The City of San Diego's Subarea Plan encompasses 206,124 acres within the MSCP planning area. The City's MHPA is approximately 56,8031 acres and includes approximately 47,910 acres within City jurisdiction. Approximately 90% of the MHPA lands (52,012 acres) within the City's subarea will be preserved. The subarea is divided into five areas: Southern, Eastern, Urban, Northern, and the Cornerstone Lands and San Pasqual Valley. The Cornerstone Lands include Lake Hodges to the Narrows, San Vicente Reservoir, Otay Lakes, and Marron Valley.

2.7.3 Proposed San Pasqual Vision Plan

San Diego City Councilmember Brian Maienschein developed a proposed San Pasqual Vision Plan (Maienschein 2003) that sets forth a comprehensive vision for the San Pasqual Valley. The plan recognizes the open space and habitat values, groundwater resources, sustainable agricultural opportunities, cultural and historic resources, and outdoor recreational opportunities present in the San Pasqual Valley and the responsibility of the City to manage these lands. The plan outlines ten specific goals to be achieved in the San Pasqual Valley and proposes actions to accomplish the goals. The goals are:

1. Establish a prohibition of any further commercialization of the Valley—to prevent any loss of open space in the Valley and to clearly establish the intention that the valley is not available for development;
2. Tailor zoning within the Valley to ensure the preservation of the Valley's existing rural character and to encourage appropriate land uses—to put in place regulations to achieve the intended preservation;
3. Protect the quality and capacity of the San Pasqual/Lake Hodges groundwater basin—to ensure that this invaluable asset as a water resource is not compromised;
4. Protect, enhance, and restore the sensitive habitats within San Pasqual Valley;
5. Promote passive recreation and interpretive uses in the Valley—to allow citizens and residents to learn about the Valley's heritage and enjoy its beauty;
6. Preserve, promote, and sustain agricultural uses—to make certain that San Diego's only agricultural area remains viable;
7. Through collaborative partnerships, build consensus among the adjacent jurisdictions and any other entities with an interest in this area on how best to preserve the qualities and resources of the San Pasqual Valley—to gain commitment form neighboring cities that preservation of the Valley's agricultural and rural character is a regional priority;
8. Establish an interpretive center in the San Pasqual Valley—to provide a place for visitors to learn about the Valley's history and plan activities to enjoy;
9. Inform the San Pasqual/Lake Hodges Community Planning Group and the Ranch Bernardo Community Planning Board of all planning and land use issues that pertain to the San Pasqual Valley area—to ensure that the local residents with an interest and passion for preserving the Valley are aware of any plans which may affect the use of land within the Valley; and
10. Ensure the long-term protection of the Valley's unique agricultural, biological, and water resources—to continually pursue the best protection of the Valley available.

2.7.4 San Dieguito River Park Concept Plan

The San Dieguito River Park Concept Plan has been prepared to formally establish the vision and goals for the future uses of the San Dieguito River Valley. Implementation of the proposals included in this plan by the San Dieguito River Valley Regional Open Space Park JPA and its member agencies will ensure the preservation and protection of the sensitive resources within the San Dieguito River Valley Regional Open Space Park's FPA. All future proposals within the planning area should be consistent with the goals, objectives, and development standards set forth in this plan.

The San Dieguito River Valley Regional Open Space Park planning effort was initiated to ensure the preservation of the San Dieguito River Valley's sensitive resources, rural character, and visual quality and to provide the concept or "framework" for the creation of future open space recreational amenities within the FPA. The FPA incorporates the entire viewshed of the river valley, its major tributary canyons, and a high desert linkage to Anza Borrego State Park. The concept plan is the initial component of the planning process for the San Dieguito River Park and the FPA as a whole. It is intended that the JPA's member agencies adopt the concept plan or incorporate the goals and recommendations of the plan into their general plans, local coastal plans, and other appropriate planning documents, and adopt design guidelines or standards similar to those provided in the concept plan for all future development within the FPA. Subsequent to the adoption of the concept plan, detailed master plans will be prepared for the individual planning units within the FPA (referred to as "landscape units"). These future master plans will establish policies for the restoration, enhancement, and management of sensitive resources; address park maintenance and management policies; propose specific park amenities such as trails, staging areas, and interpretive facilities; and further define the design and development standards for all activities (public or private) within the FPA. Four landscape units are included within the study area, including Landscape Unit F—Lake Hodges, Landscape Unit G—East Lake Hodges, Landscape Unit H—San Pasqual Valley, and Landscape Unit I—Clevenger Canyon.

3.0 EXISTING CONDITIONS

3.1 GEOGRAPHICAL SETTING AND TOPOGRAPHY

Lake Hodges and the San Pasqual Valley are located within the San Dieguito River Valley. The headwaters of the San Dieguito River watershed (Santa Ysabel Creek) originate on Volcan Mountain, approximately 30 miles from the Lake Hodges dam. Santa Ysabel Creek flows through the San Pasqual Valley and, at the confluence with Santa Maria Creek, becomes the San Dieguito River (Figure 2). The San Dieguito River empties into the San Dieguito Lagoon.

The Lake Hodges/San Pasqual Valley open space has gently sloping topography along the valley floor and steep, rugged topography in the adjacent hills. Elevations range from 180 feet mean sea level (msl) in the river channel below the Lake Hodges spillway to approximately 1,800 feet msl on the slopes at the eastern end of the open space. The Lake Hodges spillway is at an elevation of 314 feet msl.

Several tributary canyons cross the open space, including Sycamore Canyon, Cloverdale Canyon, Rockwood Canyon, Bandy Canyon, Schoolhouse Canyon, and Clevenger Canyon. Several notable mountain peaks surround the study area: Bernardo Mountain (1,150 feet) on the north shore of Lake Hodges, Battle Mountain (803 feet) south of the lake, Cranes Peak (1,054 feet) at the east end of San Pasqual Valley, and Starvation Mountain (2,140 feet) south of San Pasqual Valley and Highland Valley (Figure 2).

3.2 OPEN SPACE BOUNDARIES AND ADJACENT LAND USE

The boundaries of the Lake Hodges/San Pasqual Valley open space are shown in Figures 2 and 3. However, where owned by the City of San Diego, the area of Lake Hodges and the dam, including the shoreline area within 300 feet horizontally from the spillway elevation (315 feet msl), are excluded from the MHPA for water quality protection, as are employee residences on the western shore of Lake Hodges (City of San Diego 1997a). Various other exclusions are described in the City's Subarea Plan (1997a).

The open space is bordered on the west and east by unincorporated portions of the County of San Diego, on the north by the City of Escondido, and on the south by the City of Poway. Land uses in the vicinity of the open space consist of urban and rural residential development, intensive agriculture (row crops and citrus), ostrich farms, horse stables, dairies, vineyards, cattle grazing, and designated open space (Figure 3).

3.3 Soils

Fifeeteen soil series or formations are present in the open space (Figure 4). Soil series are described with respect to general structure and qualities, parental material, and onsite location based on information in USDA-SCS (1973). Very small amounts of five other

soils series (Grangeville series, Rough broken land, Steep gullied land, Stony land, and Wyman series) occur in the open space but are not discussed below.

Bonsall Series (B1C, B1C2). The Bonsall series consists of moderately well drained, shallow to moderately deep sandy loams that have a heavy clay subsoil. Bonsall soils in the preserve occur in areas of 2-15% slopes. Eroded soils are cut by shallow gullies. The Bonsall soils are uncommon in the open space and are located at the top of the knoll in the Bernardo Bay Natural Area, east of Bernardo Bay.

Chino Series (CkA). Chino soils are moderately well drained fine silty loams derived mainly from granitic alluvium. The fertility of these soils is high, runoff is very slow, and erosion potential is slight. These soils occur in the floodplain at the upper end of Lake Hodges (the area under the lake has not been mapped), on 0-2% slopes. The soils in this area are characterized as slightly saline.

Cieneba Series (ClE2, C1D2, C1G2, CmE2, CmrG, CnE2, CnG2). Cieneba soils include excessively drained, shallow coarse sandy loams. These soils formed in material weathered in place from granitic rock, and occur in gently sloping to steeper upland areas. Cieneba soils occur in areas of 5-65% slopes. All the soils in this series are represented in the preserve, including the Cieneba-Fallbrook soils (CnE2 and CnG2). These soils are characterized by low fertility, rapid permeability, medium to rapid runoff, and moderate to high soil erosion. Sheet and gully erosion may be evident. Cieneba soils are very common in the open space. They are the dominant soil type on the slopes upstream of Lake Hodges and in smaller areas around the lake.

Escondido Series (EsD2). The Escondido series consists of moderately deep to deep, well-drained very fine sandy loams that formed in material weathered in place from metamorphosed sandstone. Escondido soil is uncommon in the open space and occurs on 9-15% slopes in the Bernardo Bay Natural Area. Fertility of this soil is medium, runoff is medium, and erosion potential is moderate.

Exchequer Series (ExG). Exchequer soils consist of shallow, well-drained silt loams that formed in material weathered from hard metabasic rock. Fertility of this series is low, runoff is rapid, and erosion hazard is high to very high. This soil is uncommon in the open space, found on 30-70% slopes in a small area between the lake shore and Del Dios Highway.

Fallbrook Series (FeC, FeE, FeE2, FaE2, FaC, FaC2, FaD2, FaE3, FvE). The Fallbrook series consists of well-drained moderately deep to deep sandy loams that formed in material weathered in place from granodiorite. The soils occur on 5-30% slopes. Fallbrook soils predominantly occur in the eastern portion of the open space, adjacent to upland areas of Cieneba soils. They are also scattered through small areas in the western portion of the open space.

Friant Series (FxG, FxE). The Friant series consists of shallow, well-drained fine sandy loams that formed in material weathered from fine-grained metasedimentary rock. Rock outcrops cover 2-10% of the soil. They occur on 9-70% slopes in the preserve, in small areas on either side of the lake near Bernardo Bay.

Las Posas Series (LrG, LrE). Las Posas soils are characterized as well-drained, moderately deep stony fine sandy loams that have a clay subsoil. They formed in material weathered from basic igneous rocks and have a deeply weathered gabbro substratum. Fertility is medium, runoff is rapid, and erosion potential is high. In the open space they occur north of the lake on 9-65% slopes.

Placentia Series (PeC, PeC2, PeD2, PfC). The Placentia series consists of moderately well-drained sandy loams that have a sandy clay subsoil. They are formed in granitic alluvium on old alluvial fans. Fertility is low to medium, runoff is slow to medium, and erosion potential is moderate. They are relatively uncommon in the open space, occurring around the margins of the lake and in lower San Pasqual Valley on 2-15% slopes.

Ramona Series (RcE, RcD, RaB, RaC2, RaD2). Ramona soils are well-drained, very deep sand loams that have a clay loam subsoil. They formed in granitic alluvium on terraces and alluvial fans. Runoff is slow to rapid, and erosion potential is slight to high, depending on slope. Fertility is medium. In the preserve, Ramona soils occur adjacent to the San Dieguito River Valley, from the eastern end of San Pasqual Valley to the northern end of Lake Hodges, on 2-30% slopes.

Riverwash (Rm). Riverwash soils occur in intermittent stream channels. The material is typically sandy, gravelly, or cobbly. It is excessively drained and rapidly permeable. In the open space, Riverwash soils occur along Santa Ysabel Creek, Santa Maria Creek, and San Dieguito River.

San Miguel Series (SmE, SnG). The San Miguel series includes well-drained, shallow to moderately deep silt loams with a clay subsoil. These soils are derived from metavolcanic rock and occur in relatively steep upland areas. Rock outcrops cover about 10% of the soil surface. In the open space, this series includes San Miguel-Exchequer rocky silt loam. The San Miguel component of this association is slowly permeable in the subsoil layer, whereas Exchequer silt loam is moderately permeable. Overall, soil fertility is very low, drainage is good, runoff is medium to rapid, and erosion potential is moderate to very high. These soils occur in the western portion of the open space, primarily along the southwestern and western edges of Lake Hodges.

Tujunga Series (TuB). Deep, excessively drained sands derived from granitic alluvium characterize the Tujunga series. These soils occur on relatively flat alluvial fans and floodplains. Soil fertility is low, permeability is very rapid, runoff is very slow to slow, and the erosion hazard is slight. In addition, Tujunga soils are subject to short periods of

flooding. This soil is found in the floodplain along Santa Ysabel Creek and San Dieguito River downstream to nearly the high-water mark of the lake.

Visalia Series (VaA, VaB, VaC, VaD). The Visalia series includes moderately well-drained, very deep sandy loams derived from granitic alluvium. These soils occur on relatively flat portions of alluvial fans and floodplains. Visalia gravelly sand loams occur adjacent to Santa Ysabel Creek, San Dieguito River, and in Cloverdale Canyon. Runoff is slow on these soils, and the erosion hazard is slight. Where this type occurs on slightly steeper slopes (5-15% slopes), runoff is slow to medium and there is an increase in the erosion hazard. The majority of the Visalia soils in the vicinity of the open space support agriculture.

Vista Series (VsE, VsE2, VsC, VsD, VsD2, VvE, VvD). Vista soils are well-drained, moderately deep and deep coarse sandy loams, derived from granodiorite or quartz diorite. The fertility of these soils is medium, runoff is medium to rapid, and erosion potential is moderate to high. Vista soils are scattered throughout the open space on 9-30% slopes.

3.4 CLIMATE

The climate in the Lake Hodges and San Pasqual Valley region is characterized by warm, generally dry summers and cool, wet winters, with substantial year-to-year variations in temperature and precipitation. Temperatures in the San Pasqual Valley are relatively moderate because of its connection to the coast via the San Dieguito River Valley. Temperature and rainfall records from the San Diego Wild Animal Park weather station, located in the San Pasqual Valley (elevation 420 feet), are used to characterize the climate in the open space. The period of record at the San Diego Wild Animal Park station is July 1, 1979, to April 30, 2002.

Monthly average maximum temperatures at the San Diego Wild Animal Park station range from 58.0°F in December to 79.8°F in August. Monthly average minimum temperatures vary from 50.7°F in December to 73.1°F in August.

Annual average rainfall at the San Diego Wild Animal Park station for the period of record is 13.8 inches. Monthly average rainfall totals at the San Diego Wild Animal Park station range from a high of 3.1 inches in February to a low of 0.07 inch in August. The majority of rainfall (approximately 93%) occurs during the period from November to April and is associated with Pacific storms generated in the Gulf of Alaska. The San Pasqual Valley itself receives a small amount of summer monsoonal precipitation originating from the tropical Pacific and Gulf of Mexico; the upper portion of the San Dieguito River watershed likely receives a greater proportion of summer monsoonal precipitation. The total recorded rainfall at the San Diego Wild Animal Park station during the period July 1, 2001, to April 30, 2002, was 5.18 inches, and 2.95 inches of that total fell in November and December 2001.

3.5 HYDROLOGY

The Lake Hodges/San Pasqual Valley open space lies within the middle of the San Dieguito watershed (San Dieguito Hydrologic Unit [HU], Figure 5). The open space is fed by drainage from the Santa Ysabel Hydrologic Area (HA), Santa Maria HA, San Pasqual HA, and the Hodges HA (RWQCB 1994). Lake Hodges is positioned at the lower end of these HAs, which collectively drain an area of 192,585 acres. Lake Sutherland, constructed in the 1950s, controls the upper end of the watershed, an area of 34,968 acres. Water from Lake Sutherland is transported to the community of Ramona and out of the watershed to San Vicente Reservoir.

Stream flow in the mainstem San Dieguito River and Santa Ysabel Creek is intermittent. With the exception of very high rainfall years, there is no flow in the creek during later summer and fall months. During the period 1944-2000, the average annual mean daily flow at the Santa Ysabel stream gage (at the eastern end of the open space) was 11.76 cubic feet per second (cfs). Discharge in Santa Ysabel Creek is variable. The average annual maximum daily discharge was 486.15 cfs, the average annual median daily discharge was 1.96 cfs, and on January 27, 1916, a maximum daily discharge of 14,100 cfs was recorded.

Several significant tributary drainages flow into the Lake Hodges/San Pasqual Valley open space: Guejito Creek, Santa Maria Creek, Sycamore Creek, Cloverdale Creek, Green Valley Creek, and Kit Carson Creek (Figure 2). The Santa Maria Creek is the only tributary in the open space with a stream gage. Over the period 1947-2000, the average annual daily discharge in Santa Maria Creek was 6.58 cfs, the average annual maximum daily discharge was 339.69 cfs, and the average annual median flow was 0.17 cfs. The maximum observed average daily discharge of 4,960 cfs was also recorded on January 27, 1916.

3.6 FIRE HISTORY

Fire history data for the open space were obtained through the California Department of Forestry's (CDF) burn history database (CDF 2000) and cover the period from 1910 to 1999. However, it is likely that additional fires occurred in the area during this time period but were not recorded. The burn history data provide boundaries of individual fire events and the year of the event. These data do not provide information on fire intensity, which can influence post-fire vegetation recovery.

In the Lake Hodges/San Pasqual Valley open space and surrounding landscape, burn intervals generally range from 20 to 80 years, which is consistent with natural fire frequencies in Southern California shrub lands (Keeley 1986, Minnich 1995). Areas with burn intervals less than 20 years are relatively small in size and generally occur in those areas with higher fire frequencies. The slopes south of Whitman's citrus leases, at the east end of the open space, had the highest frequency of fires (6 burns) during the period

of record (Figure 6a). Adjacent to the open space, areas with the greatest frequency of fires were south of the open space, around Old Coach Estates (5 burns), and the area north of the San Diego Wild Animal Park (6 burns). Several of these fires occurred prior to 1955.

Some of the more recent significant fires in the area (i.e., within the last 30 years) include (Figure 6b):

- Slopes south of Whitman's citrus leases (mid 1970s),
- Slopes south of Lake Hodges, the area around the San Diego Wild Animal Park, and the ridge west of Highland Valley (1980s), and
- Most of the slopes north of San Pasqual Valley (1993).

Much of the area north of Lake Hodges (excluding the knoll adjacent to the boat ramp and the base of Bernardo Mountain) has no recorded fires. However, a resident in Del Dios has reported at least one fire in this area during 1987 that burned 40-50 acres (Mahrdt pers. comm.). The chaparral in this area without recorded fires is dense and mature. This area also supports a stand of wart-stemmed ceanothus, which is apparently fairly old but was still flowering in 2002.

In general, the area that burned during 1993 shows the poorest vegetation recovery at this point in time. Much of the coastal sage scrub on slopes in this area (i.e., the northeastern portion of the open space) has sparse shrub cover and a high cover of nonnative grasses. The habitat on the south side of the lake that burned in early 1980 appears to have recovered well, and the chaparral exhibits a diversity of dominant shrubs.

3.7 RECREATIONAL USES

The Lake Hodges/San Pasqual Valley open space contains several regional recreational opportunities, the most prominent of which is Lake Hodges. Other recreational opportunities include hiking, biking, and equestrian trails, cultural sites, and picnic areas. These facilities are within the San Dieguito River Park planning area on land owned by the City of San Diego Water Department. The City of San Diego Water Department and the JPA work together to manage and maintain these facilities. The San Dieguito River Park Concept Plan (2002) includes several park proposals for this area. The existing and proposed recreational facilities in the open space are described further below.

The JPA and other nonprofit groups realize the recreational need in this area and are expanding the recreational facilities in the valley to meet demand. Trails throughout the Lake Hodges/San Pasqual Valley open space (Figure 7) are heavily used by the public, particularly around Lake Hodges. The trails around Lake Hodges receive 300 users per day on weekends, with the fall and winter months being the peak user season. According to state trail user surveys, trails within close proximity to home are used most ofeeten. Proximity to the population base is an important factor; a recent County of San Diego

survey concluded that 70% of trail users polled travel 15 minutes or less to a trailhead (County of San Diego 2001).

The San Dieguito River Park Concept Plan (2002) divides the River Park FPA into 14 landscape units distinguished by landform, vegetation, changes in elevation, and existing land uses. Four of these landscape units extend through the San Pasqual Valley represented by Lake Hodges, East Lake Hodges, San Pasqual Valley, and Clevenger Canyon. Provision of recreational facilities is one of several objectives for the San Dieguito River Park.

3.7.1 Existing Recreational Facilities

Lake Hodges. Lake Hodges is a potable water reservoir owned and managed by the City of San Diego Water Department. The lake also offers recreational activities such as boating, fishing, wind surfing, and kayaking. Surrounding the lake are hiking, biking, and equestrian trails, which are described in subsequent sections. The lake also includes a boat dock and boat rentals, a tackle shop, and other facilities. The reservoir's operating schedule is Friday, Saturday, Sunday, and certain holidays from sunrise to sunset, from March/April through September/October.

There are 6 barbecues and 12 picnic tables in the picnic area. Patrons can bring self-contained barbecues for use in designated areas only. No ground fires or glass containers are allowed. Dogs must be kept on a leash at all times and at least 50 feet away from the water. Dogs are not allowed on boats (private or rental).

In addition to fishing from boats and a wheelchair accessible fishing float, patrons can float tube, wade, or fish from the shore, which is generally accessible by foot. Use of float tubes is restricted to within 150 feet from shore. Lake Hodges allows windsurfing from mid-April until the lake closes, and kayaks and canoes are permitted during days open for fishing. Overnight camping is not allowed at Lake Hodges.

Coast to Crest Trail. The Coast to Crest Trail is the focal point of the River Park's recreational component; several miles of this trail traverse the San Pasqual Valley. The multi-use Coast to Crest Trail is planned as a 55-mile long regional trail, from the beach at Del Mar to the Anza Borrego desert just east of Volcan Mountain, to accommodate hikers, bicyclists, and equestrians. Approximately 18 miles of this regional trail have been completed, all within the San Pasqual Valley. Additional segments of the trail are in various stages of planning, design, and construction. The two segments that bisect the open space are the Hodges North Shore Trail and the Mule Hill/San Pasqual Valley Trail. The Hodges North Shore Trail extends 7.4 miles along the north shore of Lake Hodges, with trail heads in Del Dios (Del Dios Park and boat dock) and at the eastern end of the lake at Sunset Drive. This trail offers shady oak paths and picturesque views of the lake. Trail use is heavy, and weekend users exceed 300 per day. The Mule Hill/San Pasqual Valley segment of the Coast to Crest Trail extends to the east of Lake Hodges through the valley's agricultural preserve. This 10.5-mile long trail reaches from Sunset Drive east to

Bandy Canyon Road and Highway 78. The western 1.5 miles of the trail offer an 8-feet wide hardened surface for bicyclists and users with disabilities adjacent to a 4-feet wide dirt path for equestrians. The remaining 9.5 miles of dirt trail vary in width from 6 to 12 feet. The trail includes two interpretive stations and interpretive signs that describe the Mule Hill battle and other historic features of the valley. The trail is adjacent to several active agricultural operations and includes stream crossings and a steep ridge climb with extensive views of the valley.

The JPA completed the trail in 2002, and amenities are still being added, which include benches, picnic tables, interpretive signs about the native plants and agricultural production in the valley, and trail information kiosks. Trails and staging areas are open to the public dawn to dusk every day of the year. Dogs on leashes are allowed on all trails.

Other Trails. Other "secondary trails" in the valley connect or are planned to connect to the Coast to Crest Trail. The Piedras Pintadas ("Painted Rocks") interpretive trail was constructed by the JPA in 1994 along the south side of Lake Hodges in the Bernardo Bay Natural Area. This 3.8-mile loop trail includes a Native American interpretive signage program. In consultation with the San Pasqual Band of Indians, the Rancho Bernardo community, and other interested parties, the JPA prepared a cultural resources management plan for the Piedras Pintadas area to ensure preservation and long-term protection of this unique cultural resource. Although the quality of the area has improved, graffiti and other forms of vandalism from trespassers continue to impact the sacred Painted Rocks site. Volunteer work parties organized by the JPA have cleaned up the site on several occasions. The Bernardo Bay Natural Area is also traversed by many "volunteer trails" that negatively impact the habitat and cause erosion. Some of these trails have been closed off and revegetated, but more work needs to be done in this area. This is discussed further below.

The Highland Valley Trail is a 2-mile long hiking and equestrian trail just south of Highland Valley Road. This trail features a children's interpretive walk. Currently, no bicyclists are allowed on this trail.

The North and South Clevenger Canyon trails are at the eastern end of San Pasqual Valley, extending north and south from Highway 78. The trails are steep climbs up the ridgeline to spectacular views of the valley. Eventually, these trails will connect to the Coast to Crest Trail planned in this area. The City of San Diego Park and Recreation Department maintains these two trails.

Sikes Adobe Farmhouse. The Sikes Adobe Farmhouse was built in the 1880s by the Sikes family. The adobe is listed as a state historic site. The JPA recently secured a state grant to restore the adobe to its 1881 period of significance. The restoration project is anticipated to begin in January 2003 and, once completed, the adobe will be opened to the public for docent-led tours.

3.7.2 Planned Recreational Facilities

Several other recreational facilities in the valley are in the planning and design stages (San Dieguito River Park Concept Plan (2002). These projects must be submitted to the City of San Diego for review and approval.

Coast to Crest Trail Crossing Around Hodges Dam. To extend the Coast to Crest Trail west of Lake Hodges, the trail will need to cross the Hodges dam to connect the Hodges North Shore Trail segment to the Del Dios Gorge trail segment just west of the dam. The JPA will work with the City Water Department on the dam crossing once the JPA obtains the necessary grant funds. The Del Dios Gorge segment is currently in the design phase, and a construction grant was recently awarded to the JPA.

Hodges Pedestrian/Bicycle Bridge. The JPA is designing a pedestrian/bicycle bridge proposed to cross Lake Hodges just west of Interstate-15. The bridge project will provide the only river valley crossing for 20 miles in both directions, with the exception of I-15, and will provide bicycle commuters an alternative to using I-15 to cross the lake. The project will also include a Class I bike path/trail along West Bernardo Road to connect the Bernardo Bay trail staging area to the Hodges North Shore Trail. The JPA received a $3 million grant for construction of the bridge, which is anticipated to begin in late 2003. The project is still under review by the City of San Diego.

Sikes Adobe Site. The San Dieguito River Park Concept Plan includes a proposal for a River Park interpretive center and park offices on the 1.8-acre Sikes Adobe site while protecting the historic integrity of the Sikes Adobe.

Poway Trail Connection to Coast to Crest Trail. The JPA is working with the cities of San Diego and Poway to provide a trail that originates in Poway and crosses Highland Valley Road to the Coast to Crest Trail. This would connect the Coast to Crest Trail to Poway's extensive network of trails and to the Blue Sky Nature Reserve.

Eastern Extension of Coast to Crest Trail. The Coast to Crest Trail is planned to extend along Santa Ysabel Creek east of the Bandy Canyon Road and Highway 78 trail staging area. The JPA has identified a conceptual alignment along an existing dirt road for this segment.

3.8 HABITATS AND SPECIES DESCRIPTIONS

Vegetation community surveys were conducted February through April 2002. Botanists surveyed the majority of the open space on foot. Several areas were surveyed via binoculars, and some areas were not surveyed due to access constraints. Vegetation communities were delineated on base maps (scale: 1 in. = 500 feet). The objectives of the vegetation community surveys were to map vegetation communities, obtain information on native and nonnative species cover, assess the presence or potential for occurrence of sensitive species (i.e., MSCP covered species), and identify disturbance

factors or other potential management issues. Locations of nonnative species *per se* were not mapped, but rather were recorded as attributes of specific vegetation community polygons on field maps.

Because of the extremely low rainfall in the area during the study period and the availability of existing species distributional information, systematic rare plant surveys were not conducted for this project. However, any sensitive plant species observed during vegetation community mapping were noted, as were areas potentially supporting sensitive plant species, based on soils, topography, and habitat. We also utilized information from knowledgeable botanists (McMillan and CBI 2002, Dillane pers. comm., Burrascano pers. comm.).

Surveys were conducted for Hermes copper butterfly (*Lycaena hermes*) in suitable habitats around Lake Hodges during June 2002 (Klein-Edwards Professional Services 2002). Systematic surveys for other sensitive wildlife were not conducted because of the availability of existing information, although field biologists did note observations of sensitive species and potential habitat for sensitive species (e.g., California gnatcatcher and coastal cactus wren). Sources of wildlife information included the original MSCP database, the San Diego Bird Atlas (unpublished data), California Natural Diversity Data Base (CDFG 2002), MEC (1998), Palomar Audubon Society surveys (unpublished data), Mardht (pers. comm.), and Barber (pers. comm.).

3.8.1 Vegetation Communities

Twelve vegetation communities were mapped in the Lake Hodges/San Pasqual Valley open space in 2002 (Figure 8). These fall into the broad categories of scrub and chaparral (4 communities), grassland (2), marsh (1), riparian (4), and woodland (1). Agricultural fields were not mapped in this study. Vegetation community classification corresponds to the modified Holland classification (Oberbauer 1996), except where noted. Some portions of the open space were not mapped due to access constraints.

Scrub and Chaparral Communities

Coastal Sage Scrub. Diegan coastal sage scrub is the dominant vegetation association in upland portions of the open space. This community occurs on all slope exposures, including flat or gently sloping areas adjacent to drainages, as well as on steep slopes. Dominant species characterizing this habitat include California buckwheat (*Eriogonum fasciculatum*) and California sagebrush (*Artemisia californica*), with laurel sumac (*Malosma laurina*), spiny red berry (*Rhamnus crocea*), prickly pear (*Opuntia littoralis*), and white sage (*Saliva apiana*) dominating in areas but not occurring uniformly throughout the open space. For example, spiny red berry is common around Lake Hodges, white sage is dominant in the eastern end of the open space, and prickly pear is common along the northern slopes of San Pasqual Valley and Lake Hodges.
Coastal sage scrub comprises 3,056 acres of vegetation in the open space. Of this total, 876.3 acres are categorized as disturbed coastal sage scrub, due primarily to the

influences of grazing and burning (e.g., grazing in Cloverdale Canyon and fire at the eastern end of the open space). In addition, 474 acres are categorized as disturbed coastal sage scrub/annual grassland. The majority of the coastal sage scrub community in the open space is high quality, with light to moderate cover of nonnative species, including annual nonnative grasses and black mustard (*Brassica nigra*).

An additional 21 acres is classified as broom baccharis scrub (6 acres classified as disturbed broom baccharis scrub). This association is dominated by broom baccharis (*Baccharis sarothroides*) and is found adjacent to Green Valley Creek.

Southern Mixed Chaparral. Southern mixed chaparral occurs throughout the open space on north- and east-facing slopes. It typically occurs at higher elevations than coastal sage scrub and is more common just outside the open space in many areas. This association is comprised of broad-leaved sclerophyllous shrubs to about 10 feet in height (Holland 1986). Dominant species include mission manzanita (*Xylococcus bicolor*), scrub oak (*Quercus berberidifolia*), redberry (*Rhamnus crocea*), toyon (*Heteromeles arbutifolia*), horryleaf ceanothus (*Ceanothus crassifolius*), and Ramona lilac (*Ceanothus tomentosus*). Around Lake Hodges, wart-stemmed ceanothus (*Ceanothus verrucosus*) is a dominant species in some chaparral stands. Southern mixed chaparral comprises 916 acres in the open space. Of this total, 183 acres are classified as southern mixed chaparral/coastal sage scrub. The majority of the southern mixed chaparral in the open space is of high quality, particularly the chaparral in the western portion of the open space around Lake Hodges.

Chamise Chaparral. This association is dominated by chamise (*Adenostoma fasciculatum*). It typically occurs on shallower, drier soils or at lower elevations than southern mixed chaparral, and the understory layer is poorly developed (Holland 1986). A small area (1.4 acres) of chamise chaparral occurs along Sycamore Creek.

Southern Maritime Chaparral. A small area (7 acres) along the southwest shore of Lake Hodges (just north of the dam) is classified as southern maritime chaparral, which is characterized by dense stands of wart-stemmed ceanothus and chamise. This stand is of moderate quality with some nonnative annual species present.

Grassland Communities

Annual (Nonnative) Grassland. This association occurs on gently sloping lower slopes or areas of level topography in the central portion of the open space. For the most part, annual grassland occurs in areas disturbed by grazing, agricultural, and other unknown historic land uses. Annual grassland is characterized by a sparse to dense cover of nonnative grasses and native and nonnative herbaceous species (Holland 1986). Dominant species in the open space include various bromes (*Bromus* spp.), dove weed (*Eremocarpus setigerus*), and black mustard. Annual grassland occurs on 243 acres in the open space. Of this total, 16 acres were classified as annual grassland/coastal sage

scrub. The grassland habitats in the open space are relatively low quality and dominated by nonnative species; however, they do provide important foraging habitat for raptors.

Disturbed Native Grassland. A small area (1.4 acres) of remnant native grassland occurs south of Highland Valley Road and is crossed by the Highland Valley Trail. Annual nonnative grasses (*Bromus* spp.) are the dominant cover. Purple needlegrass (*Nasella pulchra*) occurs in this area but comprises less than 10% of the cover. This area is of low quality but could be a target for enhancement.

Marsh Communities

Freshwater Marsh. This association occurs in areas of standing water or saturated soil, and the vegetation cover is variable. In the Lake Hodges/San Pasqual Valley open space, freshwater marsh occurs in three general areas: (1) in the vicinity of the boat ramp at Lake Hodges, (2) in the vicinity of Sikes Adobe, and (3) around the large pond next to Cloverdale Creek. Freshwater marsh is dominated by perennial species such as cattail (*Typha* spp.), bulrush (*Scirpus* spp.), and occasional willows (*Salix* spp.). The marsh area immediately east of the Sikes Adobe is of particularly high quality and diversity and is dominated by yerba mansa (*Anemopsis californica*), spike-sedge (*Eleocharis* sp.), cattail, and bulrush. Freshwater marsh comprises 67 acres of the open space.

An additional 77 acres are mapped as "lakeshore." This is a variable and somewhat disturbed association that fringes Lake Hodges. It is characterized by willows, mulefat (*Baccharis salicifolia*), broom baccharis (*Baccharis sarothroides*), bulrush, and eucalyptus (*Eucalyptus* sp.).

Riparian Communities

Southern Coast Live Oak Riparian Forest. This association is an open to locally dense riparian woodland dominated by coast live oak (*Quercus agrifolia*). It occurs in valley bottoms and outer floodplains along larger streams, in sandy soils or alluvium (Holland 1986). Other riparian tree species, such as California sycamore (*Platanus racemosa*), Fremont's cottonwood (*Populus fremontii*), and black willow (*Salix gooddingii*), may be present in this association but represent a relatively minor component of the total vegetation cover. Riparian shrub species such as mulefat (*Baccharis salicifolia*) or the nonnative tamarisk (*Tamarix* sp.) may be present in the understory. An estimated 10 acres of southern coast live oak riparian forest occur in the open space.

Southern Riparian Forest. This association is a tall, open to relatively dense, broad-leaved winter-deciduous riparian forest (Holland 1986). In the Lake Hodges/San Pasqual Valley open space, black willow and arroyo willow (*Salix lasiolepis*) are the dominant tree species in this association, although there is a significant presence of giant reed (*Arundo donax*) and tamarisk. An estimated 793 acres of southern riparian forest were mapped in the open space; of this total, 335 acres were mapped as disturbed southern riparian forest. The majority of the area assigned this classification is in the floodplain of

the San Dieguito River, downstream of the Narrows, and upstream of the high water level of Lake Hodges. It is likely that this area historically supported southern riparian forest. However, due to historic clearing and alterations of hydrology due to construction of Lake Sutherland and groundwater extraction, it is unlikely that this area will support a riparian forest community in the future. The majority of this habitat is considered to be of high quality as it provides breeding habitat for riparian wildlife species. In some areas, habitat quality has been degraded by nonnative plants, dumping, and off-road vehicles.

