

Chapter 6

Literature Cited

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6.1 Printed References

Alameda County Community Development Agency. 2002. *East County Area Plan (Revised by Initiative Nov. 2000)*. Planning Department. Hayward, CA.
Available:
<http://www.acgov.org/cda/planning/plans/EastCountyAreaPlancombined.pdf>. Accessed: February 19, 2009.

Alameda County Community Development Department. 2008. *Alameda County General Plan – Agriculture Element*. Draft Version. Hayward, CA. Prepared for: Alameda County Community Development Department.

Alameda County Community Development Agency. 2007. *East County Area Plan Land Use Diagram*. Draft Version. Hayward, CA. Prepared for: Alameda County.

Alameda County Resource Conservation District. 2006. Arroyo de la Laguna streambank restoration project. Project fact sheet. Available:
<http://www.acrcd.org/Portals/0/Arroyo/ArroyoFactSheet.pdf>. Accessed: April 27, 2009.

Alameda Creek Alliance. 2009. Recent fish documentation. Available:
<http://www.alamedacreek.org/Historical%20photos/recent%20fish%20documentation/Recent%20fish%20documentation.htm>. Accessed: February 23, 2009. Updated March 12, 2008.

- Alameda Creek Alliance. 2009. Arroyo Mocho. Available:
http://www.alamedacreek.org/Fish_Passage/Arroyo%20Mocho/Arroyo%20Mocho.htm. Accessed: April 27, 2009. Updated April 24, 2009.
- Alvarez, J. A. 2004. *Rana aurora draytonii* (California Red-legged frog) Microhabitat. *Herpetological Review* 35:162-163.
- Arnold, R.A. 1981. Distribution, life history, and status of three California lepidoptera proposed as endangered or threatened species. California Department of Fish & Game, Inland Fisheries Branch. Final report for contract #S-1620. 39 pp.
- Arnold, R. A. 2008. Draft Survey Report for Four Endangered Butterflies at the San Francisco Peninsula Watershed for the Crystal Springs/San Andreas Transmission System Upgrade Project. Prepared for SFPUC. 21 pp.
- Association of Bay Area Governments. 2006. Projections 2007: Forecasts for the San Francisco Bay Area to the Year 2035. ABAG Catalog Number P07001PRO. Oakland, CA.
- Baker, G. A., P. W. Rundel, and D. J. Parsons. 1981. Ecological relationships of *Quercus douglasii* (Fagaceae) in the foothill zone of Sequoia National Park, California. *Madroño* 28:1–12.
- Barbour, M., J. Burk, and W. Pitts. 1993. *California's Changing Landscapes: Diversity and Conservation of California Vegetation*. Sacramento, CA: California Native Plant Society.
- Barbour, Michael G.; Keeler-Wolf, Todd; and Schoenherr, Allen A. 2007. Terrestrial vegetation of California. Third Edition. Berkeley and Los Angeles, CA.: University of California Press.
- Barry, S. J. and H. B. Shaffer. 1994. The Status of the California Tiger Salamander (*Ambystoma californiense*) at Lagunita: A 50-Year Update. *Journal of Herpetology* 28:159–164.
- Bartolome, J. W., and B. Gemmill. 1981. The ecological status of *Stipa pulchra* (Poaceae) in California. *Madroño* 28:172–184.
- Bay Area Open Space Council. 2004. San Francisco Bay Area Uplands Goals Project. Phase One: Reconnaissance, Final Report. September. Available: http://www.openspacecouncil.org/upload/files/20090513155457_baosc_upland_2004.09.28_phase_one_final_report.pdf. Accessed August 2009.