Mulefat Scrub. This is a monotypic association dominated by mulefat. This association is considered early seral and is maintained by frequent flooding. Where severe flooding events are limited or absent, this association may succeed to better-developed riparian woodland or forest communities. Mulefat scrub occurs along intermittent, sandy stream channels and is ofeeten located at the outer edge of the floodplain or higher terraces. Mulefat is also an understory component of many of the riparian forests in the open space. Mulefat scrub comprises 15 acres of the open space; approximately 1 acre is characterized as disturbed.

Southern Willow Scrub. This association is a broad-leaved winter-deciduous riparian scrub dominated by willows (*Salix* spp.). It occurs on sandy alluvium near stream channels and succeeds to riparian forests in the absence of flooding (Holland 1986). This association occurs along much of the Santa Ysabel Creek/San Dieguito River and its tributary drainages. Arroyo willow, black willow, and mulefat are the characteristic species of southern willow scrub in the open space. Riparian scrub habitat mapped as disturbed includes nonnative species such as tamarisk, giant reed, and perennial pepperweed. Approximately 931 acres of riparian scrub occur in the open space and are considered to be of high quality. Of this total, 352 acres are characterized as disturbed southern willow scrub. However, over 200 acres of riparian scrub in the eastern Lake Hodges basin will likely be inundated once lake levels rise.

Woodland Communities

Coast Live Oak Woodland. This woodland typically occurs on north-facing slopes and shaded ravines, where it forms open to relatively closed canopy stands dominated by coast live oak (Holland 1986). In the eastern end of the open space, Engelmann oaks (*Quercus engelmanni*) are a component of the woodlands. The understory of coast live oak woodland is poorly developed. In the open space, much of the understory has significant annual grass cover, and some understory shrubs have established from adjacent scrub or chaparral habitat (e.g., California sagebrush, flat-topped buckwheat, spiny redberry). Coast live oak woodland accounts for 186 acres in the open space and is considered to be high quality.

Other Communities

Eucalyptus Woodland. Eucalyptus woodland occurs in several stands within the MHPA, including: the west shore of Lake Hodges, the Narrows, south of SR-78 in Colverdale

Canyon, and along Highland Valley Road near the Water Treatment Plant. Eucalyptus woodland can occur as monotypic stands of eucalyptus or include native tree and shrub species from adjacent habitats. The understory of this association is poorly developed due to the allelopathic effects of eucalyptus leaves. Individual eucalyptus trees are also scattered throughout the open space. Approximately 20 acres of eucalyptus woodland are mapped in the open space.

3.8.2 Plant Species

Three sensitive plant species covered by the City of San Diego MSCP Subarea Plan are known to occur in the open space. These include Encinitas baccharis (*Baccharis vanessae*), wart-stemmed ceanothus (*Ceanothus verrucosus*), and San Diego barrel cactus (*Ferocactus viridescens*). Of these species, wart-stemmed ceanothus and San Diego barrel cactus have habitat-based coverage criteria in the MSCP Plan. Thus, conservation and management of their habitats, including coastal sage scrub and chaparral, is required to meet the conditions of coverage. Known locations for wart-stemmed ceanothus and San Diego barrel cactus are shown in Figures 9a, b, and c. Potential habitat was mapped for Encinitas baccharis. These species are discussed further below.

Other MSCP covered plant species have the potential to occur in the open space based on distribution and habitat suitability. These include San Diego thornmint (*Acanthomintha ilicifolia*), Del Mar manzanita (*Arctostaphylos glandulosa* ssp. *crassifolia*), San Diego ambrosia (*Ambrosia pumila*), Orcutt's brodiaea (*Brodiaea orcuttii*), and variegated dudleya (*Dudleya variegata*). Comprehensive surveys in the open space have not been conducted for these species. Areas thought to have potential to support these species are shown in Figures 9a, b, and c.

Several other sensitive plant species in the open space are not listed as covered species by the MSCP Plan. These include California adolphia (*Adolphia californica*), southern tarplant (*Centromadia parryi* ssp. *australis*), western dichondra (*Dichondra occidentalis*), San Diego marsh elder (*Iva hayesiana*), San Diego sedge (*Carex spissa*), Palmer's mugwort (*Artemisia palmeri*), Cleveland's sage (*Salvia clevelandii*), Engelmann oak (*Quercus engelmannii*), rush-like bristleweed (*Machaeranthera juncea*), spiny rush (*Juncus acutus*), San Diego ambrosia (*Ambrosia pumila*), California adder's tongue (*Ophioglossum californicum*), and Fish's milkwort (*Polygala cornuta* var. *fishiae*). Known locations for of these species are also shown in Figures 9a, b, and c.

Baccharis vanessae
Encinitas Baccharis
USFWS: Threatened
CDFG: Endangered

Encinitas baccharis is a San Diego County endemic plant that is now limited to approximately 14 populations throughout its range, including Encinitas, Carmel Mountain, Mt. Israel-Del Dios, 4S Ranch, Mt. Woodson-Iron Mountain, Poway (Van

Dam Peak), and Mira Mesa (Beauchamp 1986; USFWS 1996). The latter two locations consisted of one plant each as of 1987 and are too small to constitute viable populations. A small population has also been found in the southern Santa Ana Mountains in northern San Diego County (Boyd et al. 1993). Encinitas baccharis occurs in southern maritime chaparral and dense southern mixed chaparral. In the open space, this species is known to occur primarily on metavolcanic soils on the slopes south and west of Lake Hodges (USFWS 1996, City of San Diego 1998). This species was not detected during vegetation surveys for this project.

It is estimated that the 14 remaining populations of Encinitas baccharis contain a total of about 2,000 individuals, which can be grouped into two remaining "centers" of distribution in the Lake Hodges area and in Encinitas. Five of these populations have fewer than 6 plants each, and no population is known to support more than 300 individuals (USFWS 1996). The Lake Hodges area is the largest known center of distribution for Encinitas baccharis.

Encinitas baccharis is a dioecious (i.e., male and female flowers are on separate plants), broom-like shrub. It is presumably insect-pollinated (e.g., bees and/or butterflies, Wyatt 1983), and seeds are presumably wind-dispersed.

Encinitas baccharis is a fire-adapted shrub that can be adversely affected by frequent burning. The exact fire-response mechanism is not known. Effective conservation of this species must include a fire management plan that protects conserved populations from frequent or high-intensity fires. In addition, adequate preserve design for this species must include sufficient habitat to support appropriate pollinators. In the open space, threats to this species include edge effects (including fuel modification, fire suppression, invasion of nonnative plants) and small population size.

Ferocactus viridescens
San Diego Barrel Cactus
USFWS: Federal Species of Concern (former Category 2 Candidate)
CDFG: None

San Diego barrel cactus is restricted to San Diego County and Baja California, Mexico (CNPS 2001). In San Diego County, this species occurs along the coastal slope from Oceanside south to the U.S.-Mexico border. San Diego barrel cactus is primarily associated with coastal sage scrub, although it has also been documented in chaparral and grassland habitats. Although the species was formerly widespread within its San Diego range, it now persists in numerous, fragmented populations. Approximately eight major populations of this species were identified in the MSCP planning area, none of which is in the Lake Hodges/San Pasqual Valley open space. San Diego barrel cactus is not abundant in the open space (only two localities have been recorded); the open space represents the northeastern limit of this species' distribution.

San Diego barrel cactus is a perennial plant (stem succulent) that presumably is not particularly well adapted to fire because of its succulence. It is insect-pollinated. It has a fleshy fruit, and seeds are presumably self-dispersed. The primary threats to this species are urbanization, off-road vehicles, horticultural collecting, and edge effects.

Ceanothus verrucosus
Wart-stemmed Ceanothus
USFWS: Federal Species of Concern (former Category 2 candidate)
CDFG: None

Wart-stemmed ceanothus is limited in distribution to western San Diego County and Baja California, Mexico (CNPS 2001). In San Diego County, it is found on the immediate coast from Carlsbad south to the U.S.-Mexico border. It also occurs inland towards San Marcos and Lake Hodges. Within the U.S., large populations occur in Carlsbad, Encinitas, Torrey Pines State Reserve, Carmel Mountain-Carmel Valley, San Marcos, Escondido, and Point Loma. Smaller populations are known from Kearny Mesa-Clairemont Mesa-Miramar, Soledad, and Spooner's Mesa. This species is abundant in the chaparral habitats around Lake Hodges. Wart-stemmed ceanothus is associated with southern maritime chaparral and southern mixed chaparral. It forms nearly monotypic stands in some inland locations. Threats to this species in the open space include edge effects from adjacent developments (including fuel modification and invasion of nonnative plants) and altered fire regimes.

Wart-stemmed ceanothus is an evergreen shrub. It is a highly fire-adapted species whose fire response is seed germination from a persistent seed bank afeeter exposure to intense heat (e.g., an obligate seeder afeeter fire) (Keeley 1991). This species is presumably insect-pollinated (e.g., bees or beeflies, Wyatt 1983; Conrad 1987), and seeds are self-dispersed (Keeley 1991).

3.8.3 Animal Species

Twenty-one MSCP covered animal species have been detected in the Lake Hodges/San Pasqual Valley open space or in the immediate vicinity. These covered species include arroyo toad (*Bufo californicus*), San Diego horned lizard (*Phrynosoma coronatum blainvillei*), orange-throated whiptail (*Cnemidophorus hyperythrus beldingi*), Canada goose (*Branta canadensis*), bald eagle (*Haliaeetus leucocephalus*), Cooper's hawk (*Accipter cooperii*), Swainson's hawk (*Buteo swansoni*), ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), peregrine falcon (*Falco peregrinus*), northern harrier (*Circus cyaneus*), tricolored blackbird (*Agelaius tricolor*), southwestern willow flycatcher (*Empidonax traillii*), least Bell's vireo (*Vireo bellii pusillus*), rufous-crowned sparrow (*Aimophila ruficeps*), California gnatcatcher (*Polioptila californica californica*), coastal cactus wren (*Campylorhychus brunneicapillus*), western bluebird (*Sialia mexicana*), white-faced ibis (*Plegadis chihi*), mountain lion (*Felis concolor*), and mule deer (*Odocoileus hemionus*). Appendices B and C include a list of bird and herpetofauna species, respectively, observed in the vicinity of the open space.

The majority of these species have habitat-based coverage criteria. Thus, conservation and management of their habitats is required to meet the conditions of coverage. Habitats for these species include coastal sage scrub, chaparral, oak woodland, riparian woodland and scrub, open water, and annual grassland. Habitat quality in the open space is generally considered to be high, except in specific locations discussed in Section 5.0. The National Audubon Society and American Bird Conservancy have recognized Lake Hodges and the upland habitats around it as a Globally Important Bird Area, the first site in California to receive this designation. The area around the Narrows is also considered to have particularly high habitat value (Lopez pers. comm.). The open space also contains recent nesting locations and foraging territories for golden eagles (WRI 2002), which are extremely rare in the MSCP planning area.

The Lake Hodges/San Pasqual Valley open space serves as an important habitat linkage and regional wildlife movement corridor for a variety of species. The Lake Hodges/San Pasqual Valley open space provides connectivity between conserved lands in coastal areas (e.g., San Dieguito River, San Dieguito Lagoon, Lusardi Creek, Black Mountain Open Space, Carmel Mountain, Del Mar Mesa, Los Peñasquitos Canyon Preserve, Torrey Pines State Reserve) and conserved and other undeveloped habitats in inland areas (e.g., Ramona grasslands, Rancho Guejito, Pamo Valley, Cleveland National Forest, Volcan Mountain, Santa Ysabel preserves). The corridor under I-15 in the open space is one of the few remaining in the county between coastal and inland habitats. The open space is used by mule deer, bobcats, and coyotes, and there have been anecdotal sightings of mountain lions in San Pasqual Valley.

Five of the covered animal species in the open space have site-specific coverage criteria. These species are discussed in more detail below.

Bufo californicus
Arroyo Toad
USFWS: Endangered
CDFG: Species of Special Concern, Protected

Arroyo toads are abundant in most of the San Pasqual Valley, downstream to the confluence of Sycamore Creek (MEC 1998). The open space likely supports the largest population of arroyo toads in the MSCP preserve system (Fisher pers. comm.). Surveys have characterized the upper end of San Pasqual Valley to the confluence of Santa Maria Creek, and including the Santa Maria Creek reach, as having the highest quality habitat for arroyo toads in San Pasqual Valley. While arroyo toads were present, habitat quality for this species was considered to decline downstream of the confluence with Santa Maria Creek (MEC 1998), likely due to many of the factors described below.

The arroyo toad occurs along rivers and creeks that sustain a sufficient flow to allow the development of tadpoles. Eggs and tadpoles require still backwaters along the sandy or gravelly banks of clear, slow-moving streams and rivers (Stebbins 1985; Sweet 1992). Adults forage and burrow in upland habitats adjacent to breeding areas. Upland habitats

include oak woodlands, open grasslands, coastal sage scrub, and fallow agricultural fields. Adults are known to range up to 3,000 feet from breeding pools (Griffin et al. 1999) and have been shown to burrow in adjacent upland habitats, including agricultural fields (Griffin and Case 2001). Increased human activities have encroached in arroyo toad habitat over the last 50 years and have caused precipitous declines in this species' abundance. Major threats in San Pasqual Valley include nonnative plant species (e.g., perennial pepperweed) that invade areas used for estivation, stream flow alteration and associated changes in physical habitat characteristics, water quality from urban and agricultural runoff, agricultural operations that may affect individuals within burrows in agricultural fields, off-road vehicle activity in the stream channel, and introduced aquatic predators such as bullfrogs and nonnative fish.

Polioptila californica californica
California Gnatcatcher
USFWS: Threatened
CDFG: Species of Special Concern

In the Lake Hodges/San Pasqual Valley open space, California gnatcatchers are abundant throughout coastal sage scrub west of the SR-78 bridge over Santa Ysabel Creek. The open space supports one of the largest subpopulations of gnatcatchers in the MSCP and is a core area for this species. Portions of the open space east of the SR-78 bridge are too steep and the vegetation is too sparse to support significant numbers of gnatcatchers.

The coastal subspecies of California gnatcatcher is restricted to the coastal slopes of southern California, from southern Ventura County south to El Rosario, Baja California Norte. It is closely associated with coastal sage scrub vegetation, particularly on gentle slopes within the maritime and coastal climate zones. In San Diego County, the California gnatcatcher occurs most commonly in coastal sage scrub vegetation with high proportions of California sage and flat-topped buckwheat and less commonly in subassociations dominated by black sage, lemonade-berry (Atwood 1980, 1990; Bontrager 1991; Weaver 1998), or broom baccharis (Unitt 1984). Territory size requirements appear to vary with habitat quality, ranging from 2.5 to 45 acres in San Diego County (RECON 1987; ERCE 1991), with territory size increasing with distance from the coast (Ogden 1993; Preston et al. 1998).

The primary cause of this species' decline is the cumulative loss and fragmentation of coastal sage scrub vegetation by urban and agricultural development. Gnatcatchers are subject to predation by a wide variety of vertebrate predators (Sockman 1997, Braden et al. 1997), including human-subsidized predators (e.g., house cats, raccoons, ground squirrels, and scrub jays). Gnatcatchers are also subject to nest parasitism by brown-headed cowbirds (USFWS 1991, Ogden 1993, Braden et al. 1997). Maintenance of appropriate habitat structure through fire management is an important management issue for gnatcatchers. Recent research (Atwood et al. 2002) indicates that California gnatcatchers may require "old growth" (e.g., >20 years) coastal sage scrub to maintain viable populations when numbers of individuals in the population naturally fluctuate to

low levels. In the open space, threats to California gnatcatchers include degradation and loss of habitat associated with altered fire frequency, unauthorized trails, and invasion by nonnative plant species. Predation by human-subsidized predators and nest parasitism by cowbirds may be a threat to gnatcatchers in the area, given the presence of suburban development and dairy operations, which are known to attract brown-headed cowbirds.

Campylorhynchus brunneicapillus
Coastal Cactus Wren
USFWS: Federal Species of Concern (former Category 2 Candidate)
CDFG: Species of Special Concern, Protected

The coastal cactus wren occurs along the coastal plain of Southern California. It is an endemic species that relies on patches of tall cactus for nesting habitat. Over a decade ago, the population of coastal cactus wrens in San Diego County was estimated to be less than 300 pairs (Rea and Weaver 1990). In San Diego County, this species has a highly disjunct distribution, with populations occurring in five primary areas (Camp Pendleton, Lake Hodges/San Pasqual Valley, Santee/Lake Jennings, Sweetwater River, and Otay River/Otay Mesa). The Lake Hodges/San Pasqual Valley open space supports a core population of cactus wrens. The majority of the occupied habitat is on the north shore of Lake Hodges and the north side of the San Pasqual Valley, in the vicinity of the San Diego Wild Animal Park. Primary threats to this species are degradation and fragmentation of habitat containing suitable patches of cactus for breeding (Rea and Weaver 1990). In the open space, the primary threats to this species are disturbance from humans and the loss of suitable nesting habitat from large or repeated wildfires. There is anecdotal information that the cactus wren is highly sensitive to human activity and may abandon suitable habitat in proximity to high human use areas (Barber pers. comm., Mahrdt pers. comm.). The small number of cactus wrens that were breeding in the early 1990s in the uplands around Bernardo Bay apparently are no longer present. This area experiences heavy human use, including model airplane flying from the top of the hill, a sewer pipe vault at the base of the hill, and numerous volunteer trails throughout the area.

Vireo bellii pusillus
Least Bell's Vireo
USFWS: Endangered
CDFG: Endangered

The least Bell's vireo is abundant and well-distributed throughout riparian habitats in the open space. Kus and Beck (1998) documented 106 territorial males in the San Dieguito River system in 1997. Between 1986 and 1997, the number of vireo territories in the open space showed an increasing trend (USFWS 1998, Kus and Beck 1998). The total population of least Bell's vireos in the area encompassing the San Pasqual Valley downstream to the confluence with Sycamore Creek has been estimated to range between 75 and 125 pairs (MEC 1998). Surveys conducted in 2002 documented 165 vireo locations, generally singing males (Varanus Biological Services, Inc. 2003). Major vireo populations are currently on six river systems in San Diego County: Tijuana,

Sweetwater, San Diego, Santa Ysabel Creek/San Dieguito River, San Luis Rey River/Pilgrim Creek, and Santa Margarita.

The least Bell's vireo is a neotropical migratory species restricted to willow- and mulefat-dominated riparian woodlands in Southern California, with the majority of breeding pairs occurring in San Diego, Santa Barbara, and Riverside counties. Least Bell's vireos prefer semi-open riparian woodlands with a dense shrub understory. The least Bell's vireo is endangered due to loss, degradation, and fragmentation of willow/mulefat-dominated riparian habitat. This species is also vulnerable to brown-headed cowbird parasitism (Kus 1991a; 1991b; 1992a; 1992b), and reduction or elimination of cowbirds in least Bell's vireo nesting habitat appears to benefit this species substantially. In the Lake Hodges/San Pasqual Valley open space, the least Bell's vireo is threatened by nonnative plant species, human disturbances (e.g., off-road vehicles, homeless encampments), encroachment into its habitat by adjacent land uses, and cowbird parasitism.

Empidonax traillii
Southwestern Willow Flycatcher
USFWS: Endangered
CDFG: Endangered

The southwestern willow flycatcher breeds rarely in the open space. The San Diego Bird Atlas Project recorded two nesting pairs of flycatchers between the upper margin of Lake Hodges and the Narrows in 1999 and two additional observations in 1998 upstream of the Narrows (San Diego Bird Atlas unpubl. data). Kus and Beck (1998) observed four breeding pairs (two definite and two probable) in the open space. Three nesting pairs of flycatchers were observed in 2003 (Varanus Biological Services, Inc. 2003). Southwestern willow flycatchers suspected of being migrants have been seen in the open space (MEC 1998, Varanus Biological Services, Inc. 2003).

The southwestern willow flycatcher is a neotropical migratory species that breeds in summer in riparian wetlands in the Southwestern U.S. In California, it breeds from the Kern River south to the U.S.-Mexico border (USFWS 1995). It is considered to prefer cottonwood-willow dominated habitats but can be found in salt cedar-dominated habitats as well (Hunter et al. 1988). Habitat structure and the presence of surface water or saturated soils may be more important than plant species composition in defining suitable flycatcher habitat (USFWS 1995). Territory sizes are not well known for this species, but habitat patches as small as 1.2 acres have been found to support one or two nesting pairs (USFWS 1995). This species was once widespread throughout the Southwest but has experienced extensive population reductions throughout its range (USFWS 1995).

The primary factors responsible for the decline of the flycatcher are the loss and degradation of native riparian habitats, particularly cottonwood-willow associations (USFWS 1995). Related factors contributing to the decline include brood parasitism by brown-headed cowbirds, livestock grazing, water diversion and impoundment, channelization, off-road vehicle use, floods, pesticides, and possible gene pool limitations

(USFWS 1995, AGFD 1997). In the open space, threats to southwestern willow flycatchers include degradation of habitat quality by nonnative plant species and, potentially, nest parasitism.

4.0 MANAGEMENT GOALS AND OBJECTIVES

This section describes management issues and concerns (Section 4.1) and management goals and objectives (Section 4.2). Management goals are specific to this plan, but are intended to achieve the overall goals of the MSCP.

4.1 MANAGEMENT ISSUES AND CONCERNS

Conceptual models describe important resources and processes necessary to maintain functioning biological communities, identify potential threats to these resources and processes, and identify key assumptions or hypotheses regarding the functions of the system.

4.1.1 Coastal Sage Scrub and Chaparral Communities

The coastal sage scrub and chaparral communities within the Lake Hodges/San Pasqual Valley open space provide critically important core habitat for both covered species and non-covered species in the MSCP planning area. The Lake Hodges/San Pasqual Valley open space also provides important linkages to upland habitats in other parts of the MSCP and other NCCP planning areas.

The distribution and structure of the coastal sage scrub and chaparral vegetation communities are governed largely by climate, fire regimes, soils, and species colonization and succession patterns (Hanes 1977, Mooney 1977, Westman 1981). Coastal sage scrub and chaparral in Southern California have evolved in and are adapted to a Mediterranean climate, with hot, dry summers and cool, wet winters. The Mediterranean climate is considered a major environmental factor in the ecology of the plant communities (Hanes 1977, Mooney 1977).

Many coastal sage scrub species are considered to be "pioneer species," which are present in early successional stages following disturbances (Mooney 1977, Zedler et al. 1983). The coastal sage scrub community can be "pre-climax" to chaparral or be a stable climax community, depending on soil parent material, aspect, and disturbance history. Coastal sage scrub tends to be a stable climax community on drier sites (Mooney 1977), and the spatial patterning of chaparral versus coastal sage scrub can ofeeten be related to soil moisture (Hanes 1977). As the moisture-holding capaCity of soil types can vary, soil type can have a significant effect on the distribution of plant species (Westman 1981). Nitrogen has been shown to be a limiting nutrient for chaparral plants, and soils vary with respect to the availability of nutrients (Westman 1981).

Most upland vegetation communities in Southern California have evolved with fire, which is thought to have occurred at intervals of 20-70 years (Keeley 1986, Minnich 1995). Coastal sage scrub and chaparral rely on this fire cycle to maintain their distribution and structure. Modifications of natural fire cycles can alter the composition of the community (Zedler et al. 1983). Overly frequent fires can type-convert shrub

habitats to grassland habitats. The establishment of annual grasses provides a fuel load that decreases the return interval between fires, creating a positive feedback loop that continues to favor annual nonnative grasses over native species (Minnich and Dezzani 1998). On the other hand, fire suppression can lead to overly mature habitats and increased fuel loads, which result in larger, hotter fires when a burn does occur. Development and fragmentation of habitats does not allow natural fire regimes to continue without placing adjacent homes and businesses at risk, thereby increasing pressure on fire protection agencies to suppress wildfires. In addition, in many natural open space areas, fire frequency has actually increased due to human sources of ignition (e.g., off-road vehicles, cigarettes, campfires at homeless encampments). In several areas of the open space, fires have burned with high frequency (e.g., 4-6 times in the last 80 years). However, in the area north of Lake Hodges and west of Bernardo Mountain, there is no record of fire in the mature stand of chaparral. At least two of the MSCP covered species in the open space (Encinitas baccharis and wart-stemmed ceanothus) require burning for germination and recruitment of new individuals into the population. Recent work on Camp Pendleton (Atwood et al. 2002) also indicates that California gnatcatchers may require "old growth" (e.g., >20 years) coastal sage scrub to maintain viable populations when numbers of individuals in the population naturally fluctuate to low levels.

There are a variety of potential threats to coastal sage scrub and chaparral within the Lake Hodges/San Pasqual Valley open space. Many of these threats are ultimately related to habitat fragmentation by development, agriculture, and associated infrastructure. As development fragments habitat areas into smaller patches, the amount of habitat edge increases. Habitat edges are the interfaces between natural habitats and adjacent human land uses, and this interface is where many adverse impacts to remaining natural open space originate (Lovejoy et al. 1986, Yahner 1988, Sauvajot and Buechner 1993). Impacts include invasions by exotic plant and animal species, increased mortality from roadkill, changes in fire cycles as noted above, disturbance of habitats by foot and vehicle traffic, pollution, and increases in lights and noise.

In the Lake Hodges/San Pasqual Valley open space, degradation of habitat quality by unauthorized recreational uses, off-road vehicles, and adjacent agricultural and residential areas and alteration of the natural fire cycle are the most serious threats to habitat and species. Recreational users have created unauthorized and unplanned trails that increase the levels of human disturbance to interior portions of remaining habitat patches, thereby disturbing or removing native vegetation, compacting soils, and facilitating invasion of nonnative species. In addition, residents of developments that fringe many upland areas of the open space have created illegal access routes into the open space. Illegal dumping is a problem in several locations, generally along paved or dirt roads and along the agricultural leases. Nonnative landscaping in residential areas is encroaching into the open space, and native habitat has been cleared for firebreaks or access routes.

Increased nitrogen input into soils from automobile exhaust greatly favors weedy annual species over native perennial species (Allen et al. 1996). When this effect is combined

with invasion of exotic grasses and unnaturally frequent fires, coastal sage scrub and other communities are rapidly converted to nonnative grasslands or weedy fields (Minnich and Dezzani 1998). This process is likely to accelerate under global climate change (Field et al. 1999).

Development and the construction of roads alter movement patterns of many wildlife species, particularly mobile species such as larger mammals (e.g., mule deer, coyotes, bobcats, and mountain lions). Development can force these mobile species to move more frequently across roadways to reach fragmented habitat patches. Road crossings by wildlife ofeeten result in increased mortality (Beier 1993, 1995). There are several significant wildlife movement corridors in the open space. A corridor along the San Dieguito River connects coastal habitat patches (e.g., San Dieguito River, Black Mountain, Del Mar Mesa, Los Peñasquitos Canyon Preserve) to habitats east of the preserve (e.g., Santa Ysabel, Mesa Grande, Cleveland National Forest). An MSCP wildlife corridor was identified along Sycamore Creek, which connects the San Pasqual Valley to Blue Sky Ecological Reserve. In addition, there appears to be wildlife movement through Bandy Canyon between San Pasqual Valley and the Ramona area. The I-15 bridge over the eastern end of Lake Hodges presents a substantial impediment to wildlife movement along the river valley when the lake level is elevated. Bandy Canyon Road crosses the mouth of Bandy Canyon, and significant road kill has been observed in this area (Lopez pers. comm.). There is also likely movement of animals between the upland habitats around Lake Hodges and those west of Del Dios Highway (e.g., Elfin Forest Recreational Reserve).

4.1.2 Riparian and Aquatic Communities

Riparian plant species recruitment and survival are strongly associated with riverine hydrology and fluvial processes (Scott et al. 1996, 1997; Shafroth et al. 1998; Stromberg 1993, 1998). Woody riparian plant species establish in positions along streams where there are suitable conditions for seed germination and sufficient water for seedling survival, and where they can tolerate physical disturbance from floods (Stromberg and Patten 1992, Hupp and Osterkamp 1996, Scott et al. 1996, Mahoney and Rood 1998). Thus, the structure of riparian vegetation communities is ofeeten a mosaic, at varying spatial scales, of species and age classes produced by spatial and temporal variations in stream discharge patterns (Auble and Scott 1998, Stromberg et al. 1997, Shafroth et al. 1998). This mosaic of structure supports a wide variety of wildlife species with varying habitat requirements. The least Bell's vireo requires riparian habitat with a shrubby understory (3-6 feet above ground) and a dense stratified canopy (USFWS 1998), whereas the arroyo toad requires channel pools and unvegetated sand bars.

Aquatic habitat quality is largely determined by substrate composition and water quality. Macroinvertebrate diversity is generally highest in streams with coarse substrates (coarse sands, gravels, and cobbles), moderate nutrient and high dissolved oxygen concentrations, and adequate tree canopy cover to moderate water temperatures. Species such as the arroyo toad require aquatic habitats for breeding and larval development but also require open sand bars and undisturbed adjacent upland areas to complete portions of

their life cycle. Thus, maintaining suitable sediment dynamics to allow sand bar formation will be necessary to maintain high quality arroyo toad habitat. Vegetation in adjacent upland areas also provides carbon and nutrients to aquatic habitats in the form of leaf litter, woody debris, and terrestrial insects and serves to moderate sediment input.
Storm water runoff from developed areas can carry significant loads of urban pollutants (Paul and Meyer 2001). Runoff from buildings, streets, landscaped areas, agricultural fields, and livestock pens transports water quality constituents, such as silt, metals, fertilizers, herbicides, and pesticides, to downstream waterbodies. These constituents have been shown to cause toxiCity to aquatic organisms and cause eutrophication of receiving waters. Eutrophication generally depresses dissolved oxygen concentrations, particularly in pools and slow-moving waters that are used by species such as the arroyo toad for breeding.

Less studied, but potentially as significant, is the influence of altered stream hydrology on riparian communities. Many species have evolved under specific hydrologic regimes and can be sensitive to changes in the magnitude, frequency, and duration of flows. Modifications of riverine hydrologic characteristics by dams, urban development, and irrigated agriculture can greatly affect the composition of the riparian and aquatic communities. In many instances, altered hydrologic characteristics favor nonnative species at the expense of native species. Stream discharge patterns and fluvial processes in the valley have been altered by Sutherland Dam, roads, agricultural developments, and channel modifications. The general effects of dams are to reduce flood peaks and potential summer base flows. The effects of channel modifications and adjacent developments are to restrict flood flows from leaving the channel, which can alter sediment transport characteristics of the river. We have a poor understanding of the sediment dynamics and its effects on habitat quality in this system. Groundwater pumping for irrigation may also affect the hydrology of the open space by altering water table elevations and dynamics, but the extent of this effect is also unknown.

Several factors can reduce breeding success of covered species in the open space. Nest parasitism by brown-headed cowbirds has the potential to significantly reduce reproductive success of riparian bird species, and cowbirds are abundant because of agricultural areas with livestock and areas with equestrian activities. Nonnative predators such as house cats can also prey on riparian birds. However, the extent to which these factors adversely affect bird species in the open space is not clear. In fact, populations of least Bell's vireos in the open space appear to be increasing (USFWS 1995, Kus and Beck 1998). Nonnative aquatic predators, such as bullfrogs and nonnative fish, can reduce the reproductive success of covered species such as the arroyo toad.

As discussed for the upland communities (Section 3.1), development and human uses facilitate the invasion of nonnative plant species into adjacent natural habitats. Perennial pepperweed is a large problem throughout much of the floodplain, and tamarisk and giant reed are patchily distributed throughout riparian areas of the open space. These species displace native plant species and reduce habitat quality for riparian wildlife species. The extent of the perennial pepperweed infestation is so great that it is likely eliminating large

areas of potential estivation habitat for arroyo toads.

Residential developments and agricultural fields in close proximity to natural open space generally result in increased disturbances from foot, bicycle, and motorized vehicle traffic as well as an increase in trash. In San Pasqual Valley, there has been dumping and encroachment into adjacent riparian habitats. Establishment of unauthorized trails and illegal off-road vehicle access is a large management issue for many portions of the open space. These trails, including authorized maintenance roads and easements, are also routes for trash dumping and invasion by nonnative species. Buildup of trash or litter in and adjacent to the open space can attract house rats and promote the abundance of mesopredators such as raccoons and skunks. An overabundance of mesopredators can affect nesting success of native birds.

4.1.3 Oak Woodland Communities

Recruitment of oaks is governed by soil moisture, acorn dispersal by wildlife, and acorn and seedling predation. Coast live oak acorns require relatively high soil moisture for germination and thus are ofeeten found on northern exposures, in ravines, or near rock outcrops where soil moisture levels are relatively high. Wildlife species (e.g., scrub jays and ground squirrels) can facilitate oak woodland regeneration by removing acorns from under mature trees and caching them in areas suitable for germination. Many native species (e.g., deer and rodents) also eat acorns or seedlings, and their abundance may affect the recruitment of oaks into the population.

Unnatural fire cycles may threaten individual trees in oak woodlands. Extremely hot fires that burn through the protective bark of coast live and Engelmann oaks can kill individual trees. Coast live oak has adapted to fire by crown- or stump-sprouting. Engelmann oak seedlings are relatively tolerant of fire.

Introduced weed species deplete surface water much earlier in the season than the displaced perennial grasses, which diminishes water supplies to oak seedlings (Pavlik et al. 1991). Other disturbances, such as hiking trails, off-road vehicle disturbance, and certain agricultural practices, can also destroy seedlings. Although apparently not a problem yet in San Diego County, recent cases of "sudden oak death" (*Phytophthora* canker) could threaten stands of oaks in the open space if inoculum is transported to San Diego County. Sudden oak death appears to occur more readily in areas where plenty of water is available, such as drainages carrying urban runoff, and trees have high water potentials (Swiecki and Bernhardt 2002). However, fluctuating ground water levels (e.g., around Lake Hodges) appear to cause significant stress and some mortality of oak trees (Kelly pers. comm., Lopez pers. comm.). Oak trees that become established during periods of high waters may become stressed and die during prolonged drought periods. In addition, increased stream flow in drainages adjacent to residential areas (e.g., north of Lake Hodges), as a result of from urban runoff, has the potential to favor the establishment of willows over oaks (White and Greer 2002), thus potentially causing a long-term shift in the species composition of vegetation communities.

4.2 BIOLOGICAL OBJECTIVES

Goal 1: Adaptively manage the open space to maintain populations of MSCP covered species and other sensitive resources.

OBJECTIVE 1—Protect and maintain populations of covered plants and other sensitive plant species and their habitats. In Pasqual Valley open space supports major populations of Encinitas baccharis and wart-stemmed ceanothus, as well as a small number of coast barrel cactus. Nonnative plants, authorized and unauthorized recreational disturbances, and modification of fire regimes potentially threaten covered plant species in the open space.

OBJECTIVE 2—Protect and maintain coastal sage scrub habitats for covered animals and other sensitive animal species. The Lake Hodges/San Pasqual Valley open space is a critically important coastal sage scrub area within the MSCP preserve system, supporting core populations of California gnatcatchers and coastal cactus wrens. The eastern portion of the open space appears to be recovering from a 1993 fire and appears to have reduced habitat quality for breeding bird species (e.g., rufous-crowned sparrow, California gnatcatcher). In other areas, unauthorized recreational trails have disturbed coastal sage scrub habitats and facilitated the invasion of nonnative plant species.

OBJECTIVE 3—Protect and maintain aquatic and floodplain habitat for arroyo toads and other sensitive aquatic species. The San Dieguito River and Santa Ysabel Creek support perhaps the largest population of arroyo toads in the MSCP preserve. Various stresses to the San Dieguito River and Santa Ysabel Creek, tributaries, and floodplain may reduce habitat quality for the arroyo toad and other aquatic species. Off-road vehicle activity, invasive nonnative plant species, trash and agricultural waste dumping, and floodplain encroachment by agricultural operations pose serious threats to aquatic and floodplain habitats that support the arroyo toad and other species. The crossing of Santa Ysabel Creek and Santa Maria Creek by Santa Ysabel Creek Road likely alters the hydraulics and sediment transport regime of these stream reaches, which may have adverse effects on arroyo toads and other aquatic species. Lake Sutherland has altered downstream flows and sediment dynamics in Santa Ysabel Creek, and it is unclear what long-term effects this has had on arroyo toad populations relative to their historic distribution and abundance.

OBJECTIVE 4—Protect and maintain riparian habitat for covered birds and other riparian bird species. Riparian habitats along the San Dieguito River and Santa Ysabel Creek support a large population of least Bell's vireos. The wetlands and floodplain east of Lake Hodges provide foraging areas for white-faced ibis. Nonnative species (particularly perennial pepperweed, giant reed, and tamarisk) are reducing the quality of riparian habitats in many areas by displacing native species. Agricultural operations are encroaching on adjacent riparian habitats and, in some instances, apparently clearing habitat within the open space. In Cloverdale Canyon, cattle grazing has severely

disturbed riparian vegetation and has completely eliminated it in some areas. Off-road vehicle activity and trash and agricultural waste dumping are also degrading riparian habitats in several areas of the open space.

OBJECTIVE 5—Protect and enhance nesting and foraging habitat for covered raptors and other raptor species. Grassland and open scrub vegetation communities provide important foraging habitat, and cliffs and tree species such as oaks and sycamores provide nesting opportunities for covered raptor species (golden eagle, Cooper's hawk, ferruginous hawk, Swainson's hawk, northern harrier) and other raptors (e.g., owls, white-tailed kite, red-tailed hawk, red-shouldered hawk, zone-tailed hawk). Lake Hodges also provides foraging habitat for the peregrine falcon, bald eagle, and osprey. The open space contains recent nesting sites and current foraging territories of golden eagles, which are extremely rare in San Diego County. Nesting areas for many raptor species, particularly the golden eagle, are threatened by increased human activities in the vicinity of nesting sites that is a result of illegal access into adjacent open space from established trails (Bittner pers. comm.).

OBJECTIVE 6—Protect and enhance habitat linkages to other portions of the MSCP preserve system and other regional preserve areas. The Lake Hodges/San Pasqual Valley open space is directly connected to two other important portions of the MSCP preserve system: (1) eastern Poway and the Blue Sky Reserve via Sycamore Creek, and (2) Black Mountain and Lusardi Creek via the San Dieguito River Valley. The Lake Hodges/San Pasqual Valley open space is also an important area connecting the MSCP preserve to the Multiple Habitat Conservation Program preserve and the County of San Diego's North County MSCP Subarea.

Goal 2: Monitor the status of MSCP covered species and other sensitive resources in the open space, and record the effectiveness of management actions.

OBJECTIVE 1—Monitor the populations of MSCP covered species and other sensitive species in the open space. The status of covered species and other sensitive species in the open space must be monitored to document their continued conservation and to gauge the effectiveness of management actions. Several covered species that have not been detected in the open space may potentially occur (e.g., San Diego thornmint, Del Mar manzanita, San Diego ambrosia, Orcutt's brodiaea, and variegated dudleya). Surveys should be conducted to determine if these species are present, identify any potential threats, and develop management recommendations.

Goal 3: Monitor habitats and ecological processes to aid in identifying threats to ecosystem integrity or health and to guide adaptive management of the open space.

OBJECTIVE 1—Monitor habitats to evaluate changes resulting from management measures and other factors (e.g., succession following fire). Habitat quality is likely to change in response to management actions and natural or unintentional perturbations

(e.g., human disturbance of cactus wrens). Understanding the range of changes in the open space is essential to effectively managing its resources.

OBJECTIVE 2—Monitor key ecological processes to provide an appropriate context for interpreting biological changes and responses to management measures. Key ecological processes include disturbance from fire and floods and the succession of habitats following these disturbances and other management actions (e.g., removal of nonnative plant species), nest parasitism and predation on breeding bird species, sediment dynamics, and population regulation by top carnivores. Monitoring ecological processes will allow species and habitat information to be interpreted appropriately and management actions to be identified and implemented accordingly.

Goal 4: Enhance and restore degraded habitats.

OBJECTIVE 1—Implement habitat enhancement and restoration projects. Various habitat enhancement and restoration projects are being planned to satisfy existing mitigation obligations. In some areas, restoration to increase the width of the riparian corridor should be conducted once the particular lease expires. Additional restoration projects could be conducted in the open space. Restoration projects should be consistent with the San Dieguito River Park Concept Plan (2002).

Goal 5: Implement research projects to address management issues.

OBJECTIVE 1—Facilitate the implementation of focused research projects. Effective management may ultimately be hindered by a lack of understanding of the basic biology of the resources and their responses to stressors and potential management actions. Implement focused monitoring and research projects that provide management-related information (e.g., community responses to fire, habitat value of "old-growth" scrub and chaparral habitats, population dynamics of least Bell's vireos and the influences of cowbird parasitism, sediment dynamics and its affect on habitat quality). Encourage and facilitate university-level research to address fundamental biological questions.

Goal 6: Develop and coordinate a centralized data management system.

OBJECTIVE 1—Develop a centralized data management system for use in management efforts. Effective management will require a data management system that allows managers to store and query information collected over time. The data management system must support both spatial data and numerical data. This data management system should also provide requisite information on management activities for annual monitoring purposes.

OBJECTIVE 2—Coordinate land management and resource allocations with other preserve areas. Effective management of the Lake Hodges/San Pasqual open space will require an understanding of resource status and management needs in all parts of the MSCP preserve system, adjacent MSCP subareas, and adjacent NCCP subregions. The

centralized data management system must allow comparison of resource status and management activities among various portions of the preserve within the City as well as in other parts of the regional preserve system.

4.3 PUBLIC USE OBJECTIVES

Goal 1: Enhance public appreciation of the value of the Lake Hodges/San Pasqual Valley open space and conservation issues in general, consistent with the biological objectives of the MSCP preserve system.

OBJECTIVE 1—Provide clearly marked public access points to the open space, and prohibit access at other locations. Public access and uses should be controlled such that biological functions can be maintained throughout the open space and public use impacts can be contained and monitored.

OBJECTIVE 2—Provide clearly identified trails for public use and safety. Restricting the locations of public use will assist in maintaining quality of habitat for wildlife and the quality of trails. Hikers and horses can inadvertently disperse weed seeds, and areas disturbed by human uses provide substrate for the establishment of exotic species. Off-leash dogs can harass wildlife and disperse feces throughout the open space.

OBJECTIVE 3—Identify appropriate uses of the open space, and prohibit inappropriate uses. Encourage uses of the open space that take advantage of its natural and scenic beauty and facilitate enjoyment of the outdoor experience.

OBJECTIVE 4-Provide interpretive information for the public. Provide interpretive information that will increase the public's understanding and appreciation of the biological values of the open space and the potential threats to these values.

Goal 2: Develop a public outreach and education program.

OBJECTIVE 1—Strengthen partnerships with other environmental and educational organizations to develop a public relations plan and education program. Identify and collaborate with public agencies, non-governmental organizations, and educational groups to develop regional and local programs for public education.

OBJECTIVE 2—Encourage and facilitate community involvement and stewardship. Educating and involving local residents surrounding the open space will enhance the public's appreciation of conservation goals while facilitating public use. Motivating the public to take ownership of the open space and to assist with its stewardship will increase the ability to implement management actions.

4.4 FACILITY MAINTENANCE OBJECTIVES

Goal 1: Improve and maintain facilities to ensure that biological resource values are maintained and management activities are facilitated.

OBJECTIVE 1—Maintain facilities and infrastructure in the open space. The existing infrastructure provides appropriate public access and allows fire suppression response. Maintenance of gates, fences, and roads will allow these functions to continue. Install fencing along the riparian habitat in Cloverdale Canyon to prevent encroachment from livestock. The San Pasqual Valley Plan (City of San Diego 1995) recommends restoration of a minimum 300-feet wide riparian corridor through the de Jong Dairy lease in Cloverdale Canyon. The fence should border this restored corridor.

OBJECTIVE 2—Enforce lease boundaries and authorized land uses in and adjacent to the open space. The boundaries between the open space and adjacent City of San Diego leased land and other land ownerships must be clearly established and enforced. Enforce all land uses in and adjacent to the open space to ensure that they are compatible with the objectives of this plan.

OBJECTIVE 3—Conduct cost-benefit analyses of potential flood control and sand removal projects. The aquatic and riparian habitats in San Pasqual Valley rely on flood cycles and sediment transport to maintain their quality. Flood control projects, particularly those involving sand removal or other channel modifications, should be evaluated with adequate technical studies and a cost-benefit analysis relative to the goals of the MSCP. The City's Subarea Plan specifies that sand removal be restricted to areas outside of the riparian corridor, unless determined to benefit the riparian habitat. In the extreme eastern end of the open space, where the riparian corridor is very narrow, the City's Subarea Plan specifies the maintenance of natural ecological processes. These processes include flooding and natural fluvial processes, such as erosion and sedimentation.

5.0 MANAGEMENT AND MONITORING IMPLEMENTATION

The following section describes tasks that will be implemented to meet the goals and objectives defined in Section 4. Implementation tasks can be categorized by priority as follows:

> Priority 1 Tasks—tasks that will be implemented by the preserve manager, or at the direction of the preserve manager, as part of the long-term management of the Lake Hodges/San Pasqual Valley open space (the preserve manager will be identified at the time the land is conserved). Priority 1 Tasks, in some instances, may not be implemented in the short-term but rather may be incrementally implemented over the long-term. However, this designation indicates that this task is a required part of preserve management.
>
> Priority 2 Tasks—tasks that will be implemented only if funding allows.

In addition, a number of enhancement/restoration and research tasks are presented in Sections 5.1.6 and 5.1.7, respectively, which will be implemented at the City's discretion and per the requirements of the City's Subarea Plan (City of San Diego 1997a). Additional enhancement/restoration and research tasks may be identified in the future as additional knowledge about the open space is developed. These efforts will be planned and implemented at the discretion of the City of San Diego, in consultation with the CDFG and USFWS (wildlife agencies), on a case-by-case basis.

5.1 MANAGEMENT

5.1.1 Nonnative Plant Control

Widespread areas of the open space have been invaded by nonnative plant species. Three species—perennial pepperweed, giant reed, and tamarisk—are particularly abundant in the riparian and floodplain areas of the open space, to the detriment of native species. Significant nonnative plant populations also occur in upland areas of the open space, particularly in areas disturbed by trails, adjacent to residential or agricultural land uses, or where recent fires have occurred. These species include poison hemlock (*Conium maculatum*), Cape ivy (*Delairea odorata*), fennel (*Foeniculum vulgare*), pampas grass (*Cortaderia selloana*), artichoke thistle (*Cynara cardunculus*), plumeless thistle (*Carduus* sp.), hirschfeldia (*Hirschfeldia incana*), asparagus (*Asparagus asparagoides*), palms, eucalyptus trees, and nonnative annual grasses (e.g., *Bromus mollus* and *Bromus diandrus*). Figures 10a-d show vegetation polygons where five high priority nonnative species have been detected: perennial pepperweed, giant reed, tamarisk, hemlock, and Cape ivy. While the abundance of the individual nonnative species is variable within these areas, the figures are intended to show areas that should be prioritized for future nonnative plant control efforts.

The primary objective of nonnative plant species management in the Lake Hodges/San Pasqual Valley open space should be to control nonnative plants in areas where they are adjacent to covered species, are reducing quality of habitat in the open space, or have a high potential for causing declines of habitat quality in the open space in the future. General eradication methods for the principal problem species are described below. Many of these locations are in or adjacent to sensitive habitat supporting listed wetland-dependent species and may require coordination with the wildlife agencies prior to implementing eradication programs. In general, individual nonnative plant species within a healthy native plant species community should not be a high priority for treatment. Some aggressive nonnative plants occur adjacent to the open space in agricultural fields or drainages. Also, prioritizing non-native eradication in upstream areas will reduce the re-infestation of treated areas. The City should require lessees to eliminate aggressive nonnative plants from City-owned land and should educate adjacent landowners on nonnative plant control. Nonnative plant species populations in the open space should be monitored to better understand their ability to spread and their responses to eradication efforts. In addition, exotic plant species control efforts should be coordinated with the San Diego Weed Management Area.

Priority 1 Tasks

Task 1: Eradicate perennial pepperweed from the Lake Hodges/San Pasqual preserve (Figure 10a). Control of this species will require an intensive chemical control effort, as mechanical and biological controls have not proven effective (Bossard et al. 2000). Perennial pepperweed has been shown to be intolerant of prolonged flooding (Bossard et al. 2000, Kelly pers. comm.), and thus flooding, particularly at the eastern end of the Lake Hodges basin, may be a potential control option. For effective long-term control, over 95% of the seedbank of this species must be eliminated. Control of this species should initially focus on two primary locations: (1) west of I-15, to prevent its spread in the downstream portions of the San Dieguito River (Kelly pers. comm.), and (2) along easements and access roads, where it can become tangled in vehicles and transported to other locations (Lopez pers. comm.).

Telar is considered to be most effective, but it cannot be applied when standing water is present (Kelly pers. comm.). Roundup and Rodeo can also be used. Telar has a pre-emergent character to it; while it is broad-leaf selective, it is most selective on mustards (Brassicaceae). Apply Telar in the early flowering stage, around April when approximately 5% of the plants are in flower. Check the plants again for a follow-up treatment in 2 weeks, and then again late in the season (6-8 weeks after the initial application). Removal of above-ground biomass (e.g., previous years flower stalks) can facilitate effective application of the chemical to individual plants.

Task 2: Eradicate giant reed from the Lake Hodges/San Pasqual open space (Figure 10b). Giant reed occurs patchily throughout the open space and has been mapped in detail in much of the area by MEC (1998). Giant reed can be

removed by mechanical means; this method is most effective for large stands where there is access for heavy equipment and little native habitat in the immediate area. Mechanical control requires removal of all rhizomes and downstream barriers to prevent fragments from infesting downstream areas. Chemical control methods are also effective and may ultimately be more effective and less disruptive to the treatment area (Lopez pers. comm.). Focus initial control efforts in areas where it is particularly extensive or easily accessed. Ideally, control efforts would begin in upstream areas and work downstream. Also target removal of giant reed along the low flow channel of the San Dieguito River and Santa Ysabel Creek if increasing channel capacity for flood control purposes is being considered.

Stalker is considered to be most effective as a chemical control agent, as it moves into rhizomes more readily than Roundup (Kelly pers. com.). However, Roundup or Rodeo (in areas around water) can be used as well. Large patches of giant reed can be treated after cutting down the stalks with a flail mower or by spraying chemicals into the plant from above (Kelly pers. comm.) or by spraying the foliage of the plant in the fall (Lopez pers. comm.). Giant reed mulch can be left in place without fear of resprouting. However, if revegetation efforts are planned for the treated area, remove the mulch from the site prior to planting. Treat resprouting giant reed again 6-12 months after the initial treatment.

Task 3: Eradicate tamarisk from the Lake Hodges/San Pasqual open space (Figure 10c). Tamarisk occurs patchily throughout the open space and has been mapped in detail in much of the area by MEC (1998). Southwestern willow flycatchers are known to utilize tamarisk for nesting; therefore, survey for flycatchers and other breeding birds prior to eradication efforts. It is anticipated that native riparian habitat that establishes after tamarisk has been removed will eventually provide suitable nesting habitat for willow flycatchers. However, active restoration and maintenance may be required to ensure that native species reestablish as dominants following tamarisk eradication efforts.

Tamarisk is difficult to control mechanically due to its ability to vigorously resprout (Bossard et al. 2000). Biological control methods are being investigated and show some success (see Bossard et al. 2000). In the open space, chemical control likely will be required and should be targeted in areas of denser cover by tamarisk and low cover by native riparian plant species.

A solution of Garlon-4 and basal oil (1 part Garlon-4 to 3 parts basal oil), or Garlon-4 with water and surfactant (1 part Garlon-4 to 3 parts water with 1% surfactant) can be used to control tamarisk. Cut the individual tamarisk plant as low to the ground as possible, and apply the Garlon-4 solution to the cambium layer within 1 minute (Kelly pers. comm.). Check the plants for resprouts 3-4 months after the initial application. Treat resprouts with a foliar application of 2% Roundup.

Task 4: Eradicate poison hemlock from the Lake Hodges/San Pasqual Valley open space (Figure 10d). Poison hemlock occurs primarily along the margin of the wetland habitat south of the Sikes Adobe and along the northeastern margin of Lake Hodges. Poison hemlock is a biennial species, with a low growing basal stage developing the first year and a flowering stalk developing the second year (Bossard et al. 2000). This species can be controlled effectively by mechanical methods. Pulling plants or cutting flower stalks to prevent seed set can be effective and accomplished by individuals that are not licensed herbicide applicators (e.g., volunteers). However, use care in handling the plant, as it is poisonous.

Apply 2% Roundup to the basal rosette or flower stalk prior to flowers opening. Repeat treatments in thick patches of hemlock. Remove old flower stalks prior to spraying to improve success.

Task 5: Eradicate Cape ivy from the Lake Hodges/San Pasqual Valley open space (Figure 10d). Cape ivy occurs in one small area at the west end of Lake Hodges and should be eradicated immediately before it spreads to other areas. Cape ivy can be controlled mechanically, but care must be taken to remove all roots and stems from the ground. Monitor the area following removal, and repeat control efforts as necessary. Chemical control can be achieved with 2% Roundup or a mixture of 0.5% Garlon-4 and 0.5% Roundup (or Rodeo). Use of a silicone surfactant (0.1% in solution) will help the herbicides move through the leaf cuticle.

5.1.2 Establish Open Space Boundaries and Buffer Zones

There is no clear demarcation on the ground (or in usable map form) of the boundary of the open space relative to lease boundaries or utility easements. In many areas, City of San Diego lessees and adjacent landowners are encroaching into the open space. There is at least one area (south of Santa Maria Creek and west of San Pasqual Road) where land originally committed by the City to be included in the open space has been cleared for agricultural uses, and there is agricultural waste and other dumping at the edge of the open space (Figures 11a, b). There is also no buffer between the open space and adjacent land uses, so that any potentially adverse impacts of these adjacent land uses extend into the open space (e.g., chemical applications, escaped nonnatives). In addition, in several areas, the City's Subarea Plan requires expansion of the riparian corridor when the adjacent lease expires or the agricultural use changes, and open space boundaries should be revised to reflect these changes when they occur. Use of easements through the MHPA by public utility agencies should be done in a manner compatible with open space management objectives.

Priority 1 Tasks

Task 1: Establish the boundary of the open space, which should be consistent with the boundary and acreages committed to in the MSCP Plan (City of San Diego 1998).

Task 2: Demarcate the open space boundary in the field with fencing or signage. Any fencing should be permeable to wildlife movement and not restrict debris carried by floods.

Task 3: Demarcate the open space boundary on maps provided to lessees and adjacent landowners. On land leased from the City, establish a minimum 50-feet buffer between the open space and adjacent land uses.

Task 4: For leased land along Cloverdale Creek, as land uses change or leases expire, expand and incorporate the riparian corridor into the open space. The width of the riparian habitat along Cloverdale Creek should be a minimum of 300-500 feet.

Task 5: Exclude livestock from wetland areas, particularly in Cloverdale Canyon (Cloverdale Stables) and along Santa Maria Creek (Verger Dairy). Equestrian operations should generally be 300-500 feet from coastal sage scrub or riparian habitats.

Task 6: Provide maps of the open space boundary, vegetation communities, and other sensitive resource areas to public utilities, and work with them to ensure that their activities are consistent with habitat management objectives.

Priority 2 Tasks

Task 1: Restore land south of Santa Maria Creek and west of Ysabel Creek Road (Habitat Removal area in Figure 11a).

5.1.3 Close Unauthorized Trails, Provide New Trails, and Maintain Existing Trails

Unauthorized trails (volunteer trails) provide human access into sensitive areas of the open space, degrade patches of habitat, facilitate the invasion of nonnative plants, and are potential sources of excess soil erosion. Figures 12a and b show unauthorized trails that are proposed for closure. Gate, fence, or block access to these trails, post "No Access" signs, and trim vegetation to direct trail users. Restore the unauthorized trails to prevent erosion and nonnative plant invasion and to further deter unauthorized use. In many areas, restoration of closed trails will require ripping or mulching compacted surface soils, active revegetation (seeds or container plants), and long-term weed removal.

In several areas, existing unauthorized trails should be legitimized and brought up to California State Parks standards, which are used by the San Dieguito River Park JPA. Figures 12a and b shows trails that are proposed for inclusion in the trail system. This may involve re-contouring to control erosion, widening, and installing features such as retaining walls, culverts, drainage lenses, etc. This will allow heavily used unauthorized trails to be legitimized, monitored, and maintained rather than fighting the public by trying to close them. Newly established trails should be located in the least sensitive areas. Existing authorized trails (Figure 7) should be maintained by the San Dieguito River Park JPA to California State Parks standards. All trail creation activities will require the project applicant (e.g., San Dieguito River Park JPA) or landowner to provide necessary environmental documentation to permit the activities.

In addition, Santa Ysabel Creek Road crosses both Santa Maria Creek and Santa Ysabel Creek at-grade. This road crossing is culverted but water flows over the road during high flow events. The Santa Ysabel Creek road crossing is in constant need of maintenance to function properly and not impede flows or sediment transport. Ideally, this road would be improved to allow better hydraulic function, or removed entirely. At a minimum, the road should be maintained to maximize hydraulic function in this area. The Water Department is proposing a road maintenance project to address these issues. Environmental review of this project would be required and permits obtained from the City of San Diego and state and federal resource agencies.

Priority 1 Tasks

Task 1: Close all unauthorized trails shown in Figures 12a and b. Establish gates, fencing (or other obstructions), and signage to deter continued use.

Task 2: Maintain all trails in the trail system to California State Parks standards.

Task 3: Do not locate trails or allow human access within 4,000 feet of golden eagle nest locations (City of San Diego 1997a).

Priority 2 Tasks

Task 1: Restore all closed trails. Rip compacted soils, revegetate with native plants, and remove nonnative plants.

Task 2: Monitor success of trail closure and restoration efforts.

Task 3: Legitimize specific unauthorized trails (Figures 12a and b), and bring them up to California State Parks standards. Work with City staff and the San Dieguito River Park planners and rangers to identify appropriate trail routes and designs.

5.1.4 Prepare Fire Response and Pre-Fire Management Plans

Fire frequencies and intervals appear to be relatively natural in most areas of the open space. Recent burns at the eastern area of the open space have not fully recovered, and some of the upland habitats in this area have a high proportion of annual grasses. Fire suppression is a priority in this area. The northwestern portion of the open space has no record of burning, and the vegetation is very mature. This mature chaparral supports wart-stemmed ceanothus and, possibly, Encinitas baccharis, which are fire-following species. However, while this individual stand of chaparral is mature, there does not appear to be strong biological impetus to implement a controlled burn in the open space at this time, as the wart-stemmed ceanothus has not become senescent (i.e., it is still flowering), and burning may allow the establishment of non-native plants. In addition, the chaparral communities in other parts of the open space and in adjacent surrounding areas have burned more recently, thus producing a mosaic of stand age in this local area.

Research on California gnatcatcher population dynamics and ecology indicates that gnatcatchers require relatively mature stands of coastal sage scrub (>20 years) to support source populations (Atwood et al. 2002). Much of the coastal sage scrub in the open space area has burned within the last 20 years. Current thinking on fire management in Southern California scrub and chaparral communities is that there is a greater risk of overly frequent fires than of too long of an interval between fires (Keeley 2002). This is particularly true in this open space, which has such a large wildland-urban interface, where the probability of a human-caused fire in this area in the future is considered high.

Because of the high probability of human-caused fires in the open space in the future and the management objective that fires in the open space should be managed to maintain a natural regime, a fire response and pre-fire management plan (Fire Management Plan) should be prepared. The goals of a fire management plan are to (1) ensure the safety of the surrounding residential communities and (2) maintain a "natural" fire cycle. The CDF strives to suppress all fires that threaten public safety. Pre-fire treatment of the land, in the form of fuel breaks and fuel management, as well as enforcement of allowable land uses and access will help to prevent catastrophic wildland fires in the open space. Although fire is an integral part of Southern California shrub land communities, overly frequent fires may result in shifts of species composition, loss of certain native species, or conversion of habitats to those dominated by nonnative species. Maintaining an appropriate fire cycle will assist in achieving a diverse age structure of vegetation communities and will prevent the habitat from becoming overly mature. This in-turn will reduce the fuel load and reduce the chances of large uncontrollable fire events. A Framework Fire Management Plan is included as Appendix D.

<u>Priority 1 Tasks</u>

Task 1: Coordinate with the City Fire Department, CDF, and local fire battalions to develop a fire management plan that reduces the potential for habitat degradation and loss of covered species in the Lake Hodges/San Pasqual Valley

open space. Fire management initially will take the form of fire suppression, but fuel reduction and prescribed burns may be appropriate in some habitat areas in the future.

The fire plan should be consistent with City standards and should identify the following:

- Lines of communication between fire response personnel, including the local fire battalion chief, preserve manager, and other City staff.
- Fire management objectives and general guidelines.
- Areas of sensitive resources to be avoided (both biological and cultural), to the extent consistent with protecting human lives, during fire suppression activities.
- Staging areas for trucks and equipment.
- Fire management units separated by roads or topographic features, including establishment of fuel management zones or fuel breaks, if necessary.
- Prevention and suppression tactics, by fire management unit.
- Frequency of fuel management measures.
- A post-fire rehabilitation strategy.

Task 2: Inform landowners about maintaining their own defensible space. Landowners adjacent to the open space are responsible for having an appropriate defensible space around their homes and other structures and a noncombustible roof, per the requirements of City and County of San Diego brush management regulations.

5.1.5 Control Nonnative Animals

Nonnative animals (e.g., brown-headed cowbirds, feral cats, rats) can depress populations of covered animals via nest parasitism, nest predation, and predation of adult individuals. However, it is unclear whether nonnative animals are significantly affecting covered species populations in the Lake Hodges/San Pasqual Valley open space at this time. Maintain conditions in the open space that minimize the potential for increases in nonnative animal abundance, including preventing trash dumping, accumulation of agricultural wastes adjacent to the open space, and expanding livestock operations.

Priority 1 Tasks

Task 1: Cowbirds are present in the open space. Cowbird trapping by agricultural lease-holders is specified in the City's MSCP Subarea Plan. However, given the increasing population size of least Bell's vireos in the San Pasqual Valley (USFWS 1998, Kus and Beck 1998), cowbird trapping is not considered a high priority at this time. The population dynamics of least Bell's vireos in the open

space and the influence of cowbird parasitism on productivity are not well understood. Monitor the frequency of nest parasitism (see Section 5.2), and conduct research on least Bell's vireo population dynamics (see Section 5.1.7) to guide future management actions for least Bell's vireo and other covered riparian birds. Land uses that promote cowbird populations should be closely evaluated. If cowbirds are determined to adversely affect populations of covered riparian bird species, initiate a trapping program.

Task 2: Prevent the dumping of trash and agricultural waste within and adjacent to the MHPA. Prohibit expanding livestock operations that may promote expansion of cowbird populations.

Priority 2 Tasks

Task 1: Eliminate African clawed frogs (*Xenopus laevis*) from aquaculture ponds at the Water Treatment Plant to prevent them from establishing themselves in the open space.

5.1.6 Enhance and Restore Habitat

Habitat enhancement and restoration efforts should be implemented in areas of nonnative plant control and trail closures and as discussed in Sections 5.1.1 and 5.1.2. Additional restoration opportunities are shown in Figure 13, but these are not intended to serve as a comprehensive list of opportunities. These are primarily riparian creation and floodplain terrace restoration opportunities along streams in the open space, and the lateral boundary of the restoration areas from the stream has been defined somewhat arbitrarily. Riparian restoration opportunities refer to areas that will likely support southern willow scrub or southern riparian forest habitats (e.g., habitats dominated by species of willows). Additional field studies would be required to determine the precise boundaries and target communities of suitable restoration areas. Several of these restoration projects would also benefit arroyo toads and other species that utilize floodplain habitats. Many of these potential restoration areas are located on existing agricultural land.

There are a variety of potential options that would allow restoration along the streams in the open space to proceed, such as exchanging leased lands (e.g., between Am-Sod and the Wild Animal Park), long-term leases, and direct purchases of agricultural land. The City should consider whether outside agencies (e.g., Caltrans, County Water Authority) need restoration opportunities. Enhancement and restoration activities will be implemented at the discretion of the City of San Diego, in consultation with the wildlife agencies.

Priority 2 Tasks

Task 1: Cloverdale Canyon. Streamside areas in Cloverdale Canyon are currently being considered for wetland restoration to meet mitigation obligations of both the

City Water Department and the San Dieguito River JPA. There is likely additional area for wetland restoration in this reach.

Task 2: Western end of Am-Sod lease. The riparian vegetation associated with Cloverdale Creek in this area has been cleared. This area is suitable for riparian restoration.

Task 3: Santa Maria Creek. Livestock have been excluded from Santa Maria Creek along the Verger Dairy lease. Restoration of the riparian habitat in this area could be greatly accelerated by active restoration measures.

Task 4: San Dieguito River and Santa Ysabel Creek. Along most of the valley portions of the San Dieguito River and Santa Ysabel Creek, there are opportunities for restoration of riparian habitats, including willow woodlands, willow scrub, and floodplain shrub communities. Most of the areas in San Pasqual Valley are occupied by active agricultural operations.

5.1.7 Address Management Issues through Focused Research

The City of San Diego and preserve managers should encourage research that addresses management issues. The Lake Hodges/San Pasqual Valley open space provides an excellent opportunity to support research on a variety of topics that influence habitat management. The City of San Diego should leverage funding opportunities by encouraging researchers to seek outside funding for research that would benefit management activities in the Lake Hodges/San Pasqual Valley open space and other City-owned MSCP lands. Research activities will be conducted at the discretion of the City of San Diego, in consultation with the wildlife agencies.

Examples of potential research topics at the Lake Hodges/San Pasqual Valley open space include the following.

- Response of vegetation communities to altered fire regimes.
- Response of target species populations, particularly covered species, to controlled-burn fire regimes.
- Covered species population dynamics, including the influence of cowbirds on least Bell's vireos and other riparian bird species.
- Techniques to control nonnative plant species.
- Raptor ecology.
- Population genetics studies of species in the open space (e.g., Encinitas baccharis, other rare plants, herpetofauna, California gnatcatcher and other coastal sage scrub birds).
- The influence of recreational activities on wildlife.

- Studies of pollinators of rare plant species.
- Habitat restoration techniques.
- Fluvial dynamics and its influence on riparian and aquatic habitats.

5.1.8 Maintenance, Public Use, and Enforcement

Maintenance

Regular maintenance activities will be required to effectively maintain habitat quality in the Lake Hodges/San Pasqual Valley open space. Areas where trash and agricultural waste have been dumped are scattered through the open space (Figures 11a, b). The following regular maintenance activities are required to maintain habitat quality and human safety in the open space:

Priority 1 Tasks

Task 1: Evaluate the condition of the open space and its facilities on a (minimum) monthly basis to identify and prioritize maintenance activities.

Task 2: Maintain trails, gates, fencing, and access roads. The San Dieguito River Park JPA is responsible for maintaining its trail system.

Task 3: Remove trash (including fishing line and hooks) and other debris that have been dumped in the open space.

Task 4: Install "poop bag" stations and trash cans for dog feces. Regularly remove dog feces from the trail system in the open space.

Public Use

Facilitate public use and appreciation of the open space in a manner consistent with the biological objectives of the MSCP.

Priority 1 Tasks

Task 1: Provide clearly marked public access points to the open space, and prohibit access at other locations.

Task 2: Provide clearly identified trails for public use, and prohibit use of other portions of the open space.

Task 3: Restrict recreational uses of the authorized trail system to hikers, bicycles, and equestrian users. Prohibit motorized vehicles from the open space, except for

uses authorized by preserve managers (e.g., nonnative species control, habitat restoration, monitoring, etc.).

Task 4: Require that all dogs in the MHPA be on leashes. Establish "poop bag" stations and trash cans so that trail users with dogs can clean up after their pets. Prohibit pets from areas off of designated trails, closed to public access, or otherwise deemed necessary by preserve managers to maintain habitat quality.

Task 5: Evaluate other areas in San Pasqual Valley, with fewer sensitive resources, for relocating model airplane activity currently at the Bernardo Bay area.

Priority 2 Tasks

Task 1: Develop public outreach and education programs within the context of the MSCP in partnership with other local organizations (e.g., San Dieguito River Park, San Diego Zoological Society, National Wildlife Federation, San Diego Natural History Museum, San Diego State Field Station Programs).

Enforcement

Prevent illegal activities in the open space to reduce human disturbance, trash dumping, and spread of nonnative plants.

Priority 1 Tasks

Task 1: Enforce off-road vehicle prohibitions in the open space.

Task 2: Enforce use of authorized trails and illegal incursion into adjacent habitat areas by recreational users. This includes access to Lake Hodges by recreational users, which should be restricted to established access points.

Task 3: Enforce dumping prohibitions in the open space.

Task 4: Enforce leashed dog regulations.

Task 5: Enforce the maintenance of MHPA boundaries from encroachment by lessees and adjacent landowners.

Task 6: Remove homeless encampments from the open space.

Task 7: Enforce the established hours for fishing and other recreational uses at Lake Hodges.

5.2 BIOLOGICAL MONITORING

Two scales of biological monitoring apply to the Lake Hodges/San Pasqual Valley open space—subregional and preserve-level. Subregional monitoring provides information on the status and trends of resources across the MSCP subregion. The Biological Monitoring Plan for the Multiple Species Conservation Program (Ogden 1996) specifies the following subregional monitoring elements: (1) habitat value, (2) rare plants, (3) coastal sage scrub birds, (4) arroyo toads, (5) herpetofauna, (6) raptors, and (7) wildlife corridors. Monitoring for these resources occurs at specific locations within the MSCP preserve, rather than across the preserve as a whole. Quantitative monitoring at these specific locations is in addition to the general preserve monitoring described below. The Lake Hodges/San Pasqual Valley open space, excluding the Wild Animal Park, has subregional monitoring locations for habitat value, coastal sage scrub birds, raptors, and wildlife corridors. Monitoring protocols and locations are currently being evaluated and tested and may change in the future.

Effective management of the Lake Hodges/San Pasqual Valley open space requires biological monitoring to inform the preserve manager of the status of resources, potential threats to these resources, resource response to management actions to address these threats and to general authorized recreational uses. Preserve-level monitoring will track the presence and locations of covered species and the quality of their habitats in a qualitative manner so that appropriate management actions can be identified and implemented in an adaptive fashion. Preserve monitoring at the Lake Hodges/San Pasqual Valley open space should be conducted in a manner consistent with other MSCP preserve units, so that results can be compared across the subregion. Specific preserve monitoring elements are described in the section below. In addition, the preserve manager for the Lake Hodges/San Pasqual Valley open space should visit the site frequently enough (e.g., at least monthly) to develop and maintain an understanding of the condition of the resources and any changes that may be occurring. This is the essence of good preserve management—quickly identifying threats or degraded conditions and immediately identifying and implementing management responses. All of the preserve monitoring tasks described below are in addition to subregional monitoring.

5.2.1 Priority 1 Tasks

Vegetation Communities

Task 1: At a minimum of 5-year intervals, refine the vegetation community map to reflect changes in the boundaries or attributes of vegetation community polygons (e.g., changes in the spatial distribution of vegetation communities or attributes such as level of disturbance). A system such as the California Native Plant Society's Rapid Assessment Technique is appropriate for this purpose (Appendix E). Use the most recent suitable imagery to refine the vegetation map (e.g., color infrared photography from the SANDAG consortium, ADAR or other multispectral imagery, etc.), supplemented with field surveys that focus

on areas of change in polygon shape or attributes. Automated change detection analyses using digital imagery may be helpful in updating vegetation maps and monitoring habitat changes. Tracking the response of nonnative plants to management actions is a high priority for this monitoring effort.

The year 2002 vegetation map will serve as the baseline for comparing future vegetation community monitoring. Baseline surveys were conducted to delineate vegetation communities, using both remote sensing information and field verification. Relevant attributes were assigned to each vegetation community polygon, such as the percent cover of dominant species (both native and nonnative) in each polygon and the notes on the general level of disturbance of each polygon (e.g., evidence of dumping, disturbance caused by recreational trails or off-road vehicles).

Task 2: Track fires (extent, intensity, and periodicity of burns) in the open space using CDF fire history data.

Task 3: Maintain the vegetation monitoring information in a GIS database for the open space.

Covered Plant Species

Task 1: Monitor the distribution and general abundance of covered plant species at 5-year intervals, coinciding with vegetation monitoring. The intent of the monitoring is to follow changes in the distribution of each species and the condition of the habitat over time. Estimate the abundance of individuals within each species polygon visually, with a quantitative subsample, or by other appropriate techniques (e.g., photo-monitoring). Also document the condition of the population and habitat, such as recruitment of new individuals, presence of nonnative species, or other disturbance factors. Minimize disturbance to covered plant populations during monitoring activities.

Task 2: Record the mapped information in a GIS database for the open space, and include attributes for the estimated number or density of individuals and levels of disturbance or abundance of nonnatives.

Covered Animal Species

Task 1: Annually monitor covered animal species to determine whether each species is still present and what areas of the open space it is using. Conduct surveys during the spring breeding season, and record evidence of breeding activities. Map locations of habitat utilized by covered species.

Task 2: In addition to these presence/absence surveys for covered animal species, annually track the nesting activity of covered raptors (e.g., Cooper's hawk, golden eagle), California gnatcatchers, coastal cactus wrens, and covered

riparian birds (e.g., least Bell's vireo, southwestern willow flycatcher). Determine the number of nesting pairs in the open space, the locations of the nests, and success of nesting (i.e., whether or not young are fledged) by conducting focused surveys for these species in suitable habitat in the open space. Also note the condition of foraging areas for raptors and the incidence of cowbird parasitism in covered riparian bird species nests.

Task 3: Maintain the covered animal species monitoring information in a GIS database for the open space.

Nonnative Species

Task 1: Annually monitor and record the distribution and abundance of nonnative plants, focusing on areas supporting covered plant populations, riparian areas, along trails, and in burn areas. Record changes in distribution and abundance following management actions (e.g., mechanical or chemical control, fuel management).

Task 2: Monitor rates of nest parasitism by brown-headed cowbirds on least Bell's vireos.

Task 3: Maintain the nonnative species monitoring information in a GIS database for the open space.

5.2.2 Priority 2 Tasks

Task 1: During annual monitoring of the open space for covered species, also record any observations of other sensitive species not covered by the MSCP, such as California adolphia, smooth tarplant, southern tarplant, western dichondra, San Diego marsh elder, San Diego sedge, Palmer's mugwort, Cleveland's sage, Engelmann oak, rush-like bristleweed, spiny rush, California adder's tongue, Fish's milkwort, and Hermes copper butterfly, and the habitats supporting these species.

Task 2: Monitor restoration and enhancement measures to track success and evaluate responses to management actions. Any restoration plan prepared for the site should include a long-term monitoring strategy.

Task 3: Monitor use of wildlife movement along Santa Maria Creek, where wildlife move between San Pasqual Valley and future conserved lands in the Ramona grasslands. Also monitor incidence of roadkill on Highland Valley Road.

Task 4: In cooperation with the San Diego Weed Management Area, monitor and map the progress of perennial pepperweed eradication efforts.

5.3 REPORTING AND COORDINATION

5.3.1 Priority 1 Tasks

Task 1: Summarize the management and monitoring activities undertaken each year and the status of resources in the open space in the City's annual MSCP report to the wildlife agencies. Include a description of monitoring activities, the distribution and abundance of covered species, quality of habitats, any identified threats (e.g., increasing nonnative plant abundance), management actions implemented, and responses of resources to management activities.

Task 2: Submit all GIS data to the USFWS or the designated GIS data maintenance group with the annual report for incorporation into the subregional GIS database.

Task 3: Every 3 years, prepare a status report that presents data on the habitats and species monitored in the open space. As part of the status report, include recommendations to update this open space management plan, specific priorities for management for the next 3-year period, and the budget and strategy for implementation. Identify hypotheses on which the proposed management strategy is based and research questions needed to address management issues. Evaluate the responses and apparent effectiveness of various management measures in the open space.

Task 4: Participate in the Habitat Management Technical Committee to share ideas on management and to gain an understanding of the regional trends across the MSCP preserve.

Task 5: Participate in the San Diego Weed Management Area and facilitate its mission within the open space.

5.4 STAFFING

A preserve manager should be assigned responsibility for implementing the management plan. This individual should visit the site frequently enough (at least monthly) to develop an understanding of resource conditions and to detect changes in conditions. The preserve manager's responsibilities include prioritizing management activities and coordinating with other technical specialists necessary to implement required monitoring and management activities (described below). The preserve manager is also responsible for coordinating with the wildlife agencies, San Dieguito River Park staff, CDF, and San Diego Weed Management Area and summarizing management and monitoring activities and data in annual preserve status reports. This is envisioned to be a full-time position for an area the size and importance of the Lake Hodges/San Pasqual Valley open space. Because the San Dieguito River Park staff includes rangers with existing management responsibilities and expertise in the open space area, the City should consider developing

a cooperative arrangement with the San Dieguito River Park to assume some or all of the management responsibilities described in this plan.

A variety of technical specialists will be required to conduct field surveys, advise the preserve manager on specific resource issues, and assist with analysis and reporting of monitoring data and activities. These specialists may be City staff, San Dieguito River Park staff, Weed Management Area participants, contractors, resource agency personnel, graduate students, or volunteers and must have demonstrated experience necessary to perform the required function. Technical specialists with the following expertise will be required to assist the preserve manager:

- Vegetation ecology
- Rare plants
- Wetland and upland bird species
- Herpetofauna
- Invertebrates
- Trails and recreation
- Weed abatement
- Habitat restoration
- Fire management
- Facilities maintenance

The monitoring and management program will generate and require spatially explicit data, such as vegetation and species distribution maps, which are most appropriately stored in a relational database with a GIS component. Database maintenance will be required for managing the Lake Hodges/San Pasqual open space, although it is envisioned that the database manager will be responsible for more than just the Lake Hodges/San Pasqual open space. Database management will require inputting field data, implementing quality assurance procedures, providing GIS data and maps for analyses and reporting, and other general database maintenance and documentation requirements.

Enforcement of open space land uses will be required to ensure that unauthorized activities do not degrade biological resource values. This includes enforcing off-road vehicle prohibitions, illegal dumping, unauthorized access, and open space encroachment by lessee or adjacent landowners. City Water Department rangers have citation authority and could fulfill this role. Alternatively, City Parks and Recreation Department rangers could provide enforcement and rely on San Diego Police Department for citations.

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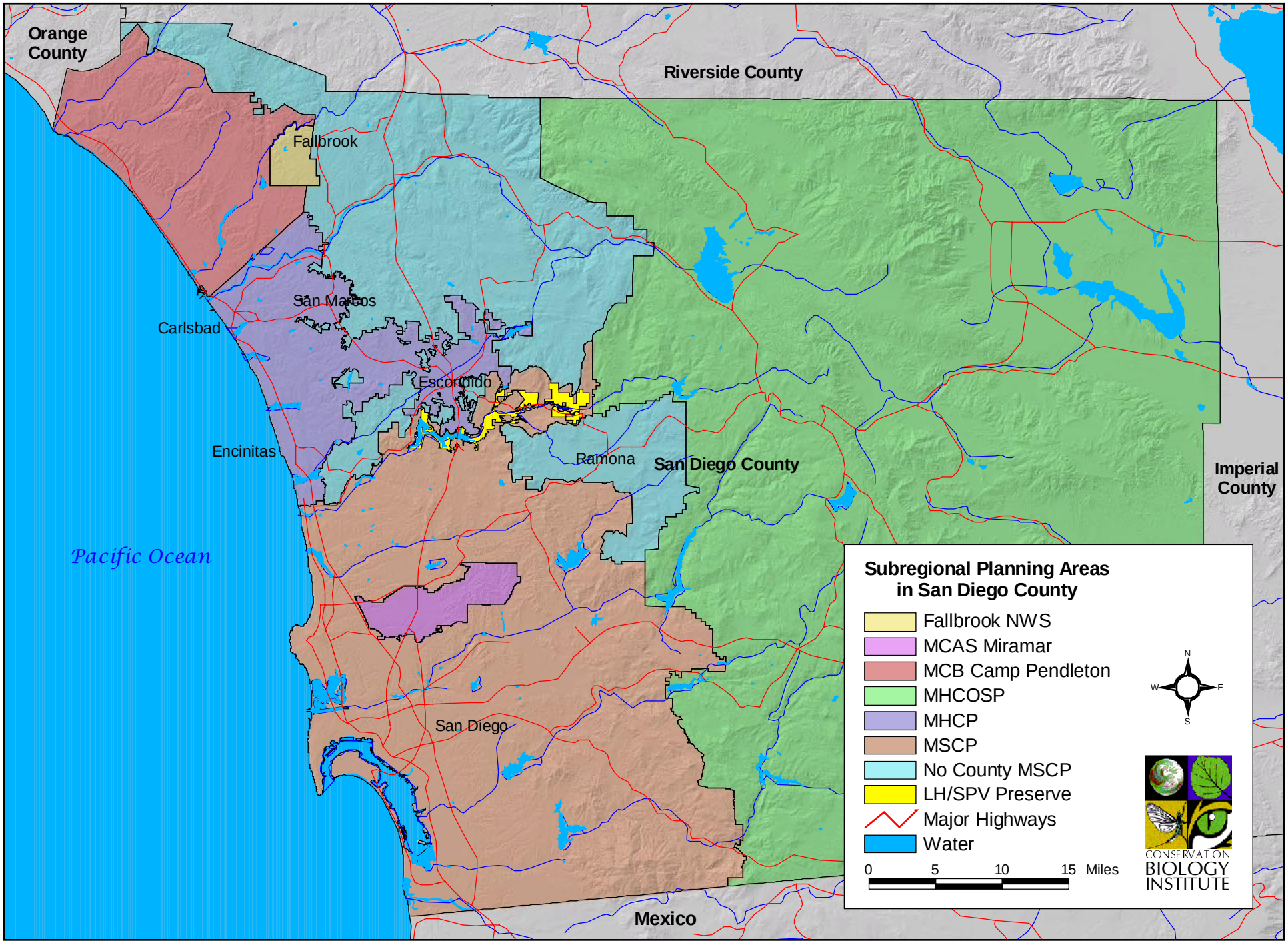


FIGURE 1: Subregional Planning Areas and the Lake Hodges/San Pasqual Valley Preserve Area in San Diego County

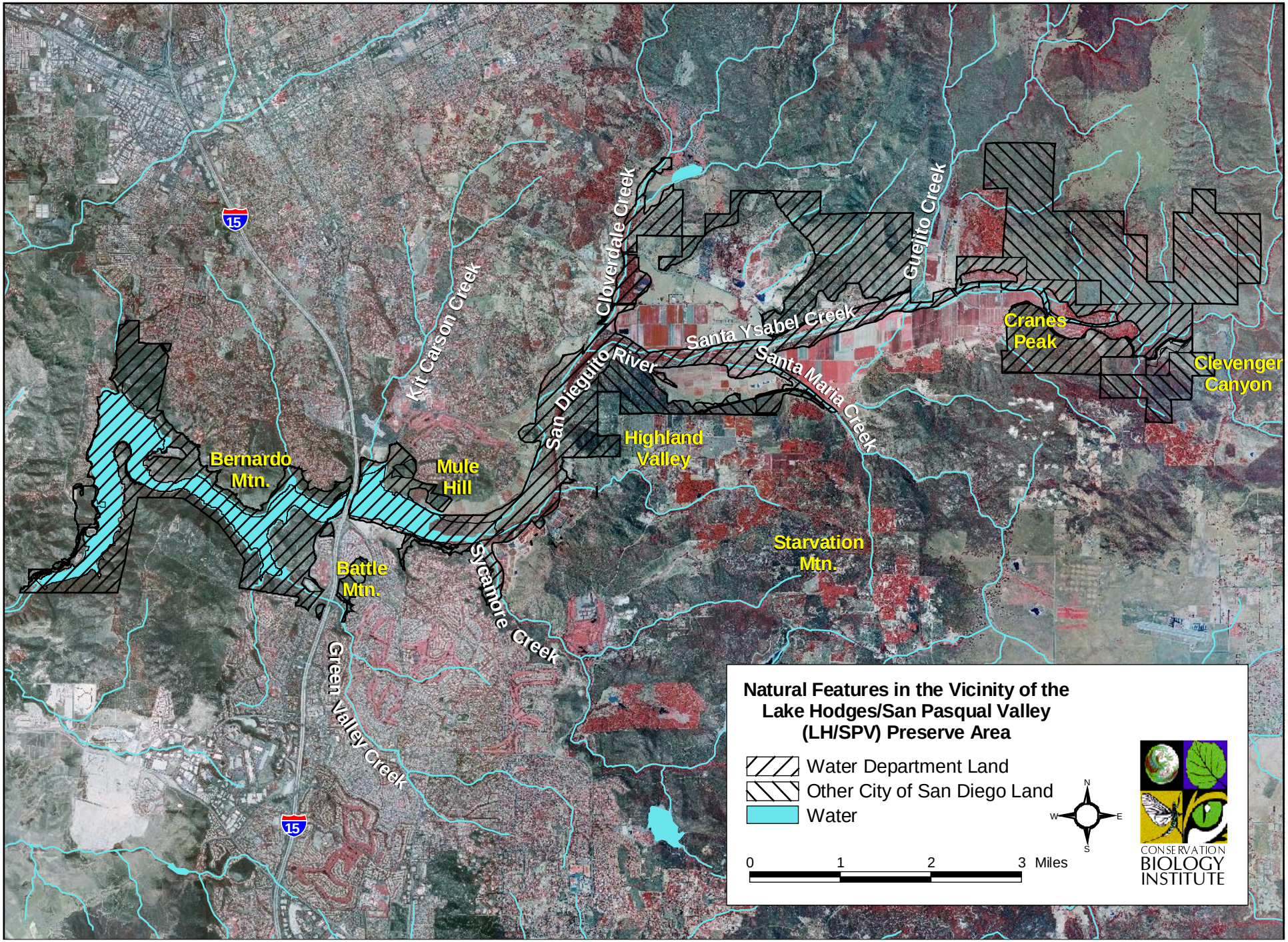


FIGURE 2: Natural Features in the Vicinity of the Lake Hodges/San Pasqual Valley Preserve Boundary

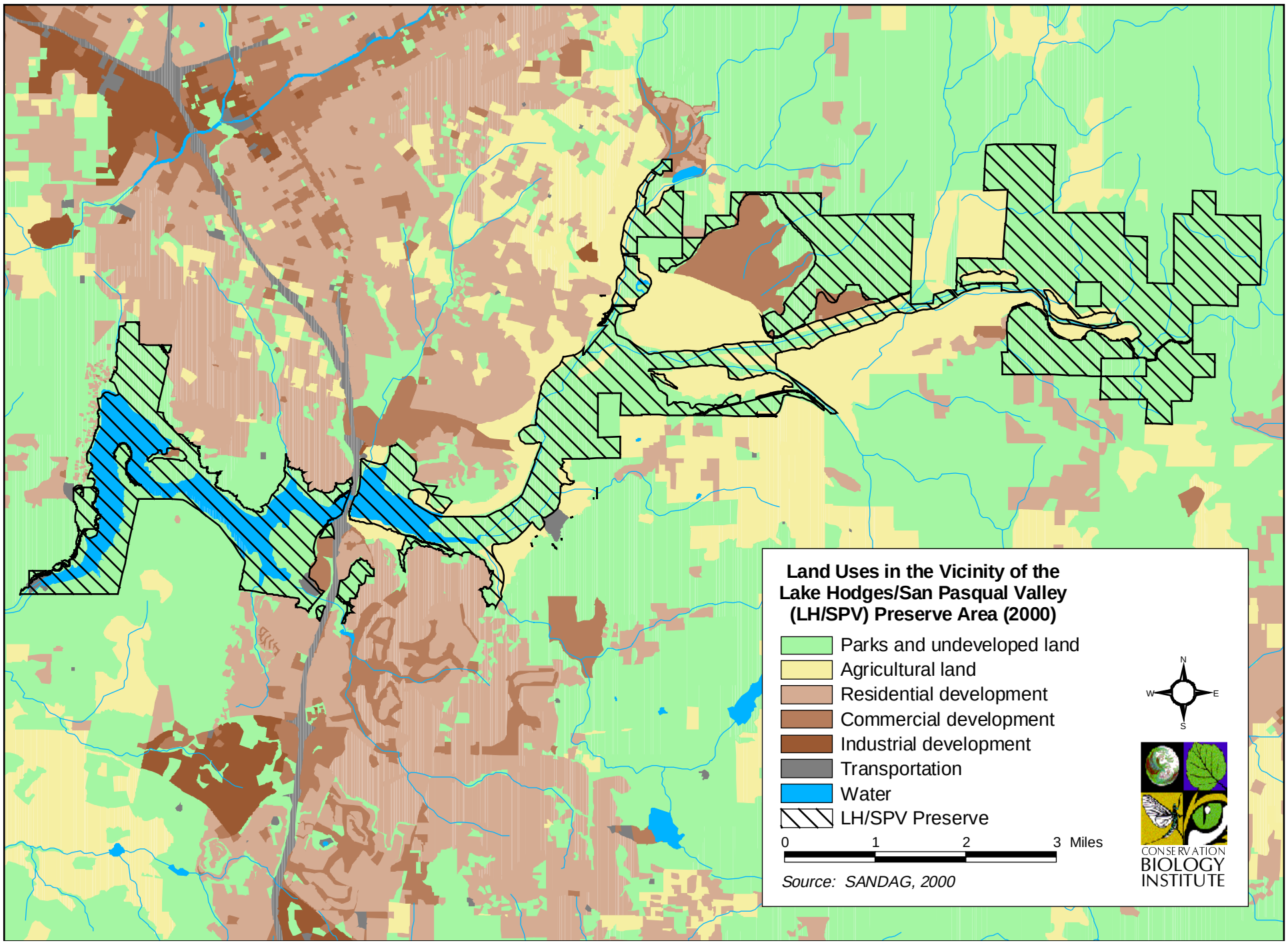


FIGURE 3: Lake Hodges/San Pasqual Valley Preserve Boundary and Land Uses in the Vicinity

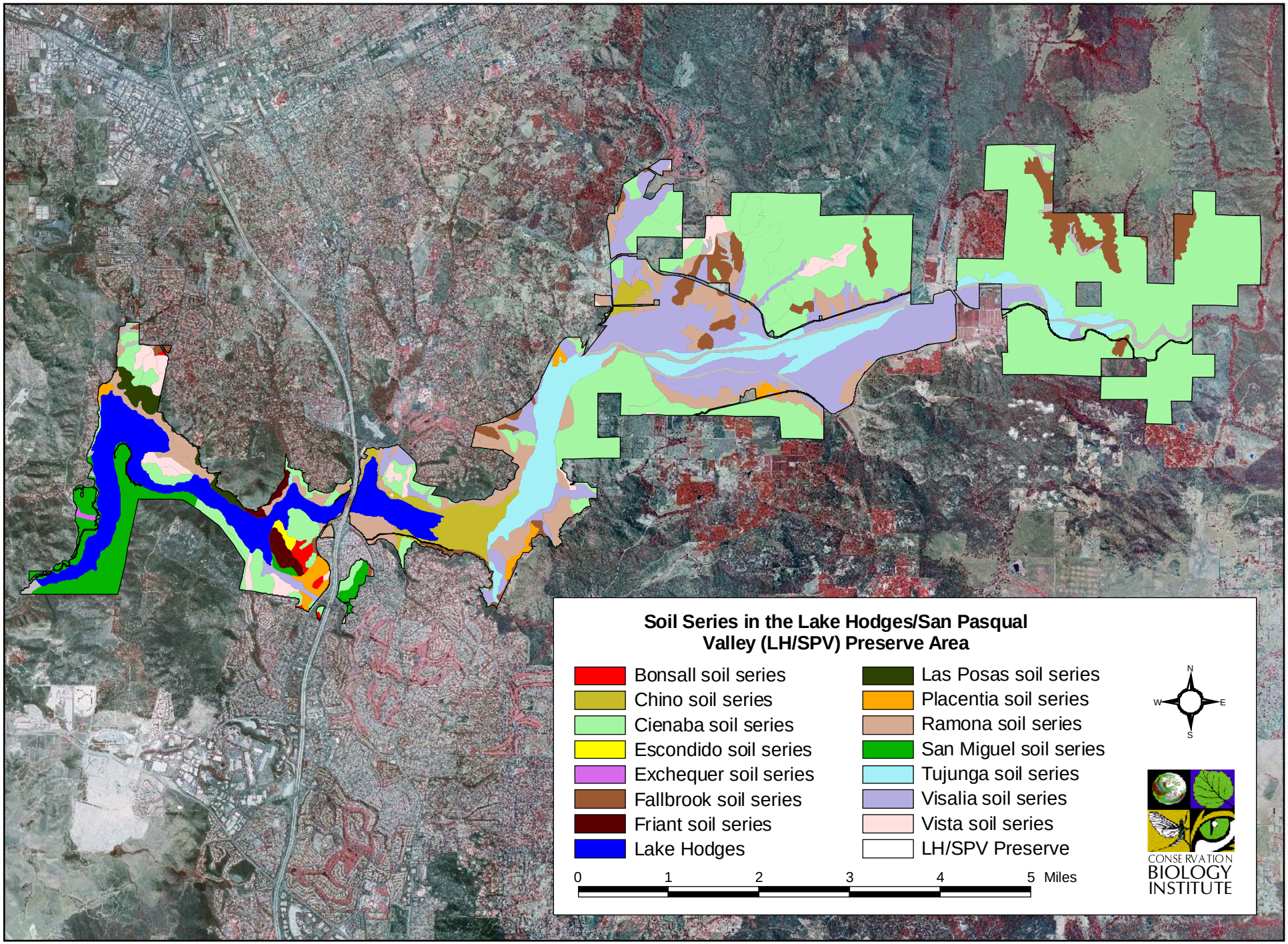


FIGURE 4: Soils in the Lake Hodges/San Pasqual Valley Preserve Boundary

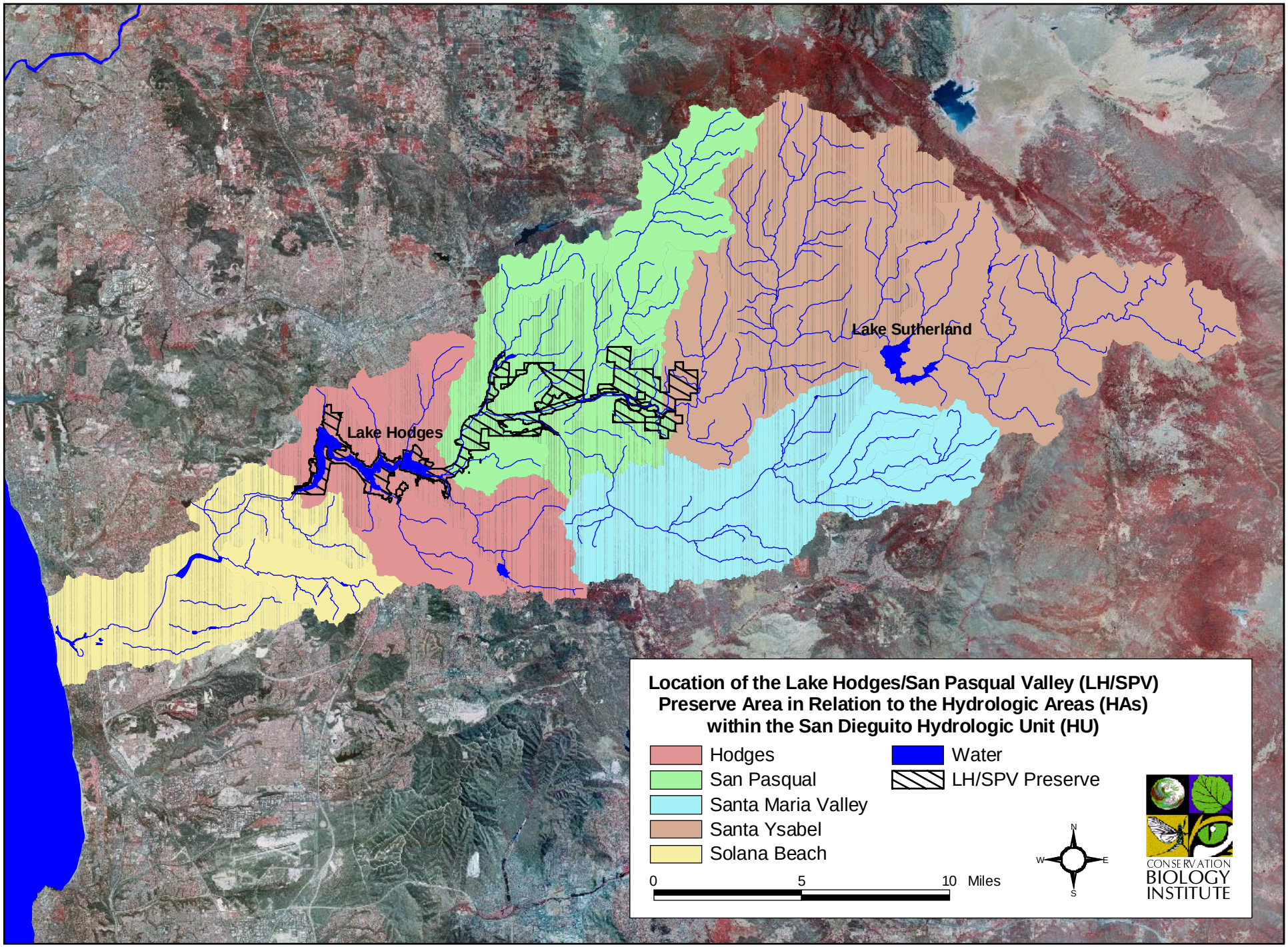


FIGURE 5: San Dieguito River Watershed and Hydrography

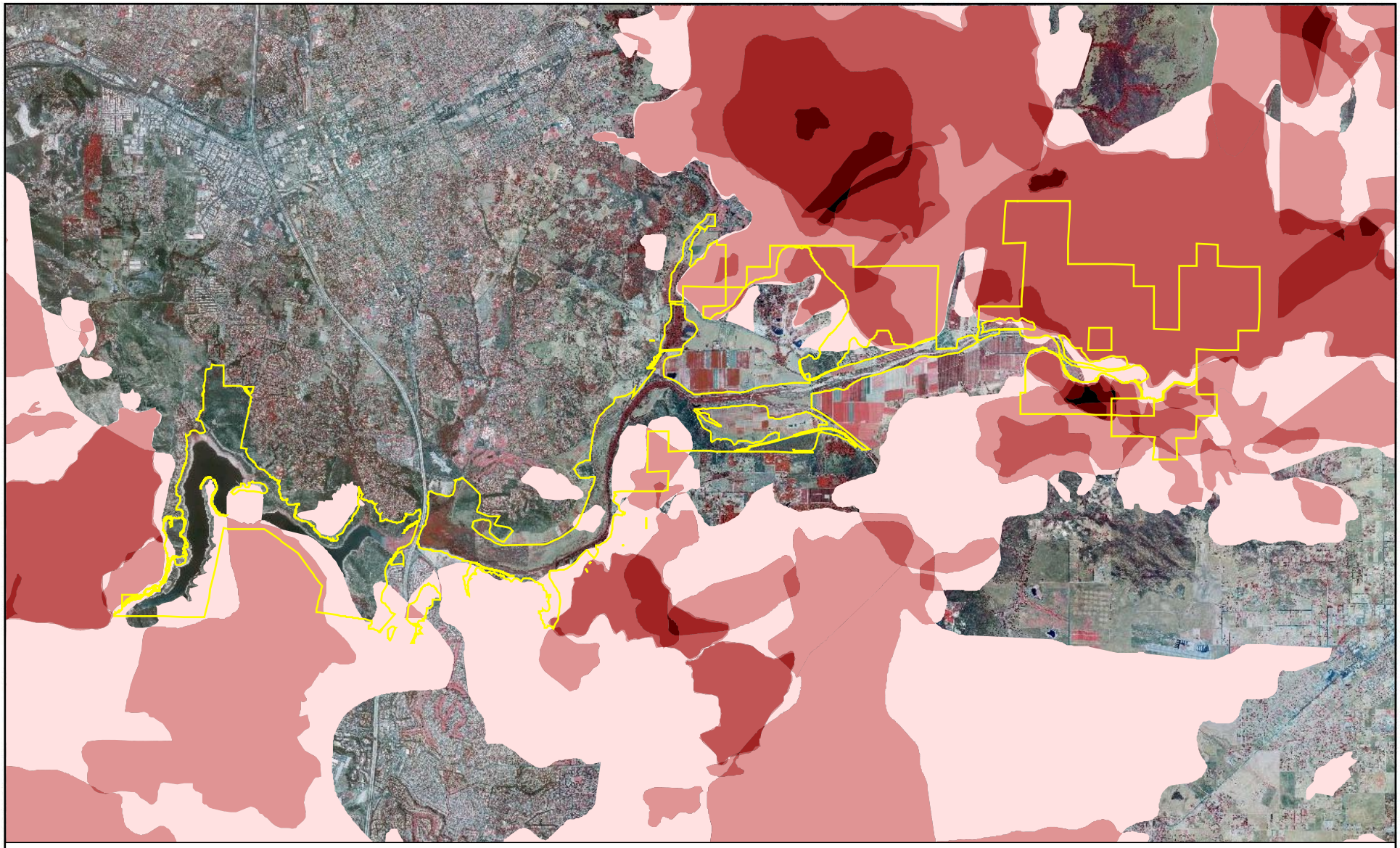


FIGURE 6a: Fire History in the Vicinity of the Lake Hodges/San Pasqual Valley Preserve Area -- Fire Frequency

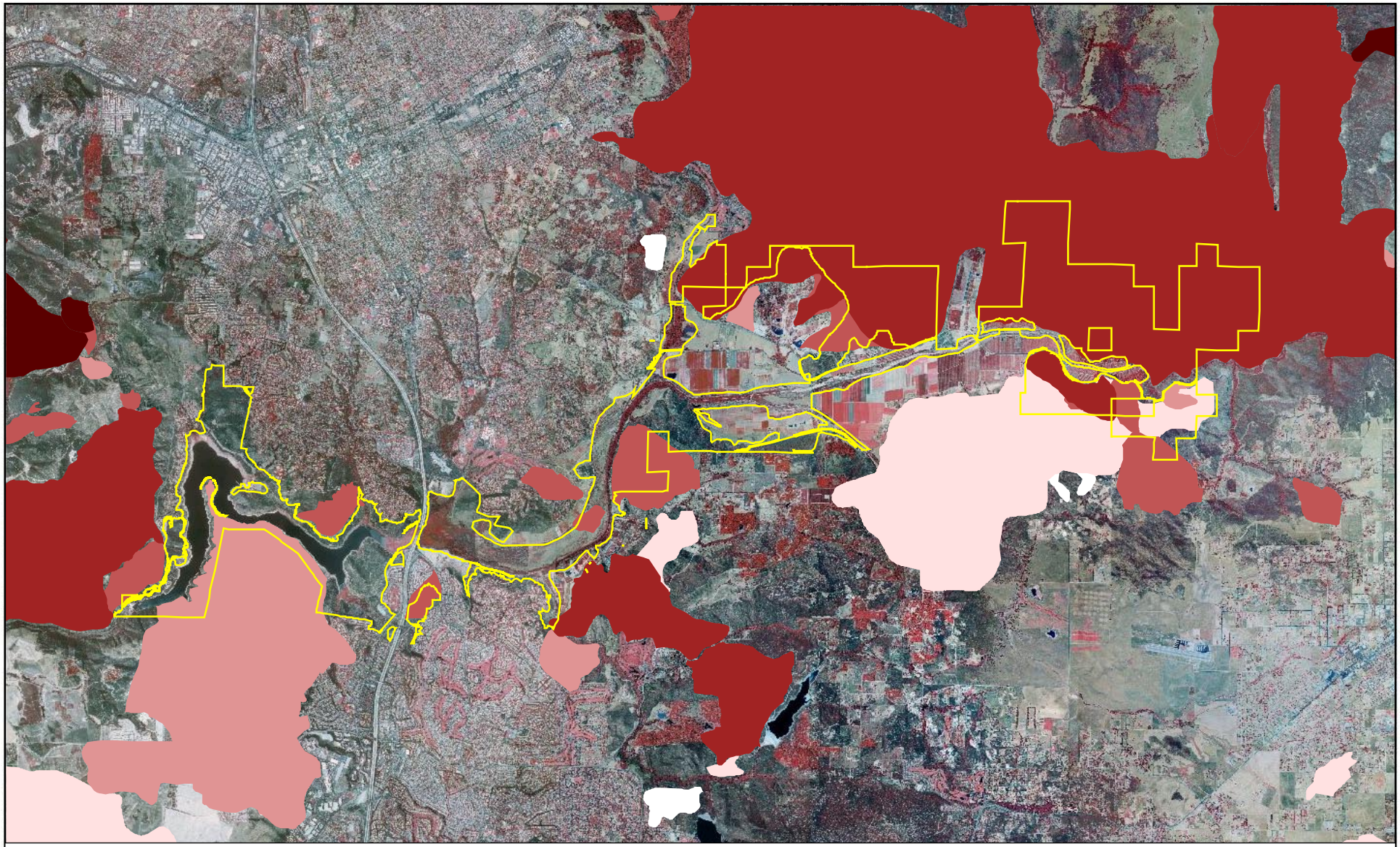


FIGURE 6b: Fire History in the Vicinity of the Lake Hodges/San Pasqual Valley Preserve Area -- Dates of Fire Events

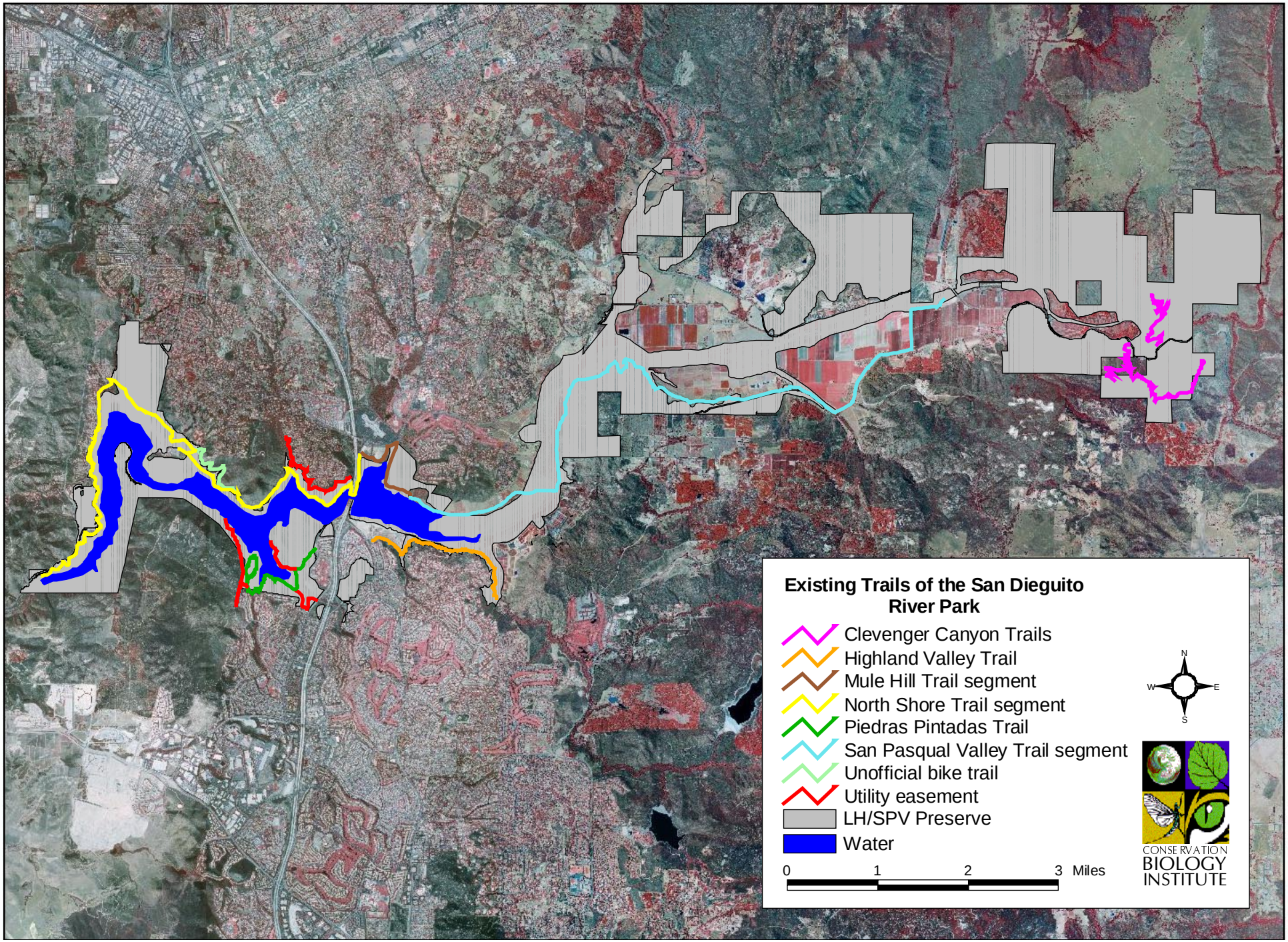


FIGURE 7: Trail System of the San Dieguito River Park

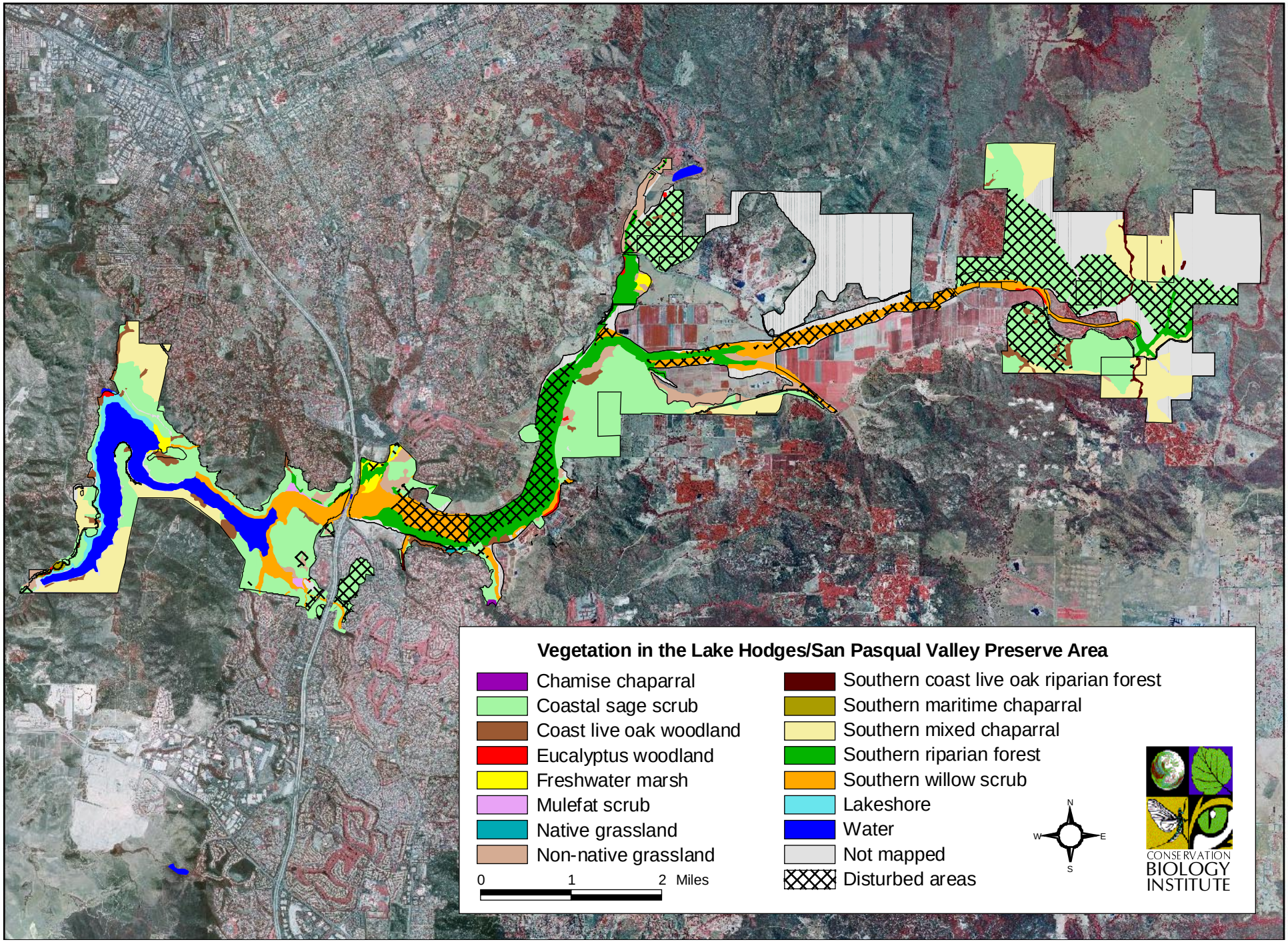


FIGURE 8: Vegetation Communities in the Lake Hodges/San Pasqual Valley Preserve Area

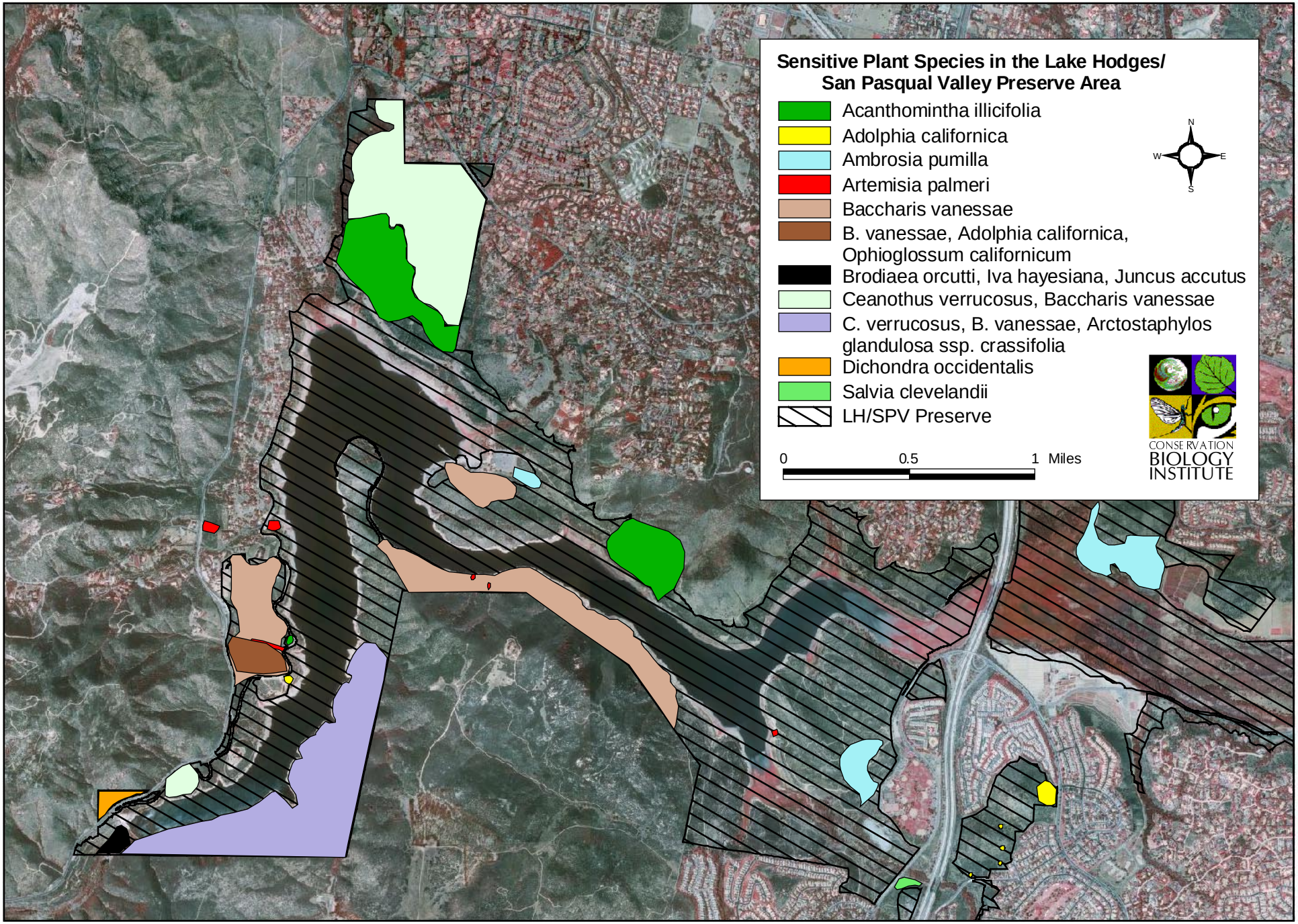


FIGURE 9a: Observed and Potential Locations of Sensitive Plant Species in the Western Portion of the Lake Hodges/San Pasqual Valley Preserve Area

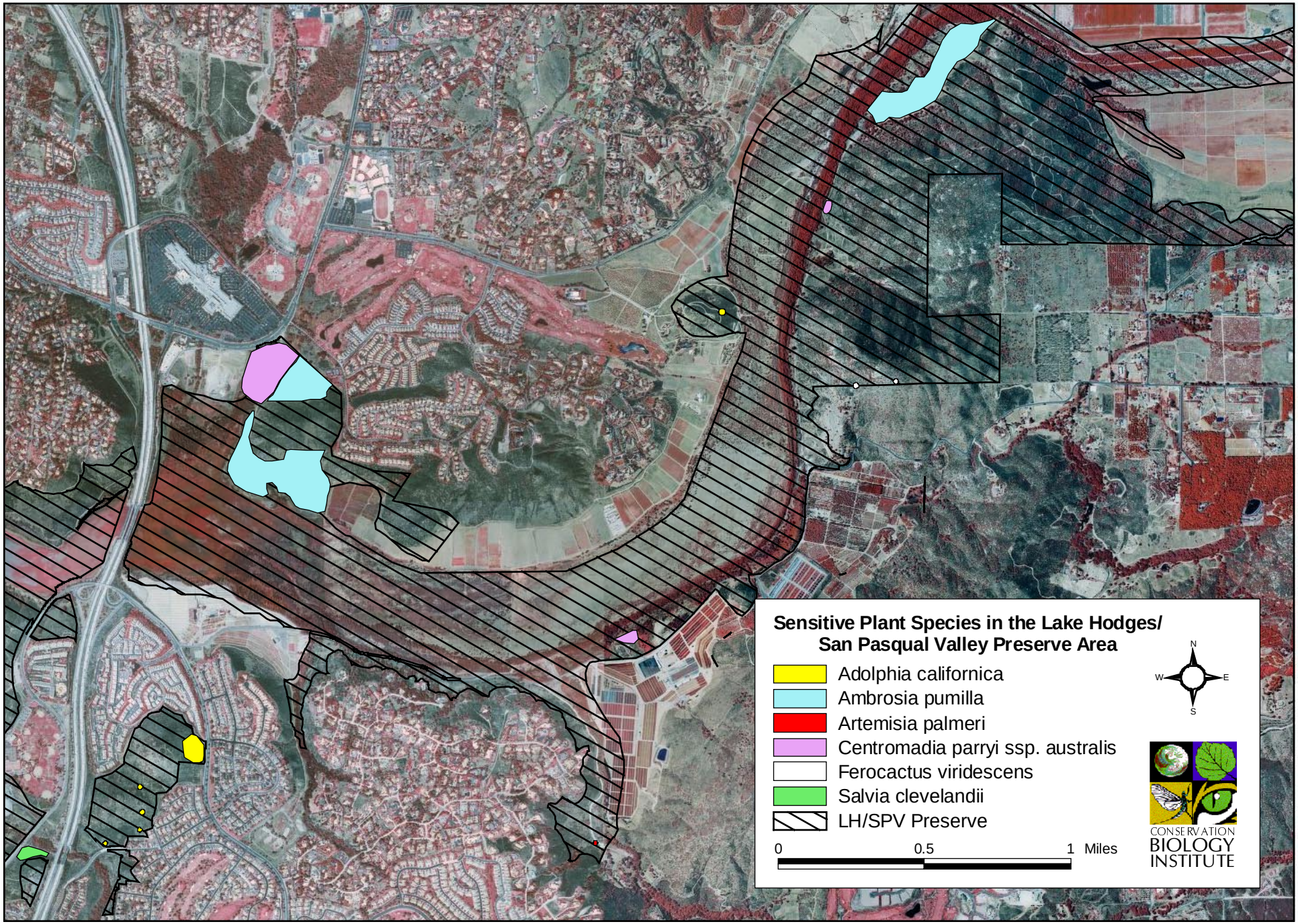


FIGURE 9b: Observed and Potential Locations of Sensitive Plant Species in the Central Portion of the Lake Hodges/San Pasqual Valley Preserve Area

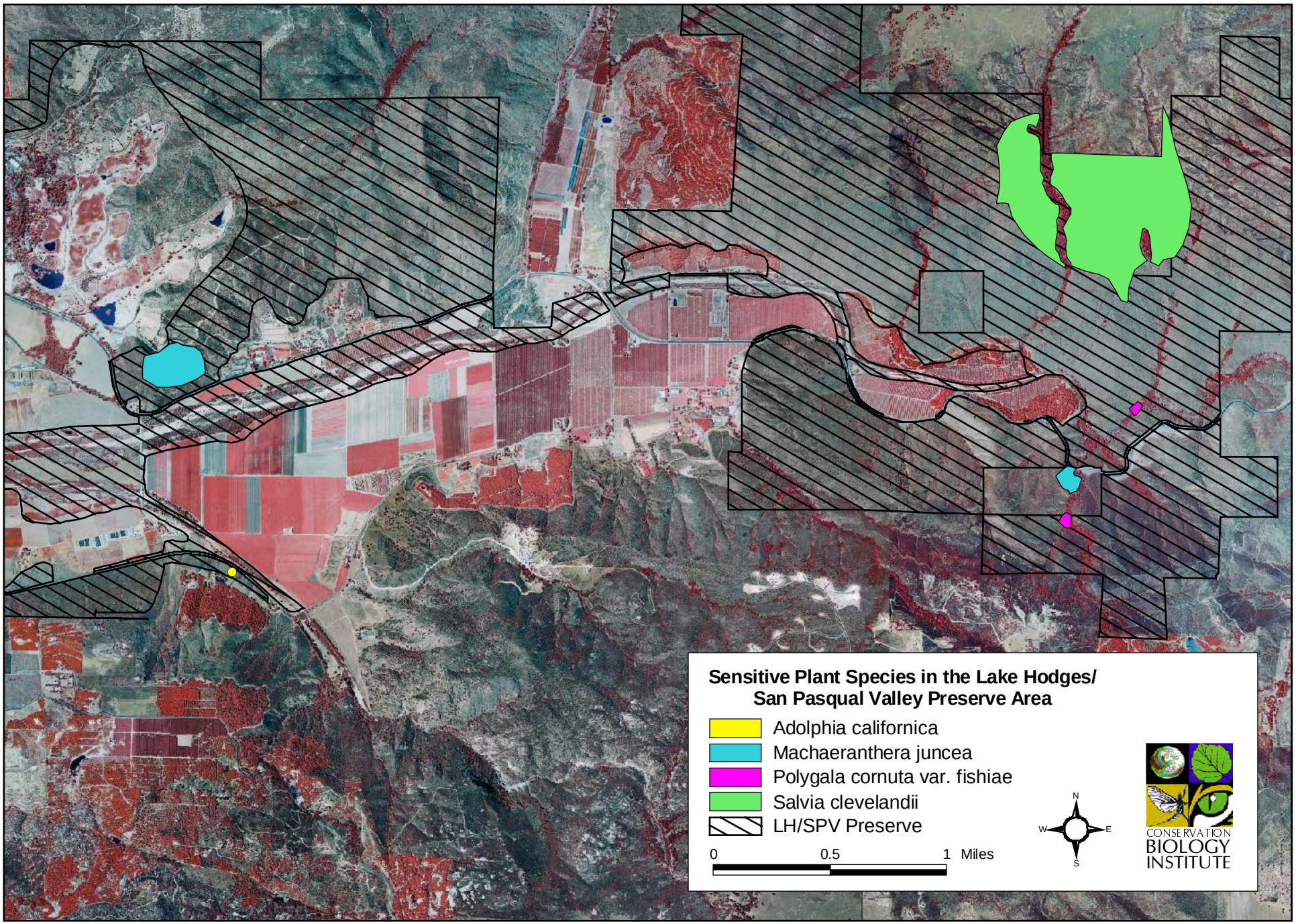


FIGURE 9c: Observed and Potential Locations of Sensitive Plant Species in the Eastern Portion of the Lake Hodges/San Pasqual Valley Preserve Area

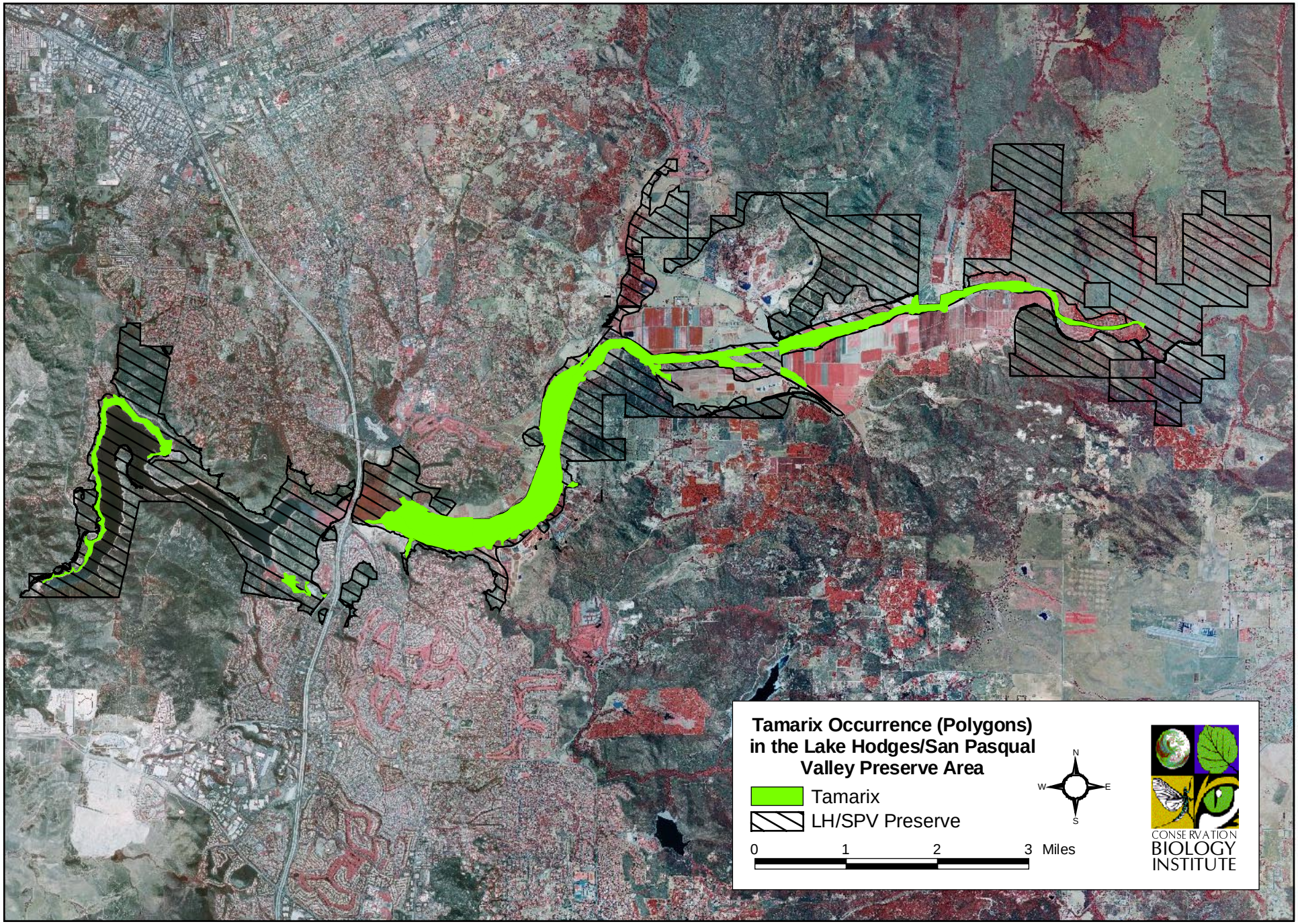


FIGURE 10a: Selected Non-Native Plant Species Occurrences within Vegetation Polygons in the Lake Hodges/San Pasqual Valley Preserve Area -- Tamarix

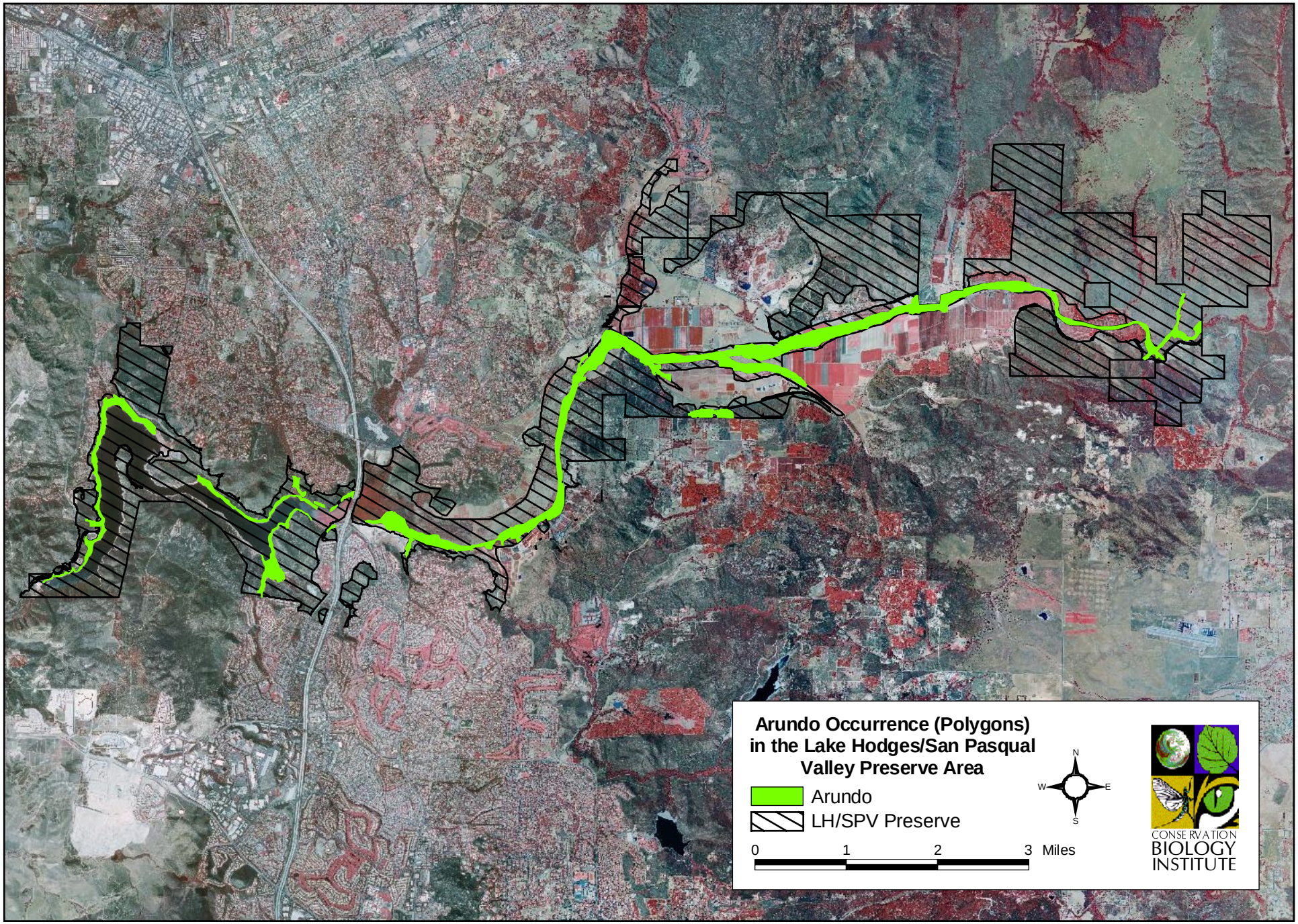


FIGURE 10b: Selected Non-Native Plant Species Occurrences within Vegetation Polygons in the Lake Hodges/San Pasqual Valley Preserve Area -- Arundo

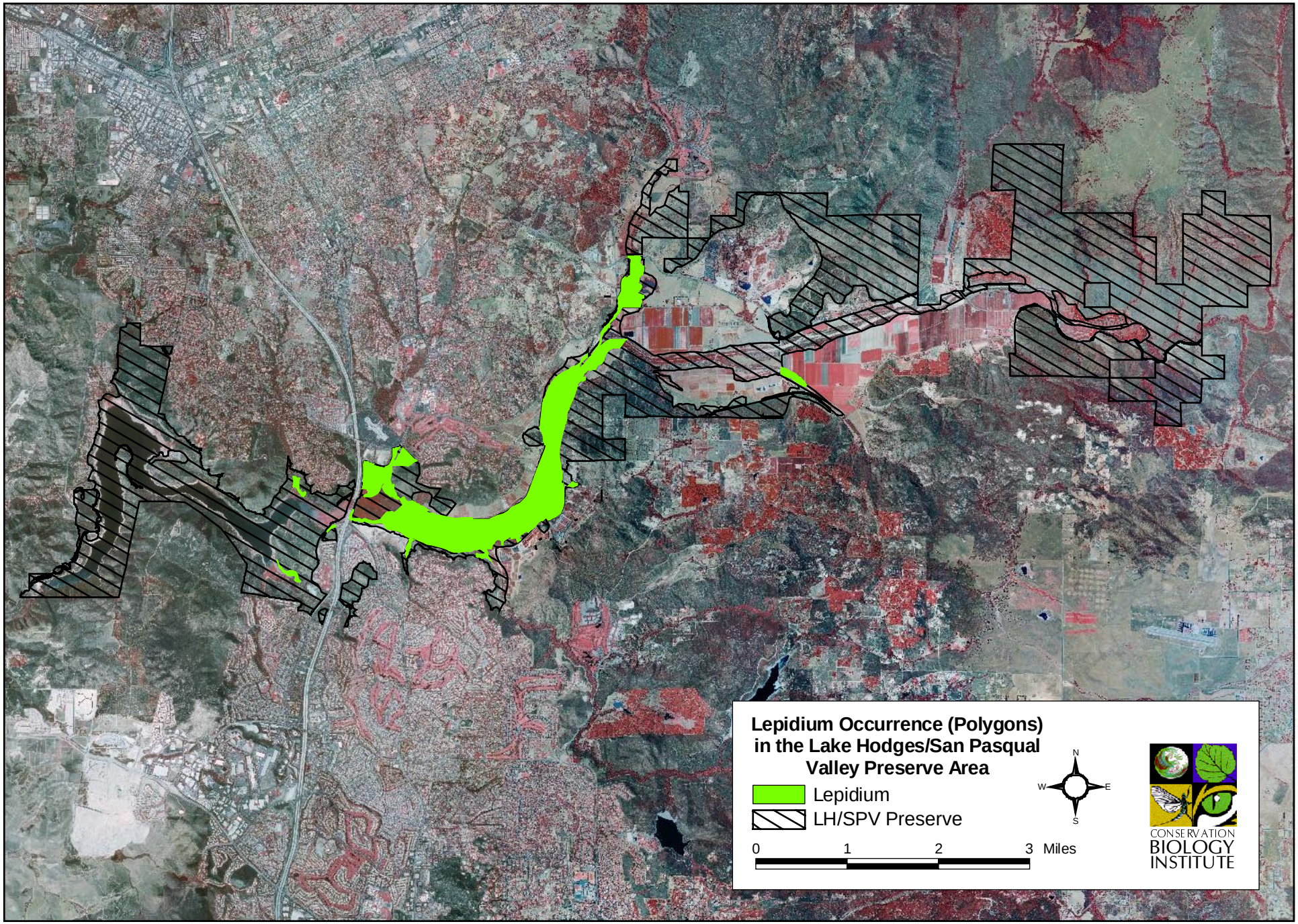


FIGURE 10c: Selected Non-Native Plant Species Occurrences within Vegetation Polygons in the Lake Hodges/San Pasqual Valley Preserve Area -- Lepidium

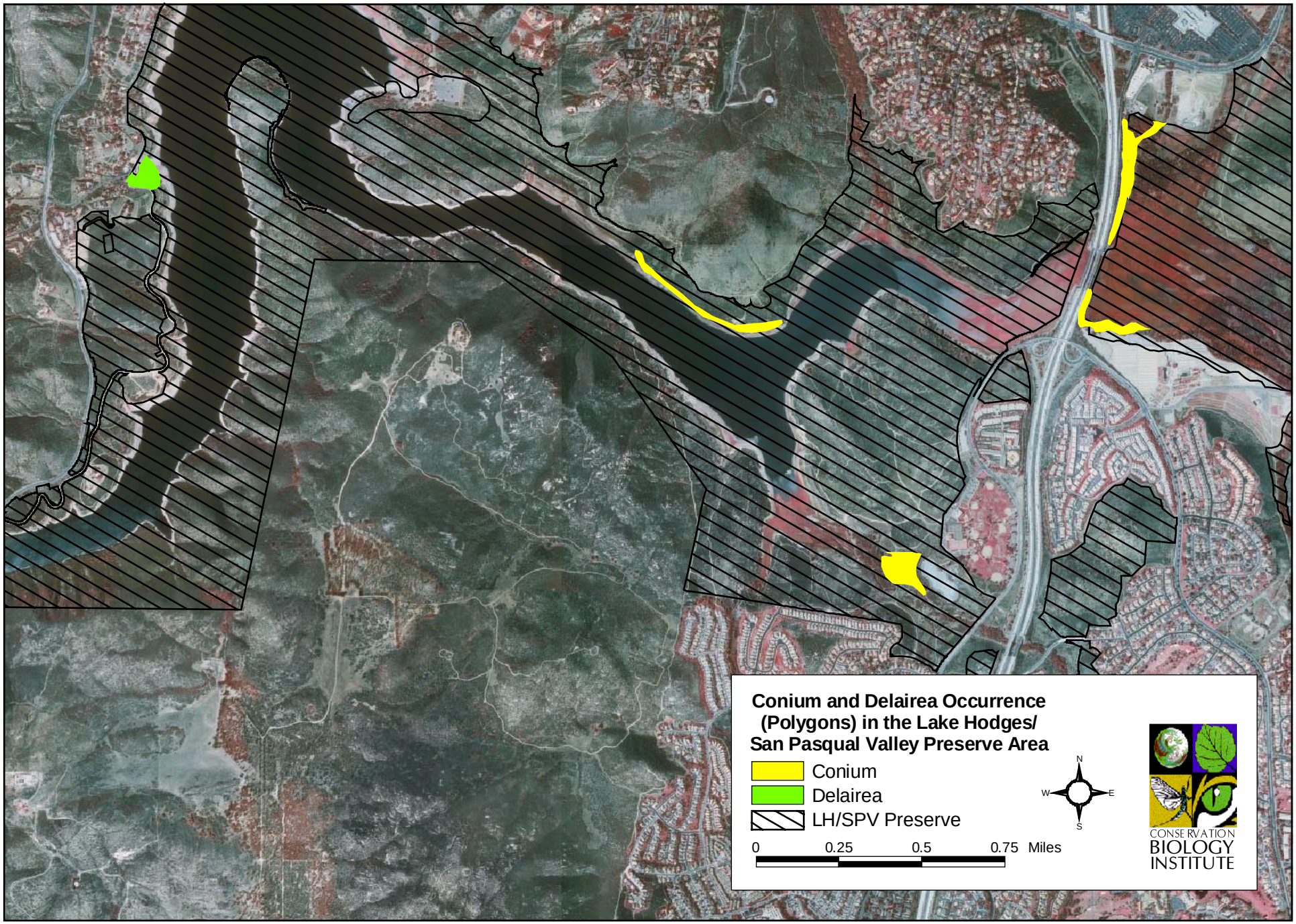


FIGURE 10d: Selected Non-Native Plant Species Occurrences within Vegetation Polygons in the Lake Hodges/San Pasqual Valley Preserve Area -- Conium and Delairea

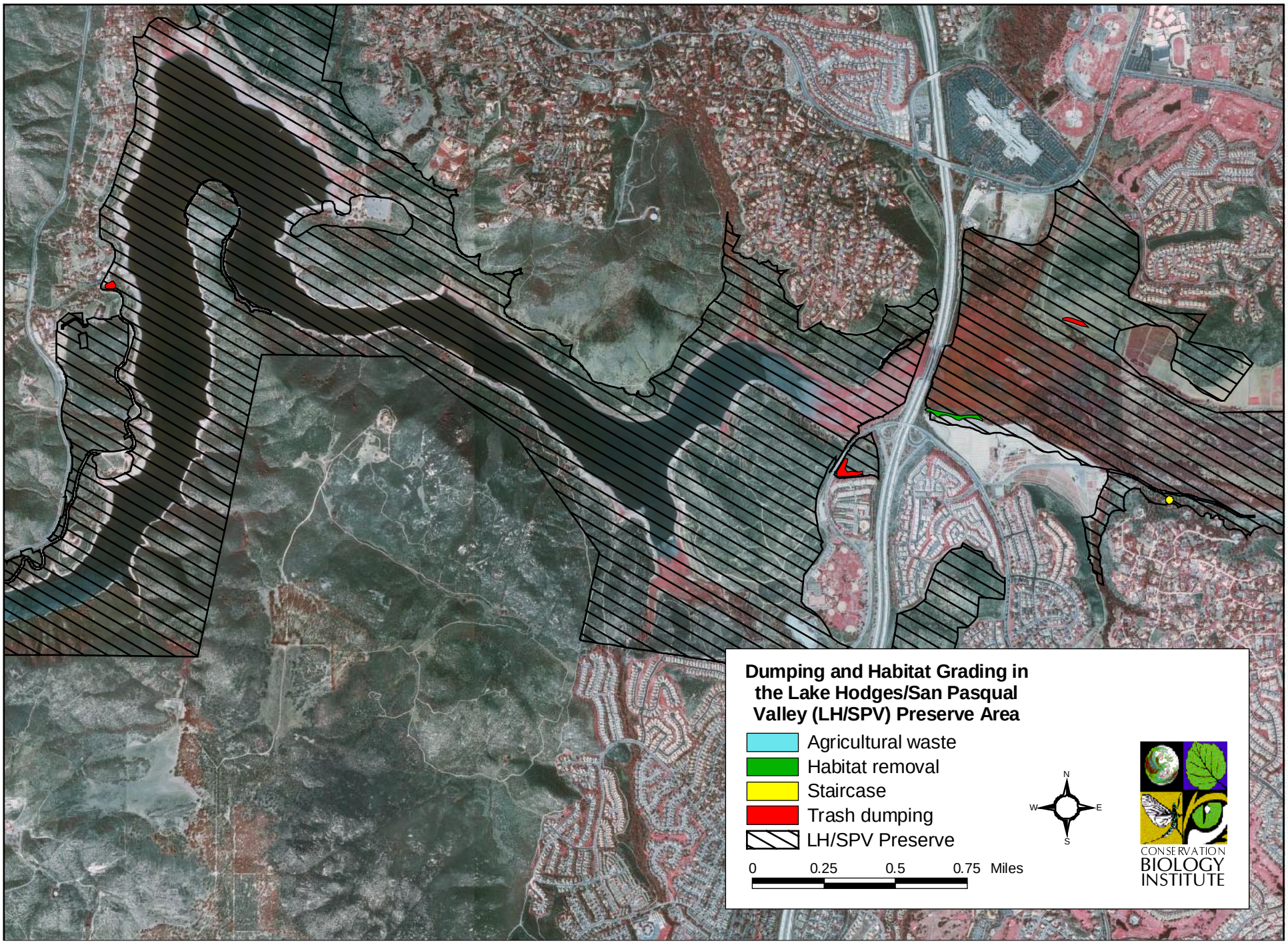


FIGURE 11a: Dumping and Habitat Grading in the Western Portion of the Lake Hodges/San Pasqual Valley Preserve Area

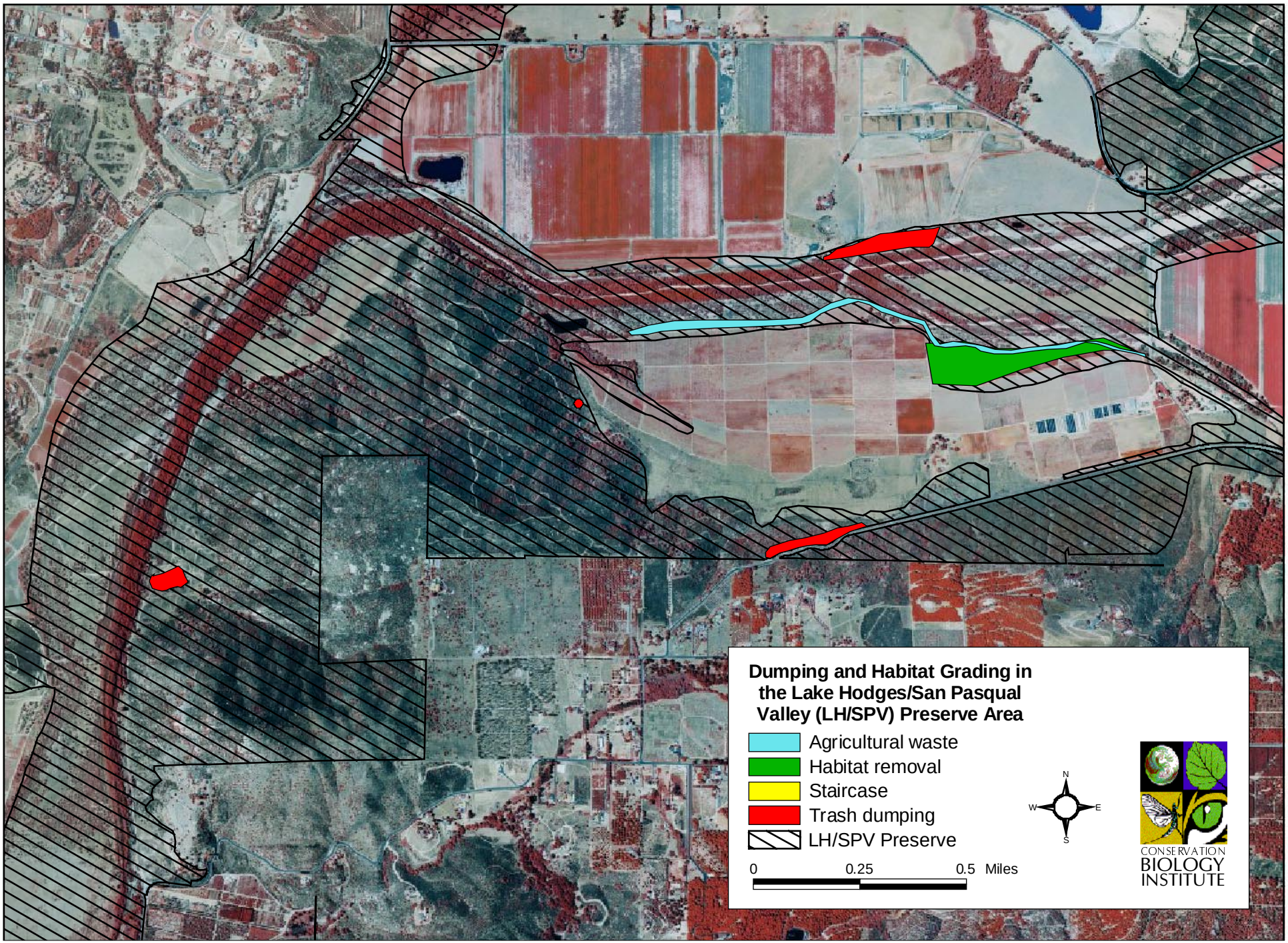


FIGURE 11b: Dumping and Habitat Grading in the Central Portion of the Lake Hodges/San Pasqual Valley Preserve Area

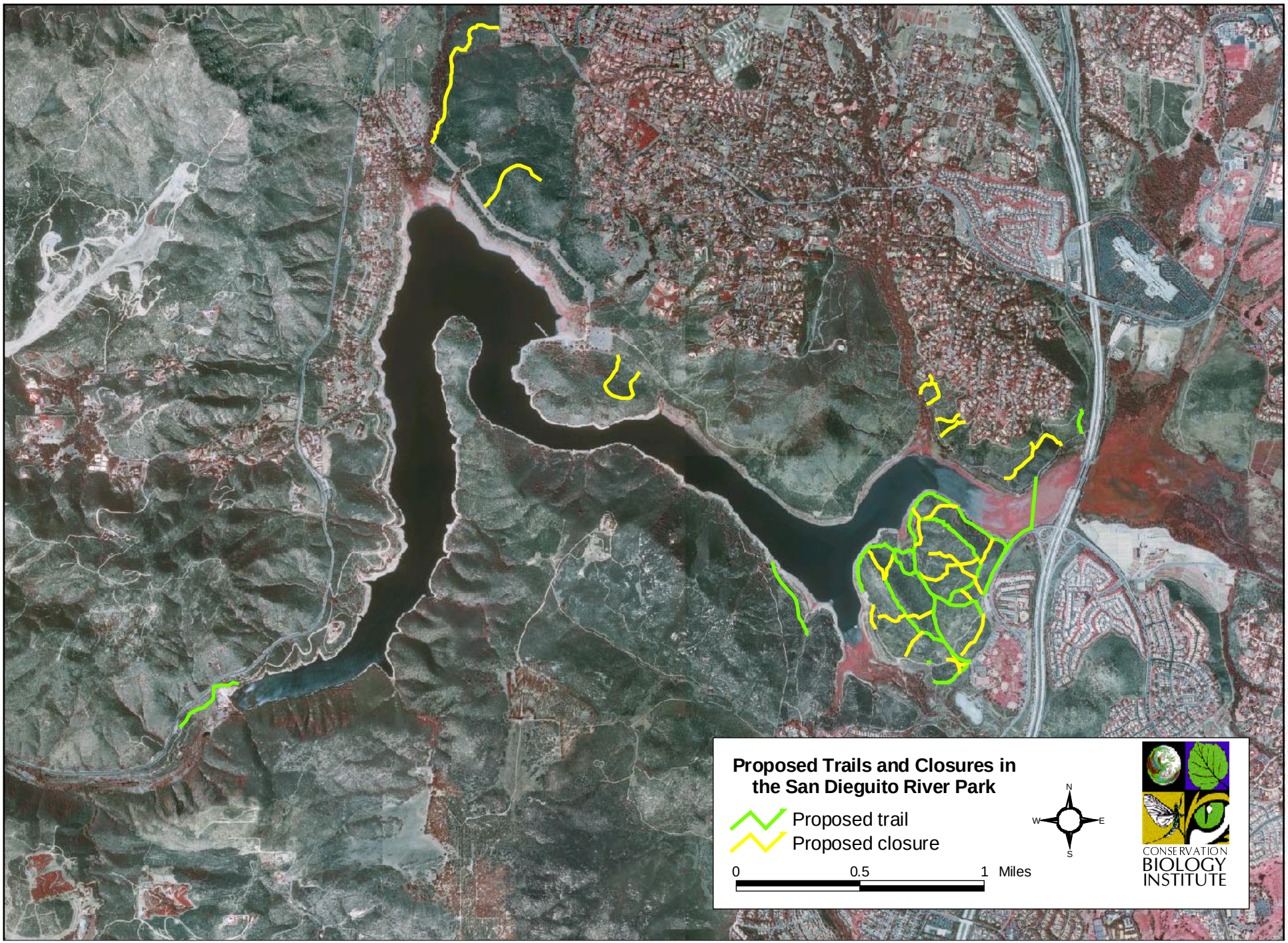


FIGURE 12a: Proposed Trails and Trail Closures in the Western Portion of the Lake Hodges/San Pasqual Valley Preserve Area

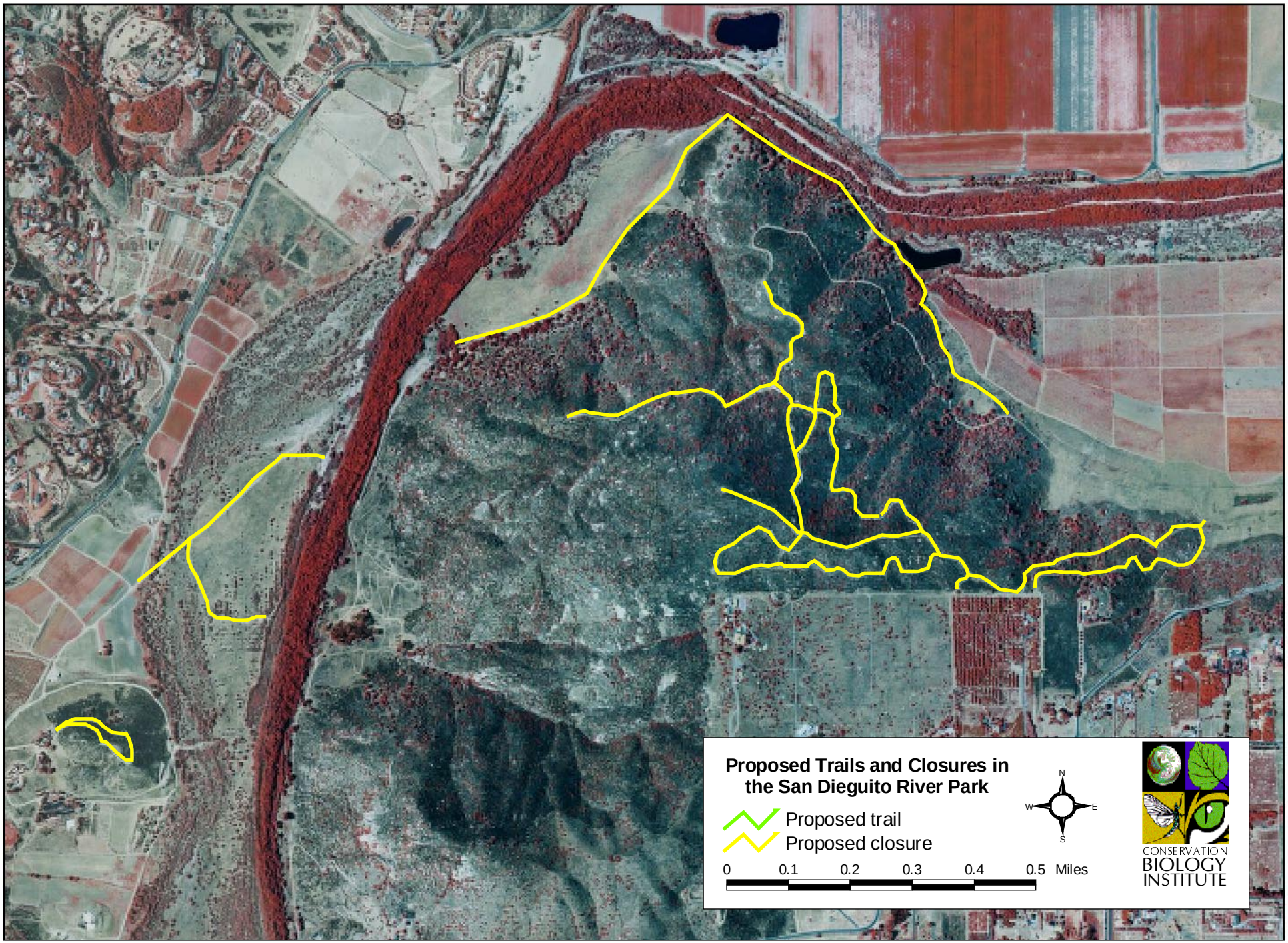


FIGURE 12b: Proposed Trails and Trail Closures in the Central Portion of the Lake Hodges/San Pasqual Valley Preserve Area

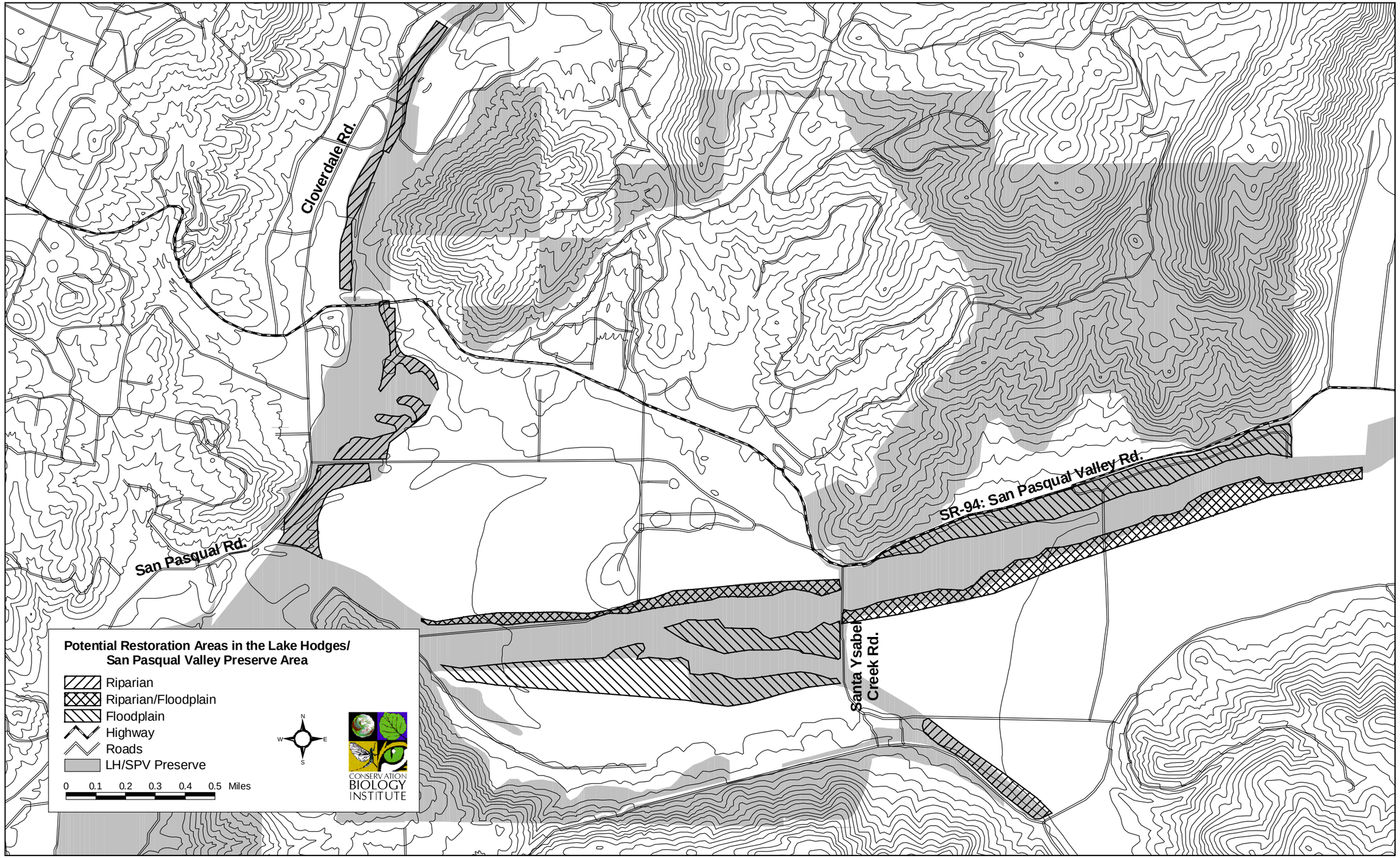


FIGURE 13: Potential Restoration Areas in the Lake Hodges/San Pasqual Valley Preserve Area

APPENDIX A

CITY OF SAN DIEGO LEASES IN THE LAKE HODGES/SAN PASQUAL VALLEY OPEN SPACE

APPENDIX A
CITY OF SAN DIEGO LEASES IN THE
LAKE HODGES/SAN PASQUAL VALLEY OPEN SPACE

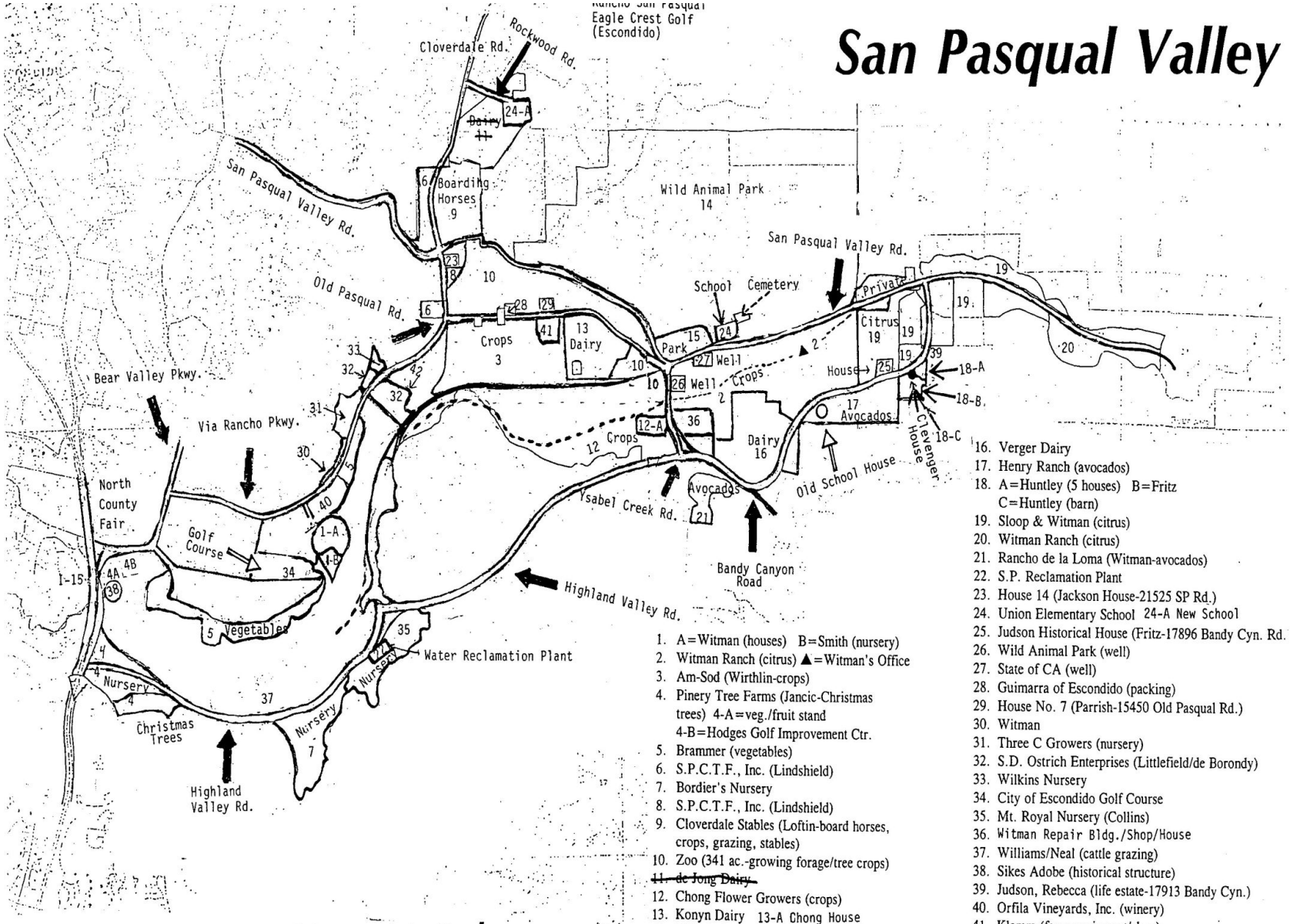
Lessee Name	Scheduled Term Date	Active Status
Am-Sod Inc.	03/31/2026	Normal
Bordier's Nursery, Inc.	12/31/2006	Normal
Brammer, William	05/31/2006	Held Over
Chong Flower Growers	07/31/2012	Normal
City of Escondido	06/01/2050	Normal
Cloverdate Stables Inc/01	08/31/1998	Held Over
Giumarra of Escondido	12/31/2016	Normal
Henry Ranch	06/08/2000	Held Over
Hodges Golf Improvement Center, LLC	06/30/2025	Normal
Huntley, Patricia		Month to Month
Jancic, Charles	12/31/2004	Normal
Jancic, Charles	01/01/2006	Normal
Klemm, Ernest	02/28/1995	Held Over
Klemm, Ernest	02/28/2001	Held Over
Konyn, Frank	03/12/2008	Normal
Mt. Royal Nursery	04/15/2006	Extended
Palomar Enterprises Inc./Einer Bros Inc.		Month to Month
San Dieguito River Park JPA/02	10/02/1997	Held Over
San Dieguito River Park JPA/03	09/01/1995	Held Over
San Dieguito River Park JPA/04	01/01/1996	Held Over
San Dieguito River Park JPA/05	01/30/1998	Held Over
San Dieguito River Park JPA/07	12/17/2001	Past Term
San Dieguito River Park JPA/08	10/13/2002	Normal
San Dieguito River Park JPA/09	04/04/2004	Normal
San Pasqual Christmas Tree Farm, Inc.	12/31/2014	Normal
San Pasqual Christmas Tree Farm, Inc./02	12/31/2024	Normal
San Pasqual Christmas Tree Farm, Inc./03	12/31/2024	Normal
SD Ostrich Enterprises, Inc.	04/30/2007	Normal
Sloop & Witman/01	12/31/2016	Normal
Sloop & Witman/02	12/31/2016	Normal
Sloop & Witman/03	12/31/2016	Normal
Smith, Robert	04/30/2007	Normal
State of CA/Dept. of Transportation/11	03/31/2003	Normal
State of CA/Dept. of Transportation/12	08/31/2002	Normal
State of CA/Monument Park	07/23/2033	Normal
Three C Growers	04/30/2007	Normal
Verger, Bert	10/03/2000	Held Over
Wilkens Nursery	04/30/2007	Normal

APPENDIX A
CITY OF SAN DIEGO LEASES IN THE
LAKE HODGES/SAN PASQUAL VALLEY OPEN SPACE

Lessee Name	Scheduled Term Date	Active Status
Witman Ranch, Inc.	12/31/2016	Normal
Witman Ranch, Inc./01	12/31/1992	Held Over
Witman Ranch, Inc./25 ac	12/31/2016	Normal
Witman Ranch, Inc./30 ac	12/31/2016	Normal
Witman Ranch, Inc./507 ac	12/31/2006	Normal
Witman, Bill	12/31/2016	Mormal
Zoological Society of San Diego		Month to Month
Zoological Society of San Diego	10/31/1995	Held Over
Zoological Society of San Diego/03		Month to Month

Information provided by City of San Diego Real Estate Assets Department

San Pasqual Valley



1. A=Witman (houses) B=Smith (nursery)
2. Witman Ranch (citrus) ▲=Witman's Office
3. Am-Sod (Wirthlin-crops)
4. Pinery Tree Farms (Jancic-Christmas trees) 4-A=veg./fruit stand
   4-B=Hodges Golf Improvement Ctr.
5. Brammer (vegetables)
6. S.P.C.T.F., Inc. (Lindshield)
7. Bordier's Nursery
8. S.P.C.T.F., Inc. (Lindshield)
9. Cloverdale Stables (Loftin-board horses, crops, grazing, stables)
10. Zoo (341 ac.-growing forage/tree crops)
11. ~~de Jong Dairy~~
12. Chong Flower Growers (crops)
13. Konyn Dairy 13-A Chong House
14. Wild Animal Park (1,800-ac.)
15. State of CA Battle Monument Pk.
16. Verger Dairy
17. Henry Ranch (avocados)
18. A=Huntley (5 houses) B=Fritz
    C=Huntley (barn)
19. Sloop & Witman (citrus)
20. Witman Ranch (citrus)
21. Rancho de la Loma (Witman-avocados)
22. S.P. Reclamation Plant
23. House 14 (Jackson House-21525 SP Rd.)
24. Union Elementary School 24-A New School
25. Judson Historical House (Fritz-17896 Bandy Cyn. Rd.
26. Wild Animal Park (well)
27. State of CA (well)
28. Guimarra of Escondido (packing)
29. House No. 7 (Parrish-15450 Old Pasqual Rd.)
30. Witman
31. Three C Growers (nursery)
32. S.D. Ostrich Enterprises (Littlefield/de Borondy)
33. Wilkins Nursery
34. City of Escondido Golf Course
35. Mt. Royal Nursery (Collins)
36. Witman Repair Bldg./Shop/House
37. Williams/Neal (cattle grazing)
38. Sikes Adobe (historical structure)
39. Judson, Rebecca (life estate-17913 Bandy Cyn.)
40. Orfila Vineyards, Inc. (winery)
41. Klemm (farm equipment/shop)
42. Palomar Enterprises (road/corrals)

Rev. [illegible]

Map not to Scale

APPENDIX B

BIRD SPECIES LIST

APPENDIX B
BIRD SPECIES OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name	Breeding Records*	Winter Records*
Acorn woodpecker	*Melanerpes formicivorus*	X	X
Allen's hummingbird	*Selasphorus sasin*		X
American avocet	*Recurvirostra americana*	X	X
American bittern	*Botaurus lentiginosus*		X
American coot	*Fulica americana*	X	X
American crow	*Corvus brachyrhynchos*	X	X
American goldfinch	*Carduelis tristis*	X	X
American kestrel	*Falco sparverius*	X	X
American pipit	*Anthus rubescens*	X	X
American redstart	*Setophaga ruticilla*		X
American robin	*Turdus migratorius*	X	X
American white pelican	*Pelecanus erythrorhynchos*	X	X
American wigeon	*Anas Americana*	X	X
Anna's hummingbird	*Calypte anna*	X	X
Ash-throated flycatcher	*Myiarchus cinerascens*	X	X
Bald eagle	*Haliaeetus leucocephalus*		X
Band-tailed pigeon	*Columba fasciata*		X
Barn owl	*Tyto alba*	X	X
Barn swallow	*Hirundo rustica*	X	X
Bell's vireo	*Vireo bellii pusillus*	X	
Belted kingfisher	*Ceryle alcyon*	X	X
Bewick's wren	*Thyromanes bewickii*	X	X
Black phoebe	*Sayornis nigricans*	X	X
Black-and-white warbler	*Mniotilta varia*		X
Black-bellied plover	*Pluvialis squatarola*		X
Black-chinned hummingbird	*Archilochus alexandri*	X	X
Black-chinned sparrow	*Spizella atrogularis*	X	
Black-crowned night heron	*Nycticorax nycticorax*	X	X
Black-headed grosbeak	*Pheucticus melanocephalus*	X	
Black-necked stilt	*Himantopus mexicanus*	X	X
Black-throated gray warbler	*Dendroica cerulea*	X	X
Blue grosbeak	*Guiraca caerulea*	X	
Blue-gray gnatcatcher	*Polioptila caerulea*	X	X
Blue-winged teal	*Ana discors*		X
Bonaparte's gull	*Larus philadelphia*	X	X
Brewer's blackbird	*Euphagus cyanocephalus*	X	X
Brewer's sparrow	*Spizella breweri*		X
Brown pelican	*Pelicanus occidentalis*	X	X

APPENDIX B
BIRD SPECIES OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name	Breeding Records*	Winter Records*
Brown-headed cowbird	*Molothrus ater*	X	X
Bufflehead	*Bucephala albeola*	X	X
Bullock's oriole	*Icterus bullockii*	X	
Burrowing owl	*Athene cunicularia*		X
Bushtit	*Psaltriparus minimus*	X	X
Cactus wren	*brunneicapillus*	X	X
California gnatcatcher	*Polioptila californica*	X	X
California gull	*Larus californicuc*		X
California quail	*Callipepla californica*	X	X
California thrasher	*Toxostoma redivivum*	X	X
California towhee	*Pipilo crissalis*	x	X
Canada goose	*Branta canadensis*	X	X
Canvasback	*Aythya valisineria*		X
Canyon wren	*Catherpes mexicanus*	X	X
Caspian tern	*Sterna caspia*	X	X
Cassin's kingbird	*Tyrannus vociferans*	X	X
Cassin's vireo	*Vireo cassinii*	X	
Cattle egret	*Bubulcus ibis*	X	X
Cedar waxwing	*Bombycilla cedrorum*	X	X
Chestnut-sided warbler	*Dendroica pensylvanica*		X
Chipping sparrow	*Spizella passerina*	X	X
Cinnamon teal	*Anas cyanoptera*	X	X
Clark's grebe	*Aechmophorus clarkii*	X	X
Cliff swallow	*Petrochelidon pyrrhonota*	X	X
Common flicker	*Colaptes auratus*	X	X
Common gallinule	*Gallinula chloropus*	X	X
Common goldeneye	*Bucephala clangula*		X
Common ground dove	*Columbina passerina*	X	X
Common merganser	*Mergus merganser*		X
Common raven	*Corvus corax*	X	X
Common snipe	*Gallinago gallinago*	X	X
Common yellowthroat	*Geothlypis trichas*	X	X
Cooper's hawk	*Accipiter cooperii*	X	X
Costa's hummingbird	*Calypte costae*	X	X
Dark-eyed junco	*Junco hyemalis*	X	X
Domestic pigeon	*Columba livia*	X	X
Double-crested cormorant	*Phalacrocorax pelagicus*	X	X
Downy woodpecker	*Picoides pubescens*	X	X

APPENDIX B
BIRD SPECIES OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name	Breeding Records*	Winter Records*
Dunlin	*Calidris alpina*		X
Eared grebe	*Podoceps nigricollis*	X	X
Eurasian wigeon	*Anas penelope*		X
European starling	*Sturnus vulgaris*	X	X
Ferruginous hawk	*Buteo regalis*		X
Forster's tern	*Sterna forsteri*	X	X
Fox sparrow	*Passerella iliaca*	X	X
Gadwall	*Anas strepera*	X	X
Golden eagle	*Aquila chrysaetos*	X	X
Golden-crowned kinglet	*Regulus calendula*		X
Golden-crowned sparrow	*Zonotrichia leucophrys*	X	X
Grasshopper sparrow	*Ammodramus savannarum*	X	X
Gray flycatcher	*Empidonax wrightii*		X
Great blue heron	*Ardea herodias*	X	X
Great egret	*Casmerodius albus*	X	X
Great horned owl	*Bubo virginianus*	X	X
Greater roadrunner	*Geococcyx californianus*	X	X
Greater yellowlegs	*Tringa melanoleuca*	X	X
Great-tailed grackle	*Quiscalus mexicanus*	X	X
Green heron	*Butorides striatus*	X	X
Green-tailed towhee	*Pipilo chlorurus*		X
Green-winged teal	*Anas crecca*		X
Hermit thrush	*Catharus gutattus*	X	X
Hermit warbler	*Dendroica occidentalis*		X
Herring gull	*Larus argentatus*	X	X
Hooded merganser	*Lophodytes cucullatus*		X
Hooded oriole	*Icterus cucullatus*	X	
Horned lark	*Eremophila alpestris*	X	X
House finch	*Carpodacus mexicanus*	X	X
House sparrow	*Passer domesticus*	X	X
House wren	*Troglodytes aedon*	X	X
Hutton's vireo	*Vireo huttoni*	X	X
Killdeer	*Charadrius vociferus*	X	X
Lark sparrow	*Chondestes grammacus*	X	X
Lawrence's goldfinch	*Carduelis lawrencei*	X	X
Lazuli bunting	*Passerina amoena*	X	
Least bittern	*Ixobrychus exilis*	X	
Least sandpiper	*Calidris minutilla*	X	X

APPENDIX B
BIRD SPECIES OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name	Breeding Records*	Winter Records*
Least tern	*Sterna antillarum*	X	
Lesser goldfinch	*Carduelis psaltria*	X	X
Lesser nighthawk	*Chordeiles acutipennis*	X	
Lesser scaup	*Aythya affinis*		X
Lincoln's sparrow	*Melospiza lincolnii*	X	X
Loggerhead shrike	*Lanius ludovicianus*	X	X
Long-billed dowitcher	*Limnodromus scolopaceus*	X	X
Long-eared owl	*Asio otus*		X
Macgillivray's warbler	*Oporornis tolmiei*	X	
Mallard	*Anas platyrhynchos*	X	X
Marbled godwit	*Limosa fedoa*	X	X
Marsh wren	*Cistothorus palustris*	X	X
Merlin	*Falco columbarius*	X	X
Mew gull	*Larus canus*		X
Mountain Bluebird	*Sialia currucoides*		X
Mountain chickadee	*Parus gambeli*		X
Mourning dove	*Zenaida macroura*	X	X
N. rough-winged swallow	*Stelgidopteryx serripennis*	X	X
Northern harrier	*Circus cyaneus*	X	X
Northern mockingbird	*Mimus polyglottos*	X	X
Northern pintail	*Anas acuta*	X	X
Northern shoveler	*Anas clypeata*	X	X
Nuttall's woodpecker	*Picoides nuttallii*	X	X
Olive-sided flycatcher	*Contopus borealis*	X	
Orange-crowned warbler	*Vermivora celata*	X	X
Osprey	*Pandion haliaetus*	X	X
Peregrine falcon	*Falco peregrinus*	X	X
Phainopepla	*Phainopepla nitens*	X	X
Pied-billed grebe	*Podilmbus podiceps*	X	X
Pine siskin	*Carduelis pinus*	X	X
Plain titmouse	*Parus inornatus*	X	X
Plumbeous vireo	*Vireo plumbeus*	X	X
Poor-will	*Phalaenoptilus nuttallii*	X	X
Prairie falcon	*Falco mexicanus*		X
Purple finch	*Carpodacus purpureus*		X
Red crossbill	*Loxia curvirostra*	X	
Red-breasted merganser	*Mergus serrator*		X
Red-breasted nuthatch	*Sitta canadensis*	X	X

APPENDIX B
BIRD SPECIES OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name	Breeding Records*	Winter Records*
Red-breasted sapsucker	*Sphyrapicus varius*		X
Redhead	*Aythya americana*	X	X
Red-naped sapsucker	*Sphyrapicus nuchalis*		X
Red-shouldered hawk	*Buteo lineatus*	X	X
Red-tailed hawk	*Buteo jamaicensis*	X	X
Red-winged blackbird	*Agelaius phoeniceus*	X	X
Ring-billed gull	*Larus delawarensis*	X	X
Ringed turtle dove	*Streptopelia risoria*		X
Ring-necked duck	*Aythya collaris*	X	X
Rock wren	*Salpinctes obsoletus*	X	X
Ross' goose	*Chen rossii*	X	X
Royal tern	*Sterna maxima*		X
Ruby-crowned kinglet	*Regulus satrapa*	X	X
Ruddy duck	*Oxyura jamaicensis*	X	X
Rufous hummingbird	*Selasphorus rufus*	X	
Rufous-crowned sparrow	*Aimophila ruficeps*	X	X
Sage sparrow	*Amphispiza belli*	X	X
Savannah sparrow	*Passerculus sandwichensis*	X	X
Say's phoebe	*Sayornis saya*	X	X
Scissor-tailed flycatcher	*Tyrannus forficatus*		X
Scott's oriole	*Icterus parisorum*		X
Scrub jay	*Aphelocoma californica*	X	X
Semipalmated plover	*Charadrius semipalmatus*	X	X
Sharp-shinned hawk	*Accipter striatus*	X	X
Short-eared owl	*Asio flammeus*		X
Snow goose	*Chen caerulescens*		X
Snowy egret	*Egretta thula*	X	X
Solitary sandpiper	*Tringa solitaria*	X	
Song sparrow	*Melospiza melodia*	X	X
Sora	*Porzana carolina*	X	X
Spotted sandpiper	*Actitis macularia*	X	X
Spotted towhee	*Pipilo maculatus*	X	X
Summer tanager	*Piranga rubra*	X	
Swainson's hawk	*Buteo swainsonii*	X	X
Townsend's warbler	*Dendroica townsendi*	X	X
Tree swallow	*Tachycineta bicolor*	X	X
Tricolored blackbird	*Agelaius tricolor*	X	X
Turkey vulture	*Cathartes aura*	X	X

APPENDIX B
BIRD SPECIES OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name	Breeding Records*	Winter Records*
Varied thrush	*Ixoreus naevius*		X
Vaux's swift	*Chaetura vauxi*	X	X
Vermilion flycatcher	*Pyrocephalus rubinus*	X	X
Vesper sparrow	*Pooecetes gramineus*		X
Violet-green swallow	*Tachycineta thalassina*	X	X
Virginia rail	*Rallus limicola*	X	X
Warbling vireo	*Vireo gilvus*	X	
Western bluebird	*Sialia mexicana*	X	X
Western flycatcher	*Empidonax difficilis*	X	X
Western grebe	*Aechmophorus occidentalis*	X	X
Western kingbird	*Tyrannus verticalis*	X	
Western meadowlark	*Sturnella neglecta*	X	X
Western sandpiper	*Calidris mauri*	X	X
Western screech owl	*Otus kennicottii*	X	X
Western tanager	*Piranga ludoviciana*	X	
Western wood pewee	*Contopus sordidulus*	X	
White-breasted nuthatch	*Sitta carolinensis*	X	X
White-crowned sparrow	*Zonotrichia leucophrys*	X	X
White-faced ibis	*Plegadis chihi*	X	X
White-tailed kite	*Elanus caeruleus*	X	X
White-throated sparrow	*Zonotrichia albicollis*		X
White-throated swift	*Aeronautes saxatalis*	X	X
Wild turkey	*Meleagris gallopavo*	X	X
Willet	*Catoptrophorus semipalmatus*	X	X
Willow flycatcher	*Empidonax trailli*	X	
Wilson's phalarope	*Phalaropus tricolor*	X	
Wilson's warbler	*Wilsonia pusilla*	X	X
Wood duck	*Aix sponsa*		X
Wood stork	*Mycteria americana*	X	X
Wrentit	*Chamaea fasciata*	X	X
Yellow warbler	*Dendroica petechia*	X	X
Yellow-breasted chat	*Icteria virens*	X	
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*		X
Yellow-rumped warbler	*Dendroica coronata*	X	X
Zone-tailed hawk	*Buteo albonotatus*	X	X

* San Diego Bird Atlas Records for Quads K10, K11, K12, J12, J13, J14

APPENDIX C

HERPETOFAUNA SPECIES LIST

APPENDIX C
HERPETOFAUNA OBSERVED IN THE VICINITY OF THE LAKE HODGES/SAN PASQUAL VALLEY PRESERVE

Common Name	Scientific Name
Pacific slender salamader	*Batrachoseps pacificus*
Arboreal salamander	*Aneides lugubris*
Western toad	*Bufo boreas*
Pacific treefrog	*Hyla regilla*
Bullfrog	*Rana catesbiana*
Western pond turtle	*Clemmys marmorata*
Granite spiny lizard	*Sceloporus orcutti*
Western fence lizard	*Sceloporus occidentalis*
Side-blotched lizard	*Uta stansburiana*
Coast horned lizard	*Phyrnosoma coronatum*
Western skink	*Eumeces skiltonianus*
Orange-throated whiptail	*Cnemidophorus hyperythrus*
Western shiptail	*Cnemidophorus tigris*
Southern alligator lizard	*Gerrhonotus multicarinatus*
California legless lizard	*Anniella pulchra*
Western blind snake	*Leptotyphlops humilis*
Rosy boa	*Lichanura trivirgata*
Ringneck snake	*Diadophis punctatus*
Red racer	*Masticophis flagellum*
Striped racer	*Masticophis lateralis*
Gopher snake	*Pituophis melanoleucus*
California king snake	*Lampropeltis getulus*
Coast garter snake	*Thamnophis hammondii*
San Diego night snake	*Hypsiglena torquata*
Red diamond rattlesnake	*Crotalus ruber*
Southern Pacific rattlesnake	*Crotalus virdis*

Source: Clark Marhdt (unpublished from 1991)

APPENDIX D

FRAMEWORK FIRE MANAGEMENT PLAN

This document establishes the framework for the City of San Diego to work with the California Department of Forestry and Fire Protection (CDF) and local fire agencies to develop and implement a specific plan for wildland fire prevention, wildland fire suppression, pre-fire treatment, and post-fire treatment at the Lake Hodges/San Pasqual Valley open space. The actions identified in this framework are necessary to complete a fire management plan for the Lake Hodges/San Pasqual Valley open space and adjacent lands outside of the City of San Diego's jurisdiction. The fire management plan should be developed consistent with the Habitat Management Plan for the open space.

The fire management plan for the Lake Hodges/San Pasqual Valley open space should be developed and implemented within the context of the California Fire Plan (CDF 1996) and Pre-Fire Management Plan for the San Diego Unit (CDF 2001). These plans define the objectives, implementation guidelines, and components of a fire management plan, as summarized below.

1. The California Fire Plan (CDF 1996) states that the overall goal of fire management planning is to "reduce total costs and losses from wildland fire in California by protecting assets at risk through focused pre-fire management prescriptions and increasing initial attack success." According to CDF, assets at risk include life and safety; air quality; rangeland; recreation on public wildlands; structures; timber; water and watersheds; wildlife, habitat, plants, and ecosystem health; and other resource assets, cultural and historic resources, and unique scenic areas.
2. The Pre-Fire Management Plan for the San Diego Unit (CDF 2001) outlines two strategies for implementation:
    a. The plan identifies Communities at Risk for application of pre-fire programs, which may include chipping, hand clearing, pile burning, small-scale burns, community fuel breaks, and enhanced weed abatement programs. In the immediate vicinity of the Lake Hodges/San Pasqual Valley open space, Escondido, Harmony Grove, and Ramona are identified as Communities at Risk.
    b. The plan will use Vegetation Management Programs (VMP), large-scale burns, strategically placed remote fuel breaks, and improvements to fire defense to break up areas with old, decadent fuels that will readily support development of large fires. The goal of this strategy is to create a mosaic pattern of fuels that would prevent large fuel-driven fires.

D.1 GENERAL OPERATING PROCEDURES

D.1.1 Contacts for Lake Hodges/San Pasqual Valley Open Space

San Diego Fire and Life Safety Services (or first responding agency, e.g., Ranch Santa Fe Fire Protection District or Escondido Fire Department) will notify the City of San Diego of all known fires on or threatening the Lake Hodges/San Pasqual Valley open space. The Senior Ranger for the Parks and Recreation Department (currently *Name*) at the City of San Diego is the primary contact person for wildland fires in the open space, as well as

road maintenance activities, fuel management, and prescribed burns. Ideally, the contact person would be the preserve manager. See Attachment 1 for emergency contact numbers.

D.1.2 Access and Conditions

The City of San Diego is the agency responsible for suppressing wildland fires at the Lake Hodges/San Pasqual Valley open space and for maintaining fire access roads for both prevention and protection purposes. See Attachment 2 for City of San Diego Operating Plan. Responding fire agencies will use all available access points to the open space, as necessary, and thus will install locks at all access locations. The following conditions will apply to the responding agencies' authorization to access the Lake Hodges/San Pasqual Valley open space during non-emergency situations:

- Every effort will be made to minimize impacts to threatened or endangered species and their habitats as a result of road maintenance, pre-fire treatment, or vegetation management activities (see Section D.5.3).
- CDF must verbally notify the City of San Diego's contact person prior to initiation of projects in the open space involving mechanized equipment for land modifications (e.g., road maintenance, vegetation management).

D.1.3 Annual Inter-Agency Training

Once a fire management plan is developed for the Lake Hodges/San Pasqual Valley open space, the City of San Diego, San Dieguito River Park Senior Ranger, CDF, and local fire agencies will meet annually to review and update the plan, discuss new issues, exchange ideas for improving implementation, and identify priorities for the coming year. This annual review will include one or more site visits to evaluate current conditions in the open space.

D.1.4 Community and Homeowner Education

Public Information Officers from City of San Diego Fire and Life Safety Services, Rancho Santa Fe Fire Protection District, CDF, Escondido Fire Department, and other local fire agencies will work together on a community and homeowner education program. This program will include inspecting the defensible space of homeowners adjacent to the Lake Hodges/San Pasqual Valley open space. Every homeowner adjacent to the open space is responsible for having an appropriate defensible space and a noncombustible roof, per the Bates Bill (Assembly Bill No. 337), which was approved in September 1992, and City of San Diego, City of Escondido, and County of San Diego brush management ordinances.

The defensible space must include a Fuel Modification Zone within a minimum of 100 ft of the structure to meet County of San Diego fire safety requirements (San Diego County Wildland/Urban Interface Task Force 1997). The defensible space may be greater than 100 ft (30 m) due to slope. For existing structures, if the required defensible space

requirement cannot be met on the homeowner's property, approvals must be obtained from the City of San Diego to encroach into the open space. The Fuel Modification Zone should consist of irrigated landscaping or drought-tolerant, preferably nonnative, fire resistant plants when on private property adjacent to the open space.

D.2 FIRE HISTORY AND FUEL TYPES

D.2.1 Fire History

Fire frequency, intensity, patch size, and season of fire determine the fire regime. These factors are important in developing a fire management plan. Burn data were obtained through the CDF burn history database (CDF 2000), which covers the period from 1940 to 2000. It is possible that additional fires occurred in the open space during this time period but were not recorded (e.g., an unrecorded fire north of Lake Hodges in 1987). The burn history data provide boundaries of individual fire events and the year of the event. These data do not provide information on fire intensity or season; both factors can influence post-fire vegetation recovery. Several fire events have been recorded on and around the Lake Hodges/San Pasqual Valley open space (Figure D-1a). In general, fire frequency has been highest in the east and northeast and lowest in the west portions of the open space. The most recent burns have occurred in the northeast portion of the open space (Figure D-1b).

D.2.2 Fuel Types

The vegetation community types in the Lake Hodges/San Pasqual Valley open space are listed in Table D-1 and shown in Figure D-2. The majority of the open space (69%) is covered by chaparral and coastal sage scrub, which have variable fuel loads. The highest fuel loads in the open space appear to be in the chaparral communities around Lake Hodges, due to the absence of recent fires.

Table D-1

Acreage in Lake Hodges/San Pasqual Valley Open Space by Vegetation Classification

Vegetation Classification	Acres
Coastal Sage Scrub	3,056
Chaparral	924
Grassland	244
Freshwater Marsh	67
Southern Riparian Forest	793
Mulefat Scrub	15
Southern Willow Scrub	352
Lake Shore	77
Coast Live Oak Riparian Woodland	10
Coast Live Oak Woodland	186
Eucalyptus Woodland	20
Total	**5,744**

D.3 GENERAL FIRE MANAGEMENT GUIDELINES AND OBJECTIVES

The following objectives should guide development and implementation of a fire management plan for the Lake Hodges/San Pasqual Valley open space. The fire management plan should be consistent with the City of San Diego brush management guidelines, goals and objectives of the Habitat Management Plan for the open space, the California Fire Plan, and the San Diego Unit Pre-Fire Management Plan. Wildland fire suppression priorities and pre-fire treatments for specific areas of the open space are outlined in Sections D.4 and D.5, respectively.

D.3.1 Wildland Fire Suppression

The City of San Diego representative or preserve manager will be available onsite during a wildland fire to provide technical advice about ecological issues and to explore alternative fire suppression methods to minimize adverse impacts to biological and cultural resources. The City of San Diego representative will not interfere with fire suppression efforts to protect lives and real property. The following objectives are applicable during wildland fire suppression, except in instances of threat to life or real property.

1. Use fire suppression methods that cause the least amount of resource damage, commensurate with effective suppression based on threat (i.e., minimum impact suppression techniques). To this end, fire response agencies will make use of existing roads and natural fuel breaks whenever possible, even when this strategy will result in more acreage being burned.
2. Avoid dropping retardant within riparian areas.
3. Avoid bulldozer and handline use in riparian areas. When deemed necessary, fire lines within riparian areas will be constructed as close as feasibly possible to a 90-degree angle to the riparian zone to minimize impact.
4. Avoid bulldozer use within 100 m of cultural resource sites and sensitive plant sites.
5. Avoid cutting of mature trees except when they pose a direct threat to fire line integrity or the safety of firefighters and the public.
6. Avoid piling vegetation trimmings in natural habitat areas. Rather, place them along roads or previously disturbed areas, or haul them offsite.

D.3.2 Pre-Fire Treatment and Vegetation Management

Implementation of fire management measures as specified in the Fire Management Plan must comply with all federal and state environmental regulations. This may require preparation of environmental impact documentation (e.g., per the California Environmental Quality Act) and permit applications to satisfy air quality and visibility requirements (e.g., for prescribed burns), as appropriate. The following are general

objectives for pre-fire treatment and vegetation management. Implementation of measures for specific areas of the open space is discussed in Section D.5.

1. Develop and map Fire Management Units (FMU) for the open space.
2. Develop specific objectives and fire management prescriptions for each FMU, targeting appropriate levels of vegetation cover and composition for specific vegetation communities, specific prescriptions for areas important to target species, and special prescriptions for disturbed areas and areas with exotic species. Also consider soil types.
3. Avoid bulldozer use within 100 m of cultural resource sites and sensitive plant sites.
4. Avoid piling vegetation trimmings in natural habitat areas. Rather, place them along roads or previously disturbed areas, or haul them offsite.
5. Avoid use of prescribed fire during the breeding season for avian species in the open space.
6. Conduct prescribed burns to simulate natural wildland fire effects on plant community types and seral stages, to protect habitat of targeted species, and to meet fire control objectives in high-risk areas.
7. During prescribed burns or other vegetation management activities, leave isolated habitat areas to act as refugia for retreating wildlife. Control patch size burned and the availability of unburned islands to maximize reoccupation by plants and wildlife.
8. Prevent the catastrophic loss of oak trees due to excessive fuel accumulation.
9. Keep fire frequency at a level to maintain vegetative health, minimize loss of soil nutrients, and ensure regeneration of oak stands by favoring sapling recruitment. Conduct post-fire monitoring to determine what low or moderate fire frequencies or intensities favor sapling recruitment.

D.4 WILDLAND FIRE SUPPRESSION

As portions of the Lake Hodges/San Pasqual Valley open space are surrounded by residential areas, public safety is the priority fire issue at the open space. The CDF strives to suppress all fires that threaten public safety, with the overall goal of reducing total wildfire costs and losses (CDF 1996). The California Fire Plan (CDF 1996) has five strategic objectives to meet this goal:

1. Create wildfire protection zones that reduce the risks to citizens and firefighters.
2. Assess all wildland fire service providers to determine who is responsible, who is responding, and who is paying for wildland fire emergencies.
3. Analyze alternatives to reduce total costs and losses by increasing fire protection system effectiveness.
4. Monitor the cost-effectiveness of the wildland fire protection system.

5. Translate the analyses into public policies.

Pre-fire treatment of the land, in the form of road maintenance, firebreaks, and fuel management, as well as enforcement of allowable land uses, will help to prevent fires at the Lake Hodges/San Pasqual Valley open space (see Section D.5).

D.4.1 Fire Management Units

The City of San Diego and cooperating fire agencies will map and describe individual Fire Management Units (FMU) at the Lake Hodges/San Pasqual Valley open space (Table D-2). These have not yet been defined. The boundary of each FMU will be determined by its potential to contain a wildland fire, e.g., roads, trails, ridgetops, drainages, key vegetation community changes or breaks in fuel continuity, and other natural or physical barriers to wildland fire. Appropriate fire protection treatments will be defined for each FMU.

D.4.2 Fire Suppression Priorities

The fire suppression tactical priority is that all wildland fires occurring within a FMU should be contained to that specific FMU and not be allowed to encroach upon another FMU, if possible. The City of San Diego and cooperating fire agencies will identify the fire suppression priority for each FMU (Table D-3).

Table D-2

Description of Fire Management Units (FMU)
at the Lake Hodges/San Pasqual Valley Open Opace
(to be prepared by City of San Diego and cooperating fire agencies)

FMU	Acres	Vegetation Communities	Description

Table D-3

Fire Suppression Priorities and Pre-Fire Treatment at the Lake Hodges/San Pasqual Valley Open Space, by Fire Management Unit (FMU)

(to be prepared by City of San Diego and cooperating fire agencies)

FMU	Acres	Vegetation Communities	Fire Suppression Priority[1]	Pre-Fire Treatment/ Vegetation Mgmt

[1]Fire Suppression Priority:

Aggressive -- unit will receive immediate containment and control using all available resources.

Standard -- unit will receive a standard tactical fire response. The fire will not be allowed to escape or spread to an adjacent unit. Minimal disruption to natural resources.

D.4.3 Post-fire Remediation Activities

The City of San Diego and cooperating fire agencies will develop short-term (immediately post-fire) and long-term (revegetation and rehabilitation) strategies for mitigating impacts during wildland fire suppression so that there is no permanent loss of natural resource values. The strategies will adhere to the following guidelines:

1. Rehabilitate fire lines and bladed areas disturbed by mechanical activity by ripping compacted swales, spreading bulldozer berms, installing water bars, mulching, making minor road repairs, or other appropriate activity.
2. Apply mulches that do not contain exotic plant material (use onsite material, if available).
3. Reshape the control line to match the natural contour of the land where there has been major disturbance. Maintain natural drainage patterns.
4. Revegetate along trails, if needed.
5. Identify hazard trees with flagging (trees that have been burned that are near hiking trails and pose a threat to public safety).
6. Remove all flagging, litter, and equipment.
7. Conduct a post-incident action analysis to benefit from lessons learned during wildfire suppression.

D.5 PRE-FIRE TREATMENT AND VEGETATION MANAGEMENT

Pre-fire treatment of habitats, in the form of road maintenance, firebreaks, and fuel management, and enforcement of allowable land uses allow greater flexibility in avoiding impacts to sensitive habitats during wildland fire suppression. Pre-fire treatment also will help to prevent fires at the Lake Hodges/San Pasqual Valley open space.

Prescribed burning is one method of managing fuel buildup, as long as it is performed in a manner that accounts for the fire frequency sensitivity of chaparral and coastal sage scrub species. Prescribed burning will be completed according to state requirements for the use of fire as a fuel reduction tool. Use of prescribed burns has the following objectives:

1. Reduce costs to the community and the state by breaking up fuel continuity that contributes to large conflagrations.
2. Simulate natural wildfire effects on plant community types and seral stages to protect habitat of targeted species and to meet fire control objectives in high-risk areas. The need for fire to manage MSCP covered species has to be carefully determined. Fires that occur too often will have an adverse affect on many chaparral and coastal sage scrub species. Fire intervals under conditions of fire suppression may actually simulate natural fire frequencies.
3. Enhance wildlife habitat by fostering a patchy mosaic of successional stages and age classes on a regional scale. Patches that are too small may result in the loss of some species that require uniform habitat.
4. Reduce damage to watersheds due to erosion and downstream water quality deterioration caused by wildfires.
5. Reduce the hazardous effect of smoke on air quality during a wildfire.

The patchy mosaics created by fire management will reduce the average age of vegetation, thereby lessening fuel load and duff buildup. City of San Diego and cooperating fire agencies will prepare a table of areas proposed for use of prescribed fire (Table D-4).

D.5.1 Road Maintenance, Access Roads, and Staging Locations

Access roads and staging areas for fire response should be identified. The existing dirt roads within the open space can be authorized for this purpose. Maintenance measures for these roads should be described and could include grading the existing width of the road, repairing ruts and erosion gullies, and hand-clearing vegetation adjacent to the existing road. Cleared vegetation should either be hauled off the site, mulched onsite and used for revegetation, or burned onsite where appropriate. The City of San Diego and cooperating fire agencies will prepare a map showing both onsite and offsite access roads and staging locations.

Table D-4

Prescribed Fire Schedule at the Lake Hodges/San Pasqual Valley Open Space
(to be prepared by City of San Diego and cooperating fire agencies)

Unit	Acres	Vegetation Communities	Last Burn	Year	Season

D.5.2 Fuelbreak Locations

The City of San Diego and cooperating fire agencies will prepare a map showing existing and new fuelbreak locations. The following will be considered when establishing new fuelbreaks:

1. Flag sensitive biological and cultural resources that should be avoided along the fuelbreak.
2. Design the location of new fuelbreaks according to Best Management Practices to prevent soil erosion and nonpoint source pollution.
3. Where necessary, use water bars or other method to reduce the severity of water flow on fuelbreaks and thereby prevent soil erosion.
4. Unless other means of clearing are agreed to in writing by the City of San Diego, clear fuelbreaks by hand. Cut and grub the vegetation and chip it or burn it onsite, or use it as mulch in revegetation or restoration efforts.
5. Monitor the effectiveness of fuelbreak management techniques and adapt the least impacting methods accordingly.

D.5.3 Sensitive Areas to Be Avoided

During all management activities, sensitive areas will be identified on a map as areas to be avoided by heavy equipment. These areas also will be flagged in the field for conservation. Sensitive areas would include riparian habitats, any sensitive plant populations, and cultural resources areas.

D.5.4 Fuel Treatment to Protect Biological Values

To protect biological values, strategically place fuelbreaks or prescribed fire units to break up the flammable vegetative fuels. Recommended treatments within the open space include hand-cutting and chipping or piling, mechanical crushing, prescribed fire,

or a combination of all three treatments to reduce liability. City of San Diego and cooperating fire agencies will prepare a table of FMUs that will require some form of pre-fire treatment and vegetation management in the Lake Hodges/San Pasqual Valley open space to protect life and property (Table D-3).

D.5.5 Air Quality

Air pollution abatement affects the timing and feasibility of prescribed fire efforts. The San Diego Air Pollution Control District (APCD) requires smoke management planning to control this pollution source. The APCD requires a burning permit and smoke management plan that includes emissions reduction techniques and mitigation measures that identify the most favorable wind and weather conditions under which to conduct controlled burns.

D.5.6 Checklist for Prescribed Burns

The necessary steps prior to conducting a prescribed burn and the schedule for implementing the required steps are shown in Table D-5.

D.5.7 Post-fire Remediation Activities

The City of San Diego and cooperating fire agencies will develop short-term (immediately post-fire) and long-term (revegetation and rehabilitation) strategies for mitigating impacts during prescribed burns so that there is no permanent loss of natural resource values. The strategies will adhere to the following guidelines:

1. Rehabilitate firelines and bladed areas disturbed by mechanical activity by ripping compacted swales, spreading bulldozer berms, installing water bars, mulching, making minor road repairs, or other appropriate activity.
2. Apply mulches that do not contain exotic plant material (use onsite material, if available).
3. Reshape the control line to match the natural contour of the land where there has been major disturbance. Maintain natural drainage patterns.
4. Revegetate along trails, if needed.
5. Identify hazard trees with flagging (trees that have been burned that are near hiking trails and pose a threat to public safety).
6. Remove all flagging, litter, and equipment.
7. Conduct a post-burn action analysis to benefit from lessons learned during prescribed burns.

Table D-5

Planning Process Checklist for Prescribed Burns

(Timeline to be completed by City of San Diego and cooperating fire agencies)

Action Items 9-12 Months Before Burn	**Date Completed**
Select burn site that meets agency's goals.	
Sign up landowners.	
Conduct environmental review (wildlife, archaeology).	
Confer with USFWS.	
Confer with CDFG.	
Action Items 6-9 Months Before Burn	**Date Completed**
Develop burn plan and obtain burn permit.	
Develop contingency plans.	
Get burn plan approved by CDF.	
Construct hand lines or dozer lines around perimeters.	
Designate secondary control lines and safety zones.	
Contact SDG&E.	
Action Items 3-6 Months Before Burn	**Date Completed**
Develop list of required resources and volunteer help.	
Involve Information Officer.	
Develop smoke management plan.	
Obtain approval from APCD.	
Develop contact list for prescribed burn opportunities.	
Work with trainees to provide opportunities.	
Action Items 1-3 Months Before Burn	**Date Completed**
Set up portable weather station (MicroRAWS).	
Set up fuel stick.	
Take fuel moisture samples every 10 days (live and dead).	
Set up photo points and photograph before and after burn.	
Develop Incident Action Plan.	
Develop large briefing map.	
Do fire predictions calculations.	
Organize staff duties: phones, weather, biological, rovers.	
Designate landing zone for medical emergency.	
Complete handlines and interior edge preparation.	
Develop test burn site.	
Issue entry permits and gate keys.	
Determine public access closures.	
Identify radio and cell phone blind spots.	
Prepare fire behavior predictions.	
Conduct pre-burn vegetation transects.	
Survey for nesting birds within the unit.	

Table D-5

Planning Process Checklist for Prescribed Burn
(continued)

Action Items Last Week Before Burn	**Date Completed**
Send notifications to neighbors.	
Send press release to local media.	
Order radios from communication section.	
Complete ICS forms and briefing package (Incident Action Plan).	
Put Drop Point signs in place.	
Prepare drip torches, extra parts, and fuel.	
Prepare Prescribe Burn signs.	
Put portable toilets in place.	
Inventory burn cache.	
Establish placement for weather personnel.	
Establish placement for lookout personnel.	
Plan for fluids, food, and coffee.	
Phone neighbors day before and day of burn.	
Call APCD day before and day of burn.	
Fax copy of Incident Action Plan to Emergency Contact Center..	
Set up Check-in.	
Contact local fire agencies (done by ECC).	
Post Prescribe Burn signs.	
Conduct operational briefing.	
Organize staging area.	
Review Go-No Go checklist.	
Do test burn.	
Action Items After Burn	**Date Completed**
Do post-burn analysis and survey for dead animals.	
Do short report after burn: • What we did • What we burned • How many acres • What didn't burn and why	
Conduct operational debriefing as a learning tool.	

Source: Orange County Fire Authority.

D.6 RESEARCH AND MONITORING

The fire management program must include a combination of research projects and long-term monitoring to better understand species and community responses to fire. Scientific research and monitoring are important to support adaptive management decision-making. Research and monitoring may include the following studies.

1. Evaluate the effectiveness of the buffer around wildlife habitat for wildfire and prescribed fire planning.
2. Conduct studies to help establish ecological/vegetation management and restoration objectives for each FMU.
3. Study the effects of fire intensity, timing, and return interval on stimulating or retarding the spread of nonnative plants.
4. Monitor post-fire erosion and habitat recovery as related to fire pattern and intensity, including monitoring community composition and compositional changes after fire and monitoring for the potential invasion of nonnative species.
5. Photograph prescribed burn areas and the recovery process to document response.
6. Implement fire mapping and record-keeping to support decision-making for resource management. Document prescribed fire costs by acreage and fuel-type for future planning.
7. Monitor fire behavior and smoke dispersal on all fires.
8. Study dormant seed banks to assess vegetation changes resulting from the interruption of natural fire regimes.
9. Study the effects of fire on water quality, such as turbidity and pH.
10. Establish post-fire recovery plots to identify new infestations of exotic weeds associated with fire.
11. Evaluate shrub age structure and cover before prescribed burns and for several years after the burn. This evaluation may be conducted through the establishment of permanent transects in each FMU.

D.7 REFERENCES

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California Department of Forestry and Fire Protection (CDF). 1996. California fire plan: a framework for minimizing costs and losses from wildland fires. March. 104 pp.

California Department of Forestry and Fire Protection (CDF). 2000. Burn history data for San Diego County, CA.

California Department of Forestry and Fire Protection (CDF). 2001. San Diego Unit pre-fire management plan.

San Diego County Wildland/Urban Interface Task Force. 1997. San Diego County Fire Chief's Association wildland/urban interface development standards. Originally developed by the Orange County Wildland/Urban Interface Task Force Subcommittee on Open Space Management, July 1994.

ATTACHMENT 1

EMERGENCY CONTACT NUMBERS
LAKE HODGES/SAN PASQUAL VALLEY OPEN SPACE

Contact	Cell Phone	Pager
City of San Diego Fire and Life Safety		
City of San Diego Senior Ranger		
Rancho Santa Fe Fire Protection District		
Escondido Fire Department		
California Department of Forestry		
Emergency Communications Center		
San Dieguito River Park Senior Ranger		

ATTACHMENT 2

COOPERATIVE FIRE PROTECTION AGREEMENT OPERATING PLAN

(to be finalized by City of San Diego and appropriate responding agencies)

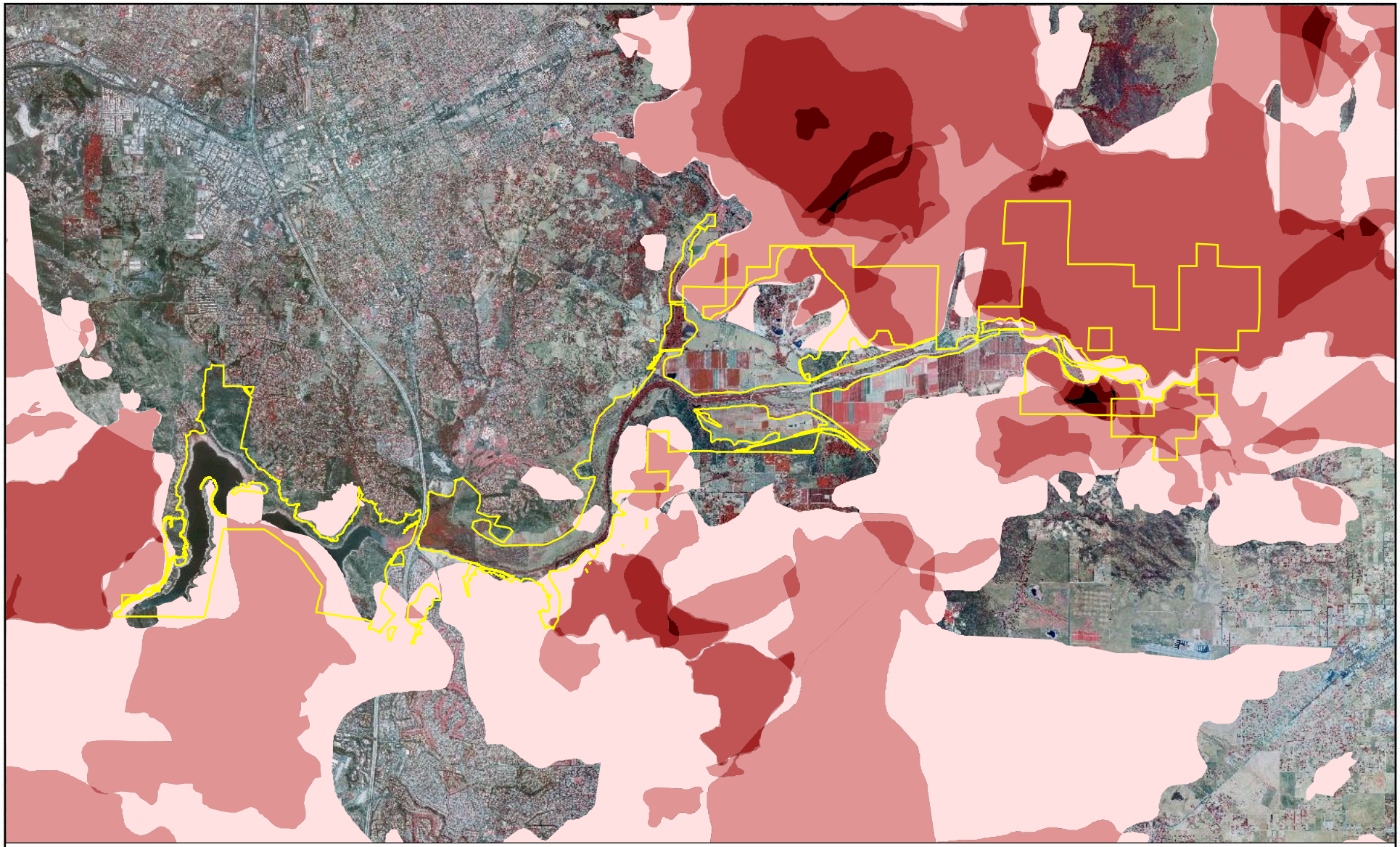

FIGURE D-1a: Fire History in the Vicinity of the Lake Hodges/San Pasqual Valley Preserve Area -- Fire Frequency

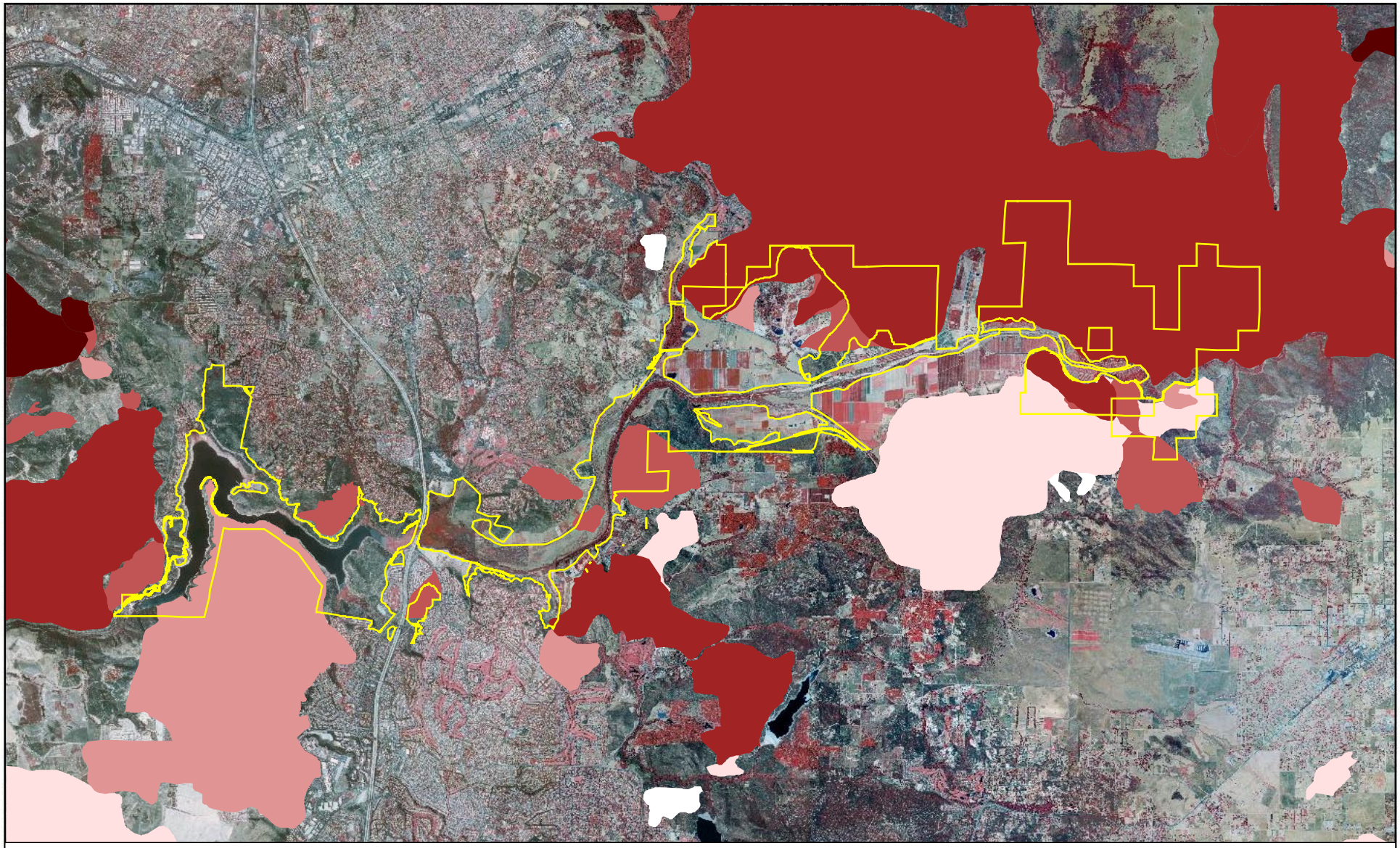

FIGURE D-1b: Fire History in the Vicinity of the Lake Hodges/San Pasqual Valley Preserve Area -- Dates of Fire Events

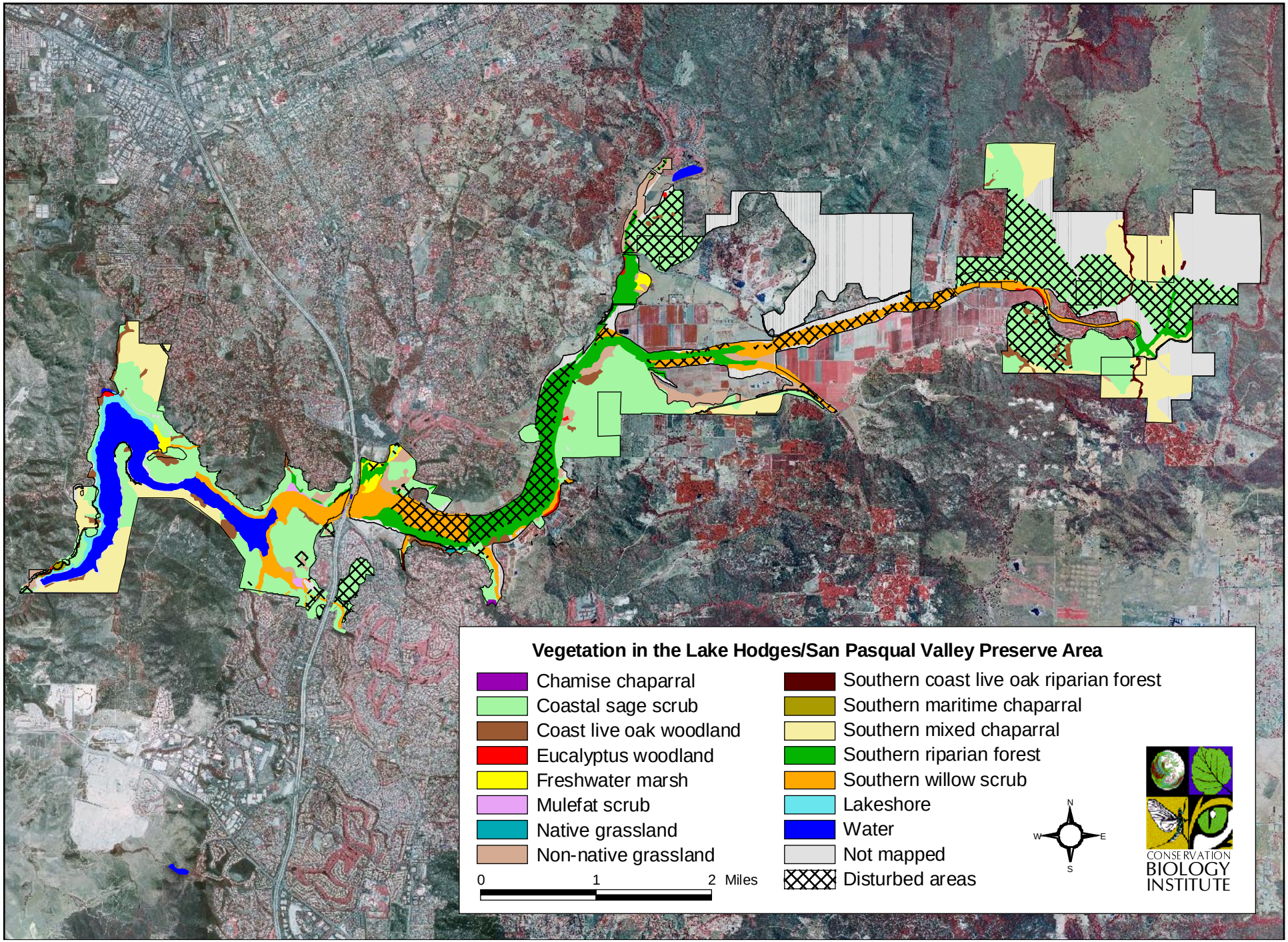

FIGURE D-2: Vegetation Communities in the Lake Hodges/San Pasqual Valley Preserve Area

APPENDIX E

CALIFORNIA NATIVE PLANT SOCIETY
RAPID ASSESSMENT PROTOCOL

CALIFORNIA NATIVE PLANT SOCIETY –
VEGETATION RAPID ASSESSMENT PROTOCOL
CNPS VEGETATION COMMITTEE
(November 5, 2001, Revised February 5, 2003)

Introduction

The rapid assessment protocol is a reconnaissance-level method of vegetation and habitat sampling. It may be used to quickly assess and map the extent of all vegetation types in relatively large, ecologically defined regions. The California Native Plant Society (CNPS) has adopted this method to verify locations of known vegetation types, to gain information about new types, and to acquire general information about their composition, habitat, and site quality. Other agencies, such as California State Parks, the Department of Fish and Game, and the U.S. Forest Service, are also adopting this method for documenting vegetation patterns.

By using this method, biologists and resource managers can gain a broad ecological perspective, as the full range in ecological variation across broad landscapes can be reflected in the vegetation assessments. For example, changes in environmental elements (such as geology, aspect, topographic position) or physical processes (fire, flooding, erosion, and other natural or human-made disturbances) can influence the distribution of plants or patterning of vegetation, which are documented in the rapid assessments. In turn, these vegetation patterns can influence the distribution of animals across the landscape.

The quantitative vegetation data recorded in the rapid assessments can be described with standard classification techniques and descriptions, and they can be depicted in maps across any landscape. Additional information recorded in the assessments, such as disturbance history and anthropogenic impacts, can serve to define habitat quality and integrity for plant and animal distributions. Because this method provides an important means for representing the full array of biological diversity as well as habitat integrity in an area, it can also be an effective and efficient tool for conducting natural resource planning.

Purpose

The Vegetation Program has adopted the rapid assessment method to update the location, distribution, species composition, and disturbance information of vegetation types as identified in the first edition of *A Manual of California Vegetation* (MCV), a CNPS publication. The release of the MCV heralded a new statewide perspective on vegetation classification. The premise of the book – all vegetation can be quantified based on cover, constancy, and composition of plant species, yielding uniform defensible definitions of vegetation units – has proven to be very useful throughout California and the rest of the nation. The MCV has become the standard reference on California vegetation and has been adopted by many agencies such as California Department of Fish and Game, the National Park Service, California State Parks, and the U.S. Forest Service as the standard approach to classify vegetation statewide.

One of the most important purposes of rapid assessments is to verify the locations of each vegetation type because much about the geography of vegetation remains uncertain in this state.

To obtain a more accurate understanding of the location and distribution of the vegetation types, nothing short of systematic inventory will suffice. Using the rapid assessment method, CNPS Chapters and other organizations can work together in selected ecological regions to gather vegetation data over a short time period in a broad area. This geographic inventory of vegetation types can greatly advance the current distribution understanding of vegetation.

In addition, California is working with a new vegetation classification, and its parameters are largely untested. The rapid assessment method will be used to gather additional information on species composition, distribution, disturbance effects, and environmental influences of vegetation. Thus, this method will provide modifications to the existing vegetation classifications and information on new types.

This protocol can also be used in tandem with other resource assessment protocols such as wildlife assessments or aquatic/stream assessments. For example, the California Wildlife Habitat Relationships (CWHR) protocols have been used in conjunction with the vegetation assessment protocol to obtain detailed records on habitat quality and suitability for vertebrate animals in terrestrial habitats. The CWHR protocols can also help test the relationships between the vegetation type and habitat of various animals and thereby refine the understanding and predictability of the distribution of animals. A portion of the CWHR protocols is incorporated into the rapid assessment method to obtain suitability information for vertebrate species.

While people can quickly obtain information on the variety of vegetation types using this method, some of the vegetation types recorded in the rapid assessment process may be poorly defined in the current classification system. These poorly understood or unknown types will be identified and located and then will be prioritized for more detailed assessment using the CNPS relevé protocol. Thus, the rapid assessment method will be used in conjunction with the relevé method to provide large quantities of valuable data on the distribution and the definition of vegetation. These data will be entered into existing databases for summarizing and archiving, and they will be used to modify and improve statewide vegetation classification and conservation information.

<u>Why do we need to know about the composition and distribution of vegetation?</u>

- to have a more accurate understanding of the commonness and rarity of different forms of vegetation throughout the state
- to link the distribution of various rare and threatened plant species with the vegetation units
- to provide a clearer picture of relationships between vegetation types
- to help prioritize community-based land conservation goals based on the local representation of unique types, high diversity areas, etc.
- to do the same for regional vegetation throughout the state and the nation.
- to broaden the vegetation knowledge base for California
- to motivate people to do more to help identify, protect, and conserve vegetation in their area
- to link vegetation types with habitat for animals

Selecting stands to sample:

To start the rapid assessment method, stands of vegetation needs to be defined.
A stand is the basic physical unit of vegetation in a landscape. It has no set size. Some vegetation stands are very small, such as alpine meadow or tundra types, and some may be several square kilometers in size, such as desert or forest types. A stand is defined by two main unifying characteristics:

1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or indistinct.
2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous.

Stands to be sampled may be selected by evaluation prior to a site visit (*e.g.* delineated from aerial photos or satellite images), or they may be selected on site (during reconnaissance to determine extent and boundaries, location of other similar stands, etc.).

Depending on the project goals, you may want to select just one or a few representative stands of each homogeneous vegetation type for sampling (*e.g.* for developing a classification for a vegetation mapping project), or you may want to sample all of them (*e.g.* to define a rare vegetation type and/or compare site quality between the few remaining stands).

Definitions of fields in the protocol

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #: Number assigned either in the field or in the office prior to sampling. It is usually denoted with an abbreviation of the sampling location and then a sequential number of that locale (*e.g.* CRRA-001 for Coyote Ridge rapid assessment number 1).

Air photo #: The number given to the aerial photo in a vegetation-mapping project, for which photo interpreters have already done photo interpretation and delineations of polygons. If the sample site has not been photo-interpreted, leave blank.

Date: Date of the sampling.

Name(s) of surveyors: The full names of each person assisting should be provided for the first rapid assessment. In successive assessments, initials of each person assisting can be recorded. Please note: The person recording the data on the form should circle their name/initials.

GPS waypoint #: The waypoint number assigned by a Global Positioning System (GPS) unit when marking and storing a waypoint for the stand location. These waypoints can be downloaded from the GPS into a computer Geographic Information System to depict sample points accurately on a map.

GPS name: The name personally assigned to each GPS unit (especially useful if more than one GPS unit is used to mark waypoints for the project).

GPS datum: (NAD 27) The map datum that is chosen for GPS unit to document location coordinates. The default datum for CNPS projects is NAD 27. However, other agencies and organizations may prefer another datum. Please circle NAD27 or write in the appropriate datum.

Is GPS within stand? Yes / No Circle"Yes" to denote that the GPS waypoint was taken directly within or at the edge of the stand being assessed, or circle "No" to denoted the waypoint was taken at a distance from the stand (such as with a binocular view of the stand).

If No cite distance (note ft/m), bearing and view from point to stand: An estimate of the number of feet or meters (please circle appropriate), the compass bearing from the waypoint of GPS to the stand, and the method of view used to verify the plot (*e.g*. binoculars, aerial photo).

Error: ± The accuracy of the GPS location, when taking the UTM field reading. Please denote feet (ft) or meters (m). It is typical for all commercial GPS units to be accurate to within 5 m (or 16 ft.) of the actual location, because the military's intentional imprecision (known as "selective availability") has been "turned off" as of July 2000. Please become familiar with your GPS unit's method of determining error. Some of the lower cost models do not have this ability. If using one of those, insert N/A in this field.

UTM field reading: Easting (UTME) and northing (UTMN) location coordinates using the Universal Transverse Mercator (UTM) grid. Record using a GPS unit or USGS topographic map.

UTM zone: Universal Transverse Mercator zone. Zone 10S for California west of the 120th longitude; zone 11S for California east of 120th longitude.

Elevation: Recorded from the GPS unit or USGS topographic map. Please denote feet (ft) or meters (m), and note if reading is from GPS unit or map. (Please note: Readings taken from a GPS unit can be hundreds of feet off.)

Photograph #'s: Note the roll number, frame number, direction, and the name of the person whose camera is being used. Take at least two photographs from different directions, and describe the location and view direction from compass bearings for each frame. Additional photographs of the stand may also be helpful. (Also, if using a digital camera or scanning the image into a computer, positions relative to the polygon/stand number can be recorded digitally.)

Topography: Check two of the provided features, characterizing both the local relief and the broad topographic position of the area. First assess the minor topographic features or the lay of the area (*e.g.* surface is flat, concave, etc.). Then assess the broad topographic feature or general position of the area (*e.g.* stand is at the bottom, lower (1/3 of slope), middle (1/3 of slope), upper (1/3 of slope), or top).

Geology: Geological parent material of site. If exact type is unknown, use a more general category (*e.g.* igneous, metamorphic, sedimentary). *See code list for types.*

Soil: Record soil texture or series that is characteristic of the site (*e.g.* sand, silt, clay, coarse loamy sand, sandy clay loam, saline, et.). *See soil texture key and code list for types.*

% Large Rock (optional): Estimate the percent surface cover of large rocks (e.g. stones, boulders, bedrock) that are beyond 25 cm in size.

% Small Rock (optional): Estimate the percent surface cover of small rocks (e.g. gravel, cobbles) that are greater than 2 mm and less than 25 cm in size.

% Bare/Fines (optional): Estimate the percent surface cover of bare ground and fine sediment (e.g. dirt) that is 2 mm or less in size.

General slope exposure (circle one and enter actual º): Read degree aspect from a compass or clinometer (or estimate). Make sure to average the reading across entire stand. "Variable" may be selected if the same, homogenous stand of vegetation occurs across a varied range of slope exposures.

General slope steepness (circle one and enter actual º): Read degree slope from compass (or estimate), using degrees from true north (adjusting for declination). Average the reading over entire stand.

Upland or Wetland/Riparian (circle one) Indicate if the stand is in an upland or a wetland; note that a site need not be officially delineated as a wetland to qualify as such in this context (*e.g.* seasonally wet meadow).

Site history, stand age, and comments: Briefly describe the stand age/seral stage, disturbance history, nature and extent of land use, and other site environmental and vegetation factors. Examples of disturbance history: fire, landslides, avalanching, drought, flood, animal burrowing, or pest outbreak. Also, try to estimate year or frequency of disturbance. Examples of land use: grazing, timber harvest, or mining. Examples of other site factors: exposed rocks, soil with fine-textured sediments, high litter/duff build-up, multi-storied vegetation structure, or other stand dynamics.

Type / level of disturbance (use codes): List codes for potential or existing impacts on the stability of the plant community. Characterize each impact each as L (=Light), M (=Moderate), or H (=Heavy). *See code list for impacts.*

VEGETATION DESCRIPTION

Basic alliance and stand description

Field-assessed vegetation alliance name: Name of alliance (series) or habitat following the CNPS classification system (Sawyer and Keeler-Wolf 1995). Please use binomial nomenclature, *e.g. Quercus agrifolia* forest. An alliance is based on the dominant (or diagnostic) species of the stand, and is usually of the uppermost and/or dominant height stratum. A dominant species covers the greatest area (and a diagnostic is consistently found in some vegetation types but not others).

Please note: The field-assessed alliance name may not exist in present classification, in which you can provide a new alliance name in this field. If this is the case, also make sure to denote and explain this in the "Cannot identify alliance based on MCV classification" of the "**Problems with Interpretation**" section below.

Field-assessed association name (optional): Name of the species in the alliance and additional dominant/diagnostic species from any strata, as according to CNPS classification. In following naming conventions, species in differing strata are separated with a slash, and species in the uppermost stratum are listed first (*e.g. Quercus agrifolia/Toxicodendron diversilobum*). Species in the same stratum are separated with a dash (*e.g. Quercus agrifolia-Quercus kelloggii).*

Please note: The field-assessed association name may not exist in present classification, in which you can provide a new association name in this field.

Size of stand: Estimate the size of the entire stand in which the rapid assessment is taken. As a measure, one acre is about 0.4 hectares or about 4000 square meters.

Adjacent Alliances: Identify other vegetation types that are directly adjacent to the stand being assessed. Specifically, list up to three alliances (or associations or mapping units) by noting the

dominant species; also note the distance away in meters from the GPS waypoint and the direction in degrees aspect that the adjacent alliance is found
(e.g. Abies concolor-Pinus ponderosa 50m, 360°/N Arctostaphylos patula 100m, 110°).

Habitat classification per California Wildlife-Habitat Relationships (CWHR)
For CWHR, identify the size/height class of the stand using the following tree, shrub, and/or herbaceous categories. These categories are based on functional life forms.

Tree: Circle one of the tree size classes provided when the tree canopy closure exceeds 10 percent of the total cover (except in desert types), or if young tree density indicates imminent tree dominance. Size class is based on the average dbh (diameter of trunk at breast height). In choosing a size class, make sure to estimate the mean diameter of all trees over the entire stand. Circle the size class 6 multi-layered tree if there is a size class 5 of trees over a distinct layer of size class either 3 or 4 (*i.e.* distinct height class separation between different tree species) and the total tree canopy exceeds 60%.

If tree, list 1-3 dominant overstory species: If tree canopy cover exceeds 10 percent (except in desert types), please list the dominant species that occur in the overstory canopy.

Shrub: Circle one of the shrub size classes provided when shrub canopy closure exceeds 10 percent (except in desert types). Size class is based on the average amount of crown decadence (dead standing vegetation on live shrubs when looking across the crowns of the shrubs).

Herbaceous: Circle one of the herb height classes provided when herbaceous cover exceeds 2 percent. This height class is based on the average plant height at maturity.

Desert Palm/Joshua Tree: Circle one of the palm or Joshua tree size classes by averaging all the stem-base diameters (*i.e.* mean diameter of all stem-base sizes). Diameter is measured at the plant's base above the bulge near the ground.

Desert Riparian Tree/Shrub: Circle one of the size classes by measuring mean stem height (whether tree and/or shrub stand).

Overall cover of vegetation
Provide an ocular estimate of cover for the following categories (based on functional life forms). Record a specific number for the total aerial cover or "bird's-eye view" looking from above for each category, estimating cover for the living plants only. Litter/duff should not be included in these estimates.

To come up with a specific number estimate for percent cover, first use to the following CWHR cover intervals as a reference aid to get a generalized cover estimate: <2%, 2-9%, 10-24%, 25-39%, 40-59%, 60-100%. While keeping these intervals in mind, you can then refine your estimate to a specific percentage for each category below.

%Overstory Conifer/Hardwood Tree cover: The total aerial cover (canopy closure) of all live tree species that are specifically in the overstory or are emerging, disregarding overlap of individual trees. Estimate conifer and hardwood covers separately. Please note: These cover values should not include the coverage of suppressed understory trees.

Shrub cover: The total aerial cover (canopy closure) of all live shrub species, disregarding overlap of individual shrubs.

Ground cover: The total aerial cover (canopy closure) of all herbaceous species, disregarding overlap of individual herbs.

Total Veg cover: The total aerial cover of all vegetation. This is an estimate of the absolute vegetation cover, disregarding overlap of the various tree, shrub, and/or herbaceous layers.

Modal height for conifer/hardwood tree, shrub, and herbaceous categories (optional)
If height values are important in your vegetation survey project, provide an ocular estimate of height for each category listed. Record an average height value, estimating the modal height for each group. Use the following height intervals and record a height class: 01=<1/2m, 02=1/2-1m, 03=1-2m, 04=2-5m, 05=5-10m, 06=10-15m, 07=15-20m, 08=20-35m, 09=35-50m, 10=>50m.

Species list and coverage
Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)
List the species that are dominant or that are characteristically consistent throughout the stand.

When different layers of vegetation occur in the stand, make sure to list species from each stratum. As a general guide, make sure to list at least 1-2 of the most abundant species per stratum. Provide a stratum code for each species listed, based on height, where T (=Tall) is >5 m in height, M (=Medium) is between 0.5 and 5 m in height, and L (=Low) is <0.5 m in height.

Also, provide a numerical ocular estimate of aerial coverage for each species. When estimating, it is often helpful to think of coverage in terms of the cover intervals from the CNPS relevé form at first (*e.g.* <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%). Keeping these classes in mind, then refine your estimate to a specific percentage (*e.g* the cover of species "x" is somewhere between 25 and 50 percent, but I think it is actually around 30%). Please note: All estimates are to be reported as absolute cover (not relative cover), and all the species percent covers may total over 100% when added up because of overlap.

Major non-native species in stand (with % cover): All exotic species occurring in the stand should be listed in this space provided (or they can be recorded in the above Species list). Make sure to give each exotic species an absolute coverage estimate.

Unusual species: List species that are either locally or regionally rare, endangered, or atypical (*e.g.* range extension or range limit) within the stand. This species list will be useful to the Program for obtaining data on regionally or locally significant populations of plants.

PROBLEMS WITH INTERPRETATION

Confidence in Identification: (L, M, H) With respect to the "field-assessed alliance name", note whether you have L (=Low), M (=Moderate), or H (=High) confidence in the interpretation of this alliance name. Low confidence can occur from such things as a poor view of the stand,

an unusual mix of species that does not meet the criteria of any described alliance, or a low confidence in your ability to identify species that are significant members of the stand.

Explain: Please elaborate if your "Confidence in Identification" is low or moderate. Similarly, if the field-assessed alliance name is not defined by CNPS's present Manual of California Vegetation (MCV) classification, note this in the space and describe why. In some instances for specific projects, there may be the benefit of more detailed classifications than what is presented in the first edition of the MCV. If this is the case, be sure to substitute the most appropriate and detailed classification.

Other identification problems (describe): Discuss any further problems with the identification of the assessment (*e.g.* stand is observed with an oblique view using binoculars, so the species list may be incomplete, or the cover percentages may be imperfect).

Polygon is more than one type (Yes, No) (Note: type with greatest coverage in polygon should be entered in above section) This is relevant to areas that have been delineated as polygons on aerial photographs for a vegetation-mapping project. In most cases the polygon delineated is intended to represent a single stand, however mapping conventions and the constraints and interpretability of remote images will alter the ability to map actual stands on the ground. "Yes" is noted when the polygon delineated contains the field-assessed alliance and other vegetation type(s), as based on species composition and structure. "No" is noted when the polygon is primarily representative of the field-assessed alliance.

Other types: If "Yes" above, then list the other subordinate vegetation alliances that are included within the polygon. List them in order of their amount of the polygon covered.

Has the vegetation changed since air photo taken? (Yes, No) If an aerial photograph is being used for reference, evaluate if the stand of the field-assessed alliance has changed as a result of disturbance or other historic change since the photograph was taken.

If Yes, how? What has changed (write N/A if so)**?** If the photographic signature of the vegetation has changed (*e.g.* in structure, density, or extent), please detail here.

Simplified Key to Soil Texture (Brewer and McCann, 1982)

Place about three teaspoons of soil in the palm of your hand. Take out any particles <2mm in size, and use the following key to figure out the soil texture (e.g. loamy sand). Then figure out the texture subclass by using the Code List attached (e.g. coarse loamy sand).

A1 Soil does not remain in a ball when squeezed.....sand

A2 Soil remains in a ball when squeezed..... B

B1 Add a small amount of water. Squeeze the ball between your thumb and forefinger, attempting to make a ribbon that you push up over your finger. Soil makes no ribbon.....loamy sand

B2 Soil makes a ribbon; may be very short.....C

C1 Ribbon extends less than 1 inch before breaking.....D

C2 Ribbon extends 1 inch or more before breaking.....E

D1 Add excess water to small amount of soil; soil feels very gritty or at least slightly gritty .....loam or sandy loam

D2 Soil feels smooth.....silt loam

E1 Soil makes a ribbon that breaks when 1–2 inches long; cracks if bent into a ring.....F

E2 Soil makes a ribbon 2+ inches long; does not crack when bent into a ring.....G

F1 Add excess water to small amount of soil; soil feels very gritty or at least slightly gritty.....sandy clay loam or clay loam

F2 Soil feels smooth.....silty clay loam or silt

G1 Add excess water to a small amount of soil; soil feels very gritty or at least slightly gritty.....sandy clay or clay

G2 Soil feels smooth.....silty clay

CALIFORNIA NATIVE PLANT SOCIETY RELEVÉ FIELD FORM CODE LIST

(revised 7/8/02)

IMPACTS

01 Development
02 ORV activity
03 Agriculture
04 Grazing
05 Competition from exotics
06 Logging
07 Insufficient population/stand size
08 Altered flood/tidal regime
09 Mining
10 Hybridization
11 Groundwater pumping
12 Dam/inundation
13 Other
14 Surface water diversion
15 Road/trail construction/maint.
16 Biocides
17 Pollution
18 Unknown
19 Vandalism/dumping/litter
20 Foot traffic/trampling
21 Improper burning regime
22 Over collecting/poaching
23 Erosion/runoff
24 Altered thermal regime
25 Landfill
26 Degrading water quality
27 Wood cutting
28 Military operations
29 Recreational use (non ORV)
30 Nest parasitism
31 Non-native predators
32 Rip-rap, bank protection
33 Channelization (human caused)
34 Feral pigs
35 Burros
36 Rills
37 Phytogenic mounding

MACRO TOPOGRAPHY

00 Bench
01 Ridge top (interfluve)
02 Upper 1/3 of slope
03 Middle 1/3 of slope
04 Lower 1/3 of slope (lowslope)
05 Toeslope (alluvial fan/bajada)
06 Bottom/plain
07 Basin/wetland
08 Draw
09 Other
10 Terrace (former shoreline or floodplain)
11 Entire slope
12 Wash (channel bed)
13 Badland (complex of draws & interfluves)
14 Mesa/plateau
15 Dune/sandfield
16 Pediment
17 Backslope (cliff)

MICRO TOPOGRAPHY

01 Convex or rounded
02 Linear or even
03 Concave or depression
04 Undulating pattern
05 Hummock or Swale pattern
06 Mounded
07 Other

PARENT MATERIAL

ANDE	Andesite
ASHT	Ash (of any origin)
GRAN	Granitic (generic)
GREE	Greenstone
DIOR	Diorite
BASA	Basalt
OBSI	Obsidian
PUMI	Pumice
IGTU	Igneous (type unknown)
MONZ	Monzonite
PYFL	Pyroclastic flow
QUDI	Quartz diorite
RHYO	Rhyolite
VOLC	General volcanic extrusives
VOFL	Volcanic flow
VOMU	Volcanic mud
BLUE	Blue schist
CHER	Chert
DOLO	Dolomite
FRME	Franciscan melange
INTR	General igneous intrusives
GNBG	Gneiss/biotite gneiss
HORN	Hornfels
MARB	Marble
METU	Metamorphic (type unknown)
PHYL	Phyllite
SCHI	Schist
SESC	Semi-schist
SLAT	Slate
BREC	Breccia (non-volcanic)
CACO	Calcareous conglomerate
CASA	Calcareous sandstone
CASH	Calcareous shale
CASI	Calcareous siltstone
CONG	Conglomerate
FANG	Fanglomerate
GLTI	Glacial till, mixed origin, moraine
LALA	Large landslide (unconsolidated)
LIME	Limestone
SAND	Sandstone
SETU	Sedimentary (type unknown)
SHAL	Shale
SILT	Siltstone
DIAB	Diabase
GABB	Gabbro
PERI	Peridotite
SERP	Serpentine
ULTU	Ultramafic (type unknown)
CALU	Calcareous (origin unknown)
DUNE	Sand dunes
LOSS	Loess
MIIG	Mixed igneous
MIME	Mixed metamorphic
MIRT	Mix of two or more rock types
MISE	Mixed sedimentary
CLAL	Clayey alluvium
GRAL	Gravelly alluvium
MIAL	Mixed alluvium
SAAL	Sandy alluvium (most alluvial fans and washes)
SIAL	Silty alluvium
OTHE	Other than on list

SOIL TEXTURE

COSA	Coarse sand
MESN	Medium sand
FISN	Fine sand
COLS	Coarse, loamy sand
MELS	Medium to very fine, loamy sand
MCSL	Moderately coarse, sandy loam
MESAL	Medium to very fine, sandy loam
MELO	Medium loam
MESIL	Medium silt loam
MESI	Medium silt
MFCL	Moderately fine clay loam
MFSA	Moderately fine sandy clay loam
MFSL	Moderately fine silty clay loam
FISA	Fine sandy clay
FISC	Fine silty clay
FICL	Fine clay
SAND	Sand (class unknown)
LOAM	Loam (class unknown)
CLAY	Clay (class unknown)
UNKN	Unknown
PEAT	Peat
MUCK	Muck

DOMINANT VEGETATION GROUP

Trees:

TBSE	Temperate broad-leaved seasonal evergreen forest
TNLE	Temperate or subpolar needle-leafed evergreen forest
CDF	Cold-deciduous forest
MNDF	Mixed needle-leafed evergreen-cold deciduous. forest
TBEW	Temperate broad-leaved evergreen woodland
TNEW	Temperate or subpolar needle-leaved evergreen woodland
EXEW	Extremely xeromorphic evergreen woodland
CDW	Cold-deciduous woodland
EXDW	Extremely xeromorphic deciduous woodland
MBED	Mixed broad-leaved evergreen-cold deciduous woodland
MNDW	Mixed needle-leafed evergreen-cold deciduous woodland

Shrubs:

TBES	Temperate broad-leaved evergreen shrubland
NLES	Needle-leafed evergreen shrubland
MIES	Microphyllus evergreen shrubland
EXDS	Extremely xeromorphic deciduous shrubland
CDS	Cold-deciduous shrubland
MEDS	Mixed evergreen-deciduous shrubland
XMED	Extremely xeromorphic mixed evergreen-deciduous shrubland

Dwarf Shrubland:

NMED	Needle-leafed or microphyllous evergreen dwarf shrubland
XEDS	Extremely xeromorphic evergreen dwarf shrubland
DDDS	Drought-deciduous dwarf shrubland
MEDD	Mixed evergreen cold-deciduous dwarf shrubland

Herbaceous:

TSPG	Temperate or subpolar grassland
TGST	Temperate or subpolar grassland with sparse tree
TGSS	Temperate or subpolar grassland with sparse shrublayer
TGSD	Temperate or subpolar grassland with sparse dwarf shrub layer
TFV	Temperate or subpolar forb vegetation
THRV	Temperate or subpolar hydromorphic rooted vegetation
TAGF	Temperate or subpolar annual grassland or forb vegetation

***Sparse Vegetation*:**

SVSD	Sparsely vegetated sand dunes
SVCS	Sparsely vegetated consolidated substrates

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Revised February 5, 2003)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
_____	_____	_____	_____

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (NAD 27)** _____ **Is GPS within stand?** Yes / No

If No cite distance (note ft/m), bearing and view from point to stand center: _____ **Error: ±**_____ **ft/m**

UTM field reading: UTME __ __ __ __ __ __ **UTMN** __ __ __ __ __ __ __ **UTM zone:** _____

Elevation: _____ **ft/m Photograph #'s**: _____

Topography: flat____ **concave**____ **convex**____ **undulating**____ | **bottom**____ **lower**____ **mid**____ **upper**____ **top**____

Geology: _____ **Soil Texture:** _____ **% Large Rock**_____ **% Small Rock**_____ **% Bare/Fines**_____

Slope exposure (circle one and/or enter actual °): **NE**_____ **SE**_____ **SW**_____ **NW**_____ **Flat**__ **Variable**__

Slope steepness (circle one and enter actual °): **0°**__ **1-5°** _____ **5-25°**_____ **> 25°**_____ **Upland** or **Wetland/Riparian** (circle one)

Site history, stand age, and comments: _____

_____

_____

Type / level of disturbance (use codes): _____

VEGETATION DESCRIPTION

Field-assessed vegetation alliance name: _____

Field-assessed association name (optional): _____

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres**___ **Adjacent alliances:** _____ _____

_____ _____ _____ _____

Tree: T1 (<1" dbh), T2 (1-6" dbh), T3 (6-11" dbh), T4 (11-24" dbh), T5 (>24" dbh), T6 multi-layered (T3 or T4 layer under T5, >60% cover)
If Tree, list 1-3 dominant overstory spp.: _____

Shrub: S1 seedling (<3 yr. old), S2 young (<1% dead), S3 mature (1-25% dead), S4 decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), H2 (>12" ht.) **Desert Palm/Joshua Tree:** 1 (<1.5" base diameter), 2 (1.5-6" diam.), 3 (>6" diam.)

Desert Riparian Tree/Shrub: 1 (<2ft. stem ht.), 2 (2-10ft. ht.), 3 (10-20ft. ht.), 4 (>20ft. ht.)

% Overstory Conifer/Hardwood Tree cover: _____/_____ Shrub cover: _____ Herbaceous cover: _____ Total Veg cover:_____
Modal Conifer/Hardwood height: _____/_____ **Tall Shrub/Low Shrub height:** _____/_____ **Herbaceous height:** _____

Species (List up to 12 major species), Stratum, and Approximate % cover: (Jepson Manual nomenclature please)

Strata categories: T=tall, M=medium, L=low; **% cover** intervals for reference: **<1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%**

Strata	Species	% cover		Strata	Species	% cover

Major non-native species (with % cover): _____

Unusual species: _____

PROBLEMS WITH INTERPRETATION

Confidence in identification: (L, M, H) _____ **Explain** _____

Other identification problems (describe): _____

Polygon is more than one type: (Yes, No) _____ (Note: type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____ _____

Has the vegetation changed since air photo taken? (Yes, No) _____ **If Yes, how? What has changed** (write N/A if so)**?** _____

_____