- Beedy, E. C. and W. J. Hamilton III. 1997. Tricolored Blackbird Status Update and Management Guidelines. Jones & Stokes Associates, Inc. (JSA 97-099.) Sacramento, CA. Prepared for U.S. Fish and Wildlife Service, Portland, OR; and California Department of Fish and Game, Sacramento, CA.
- . 1999. Tricolored Blackbird (*Agelaius tricolor*). In A. Poole and F. Gill (eds.), *The Birds of North America*, No. 423. Philadelphia, PA: The Birds of North America, Inc.
- Beir, P., and R. F. Noss. 2000. Documenting the conservation value of corridors. In *Missing linkages: restoring connectivity to the California landscape*. Conference Proceedings and report prepared by the California Wilderness Coalition, The Nature Conservancy, the Biological Resources Division of the U.S. Geological Survey, the Center for Reproduction of Endangered Species, and California State Parks. Available: <http://www.calwild.org/resources/publications>.
- Bell, H. 1994. Analysis of Habitat Characteristics of San Joaquin Kit Fox in Its Northern Range. Master's Thesis, California State University, Hayward.
- Bobzien, S. and DiDonato, J. E. 2007. The Status of the California Tiger Salamander (*Ambystoma californiense*), California Red-Legged Frog (*Rana draytonii*), Foothill Yellow-Legged Frog (*Rana boylii*) and other Aquatic Herpetofauna in the East Bay Regional Park District, California. East Bay Regional Park District, Oakland, CA. 87 pp.
- California Department of Fish and Game. 1998. *California Vernal Pool Assessment Preliminary Report*. Sacramento, CA: Wildlife and Habitat Data Analysis Branch.
- . 2003a. List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. September 6 edition.
- . 2003b. Atlas of the Biodiversity of California. Sacramento, CA.
- . 2007. Vegetation Classification and Mapping Program List of California Vegetation Alliances. October 22 edition.
- . 2009a. Special Animals list. February. Available online at: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spanimals.pdf>
- . 2009b. Special Vascular Plants, Bryophytes, and Lichens list. January. Available online at: <http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/spplants.pdf>

- California Integrated Waste Management Board. 2009. List of Disposal Facilities Used in Alameda County, 2007. Available:
<http://www.ciwmb.ca.gov/profiles/County/CoProfile4.asp?COID=01>. Accessed March 2009.
- California Native Plant Society. 2001. *Inventory of Rare and Endangered Plants of California* (6th edition). David Tibor, Ed. Sacramento, CA: California Native Plant Society.
- . 2007. *Inventory of Rare and Endangered Plants of California* (7th edition). Sacramento, CA. On-line database Available: www.cnps.org.
- . 2008. Inventory of Rare and Endangered Vascular Plants of California.
- California Natural Diversity Database. 2009. RareFind, Version 3.1.0 (February 2010 update). Sacramento, CA: California Department of Fish and Game.
- California Partners in Flight. 2004. Version 2.0. The Coastal Scrub and Chaparral Bird Conservation Plan: A Strategy for Protecting and Managing Coastal Scrub and Chaparral Habitats and Associated Birds in California. (J. Lovio, lead author). Stinson Beach, CA: Point Reyes Bird Observatory (PRBO) Conservation Science. Available: <http://www.prbo.org/calpif/plans.html>.
- California Wilderness Coalition. 2001. *Missing linkages: restoring connectivity to the California landscape*. Conference proceedings and report prepared by the California Wilderness Coalition, The Nature Conservancy, the Biological Resources Division of the U.S. Geological Survey, the Center for Reproduction of Endangered Species, and California State Parks. Available: <http://www.calwild.org/resources/publications>.
- City of Dublin. 2009a. *Demographic Profile*. Dublin, CA. Available:
<http://www.ci.dublin.ca.us/DepartmentSubLevel2.cfm?PL=econ&SL=demog&dsplID=862>. Accessed: May 26, 2009.
- City of Dublin. 2009b. *New Development*. Dublin, CA. Available:
<http://www.ci.dublin.ca.us/DepartmentSub.cfm?PL=econ&SL=newdev>. Accessed: March 27, 2009.
- City of Dublin. 2008. *General Plan*. Community Development Department. Dublin, CA. Available:
<http://www.ci.dublin.ca.us/pdf/General%20Plan%20November%202008.pdf>. Accessed: February 20, 2009.
- City of Livermore. 2009. *About Livermore*. Livermore, CA. Available:
<http://www.ci.livermore.ca.us/profile.html>. Accessed: March 27, 2009.

- City of Livermore. 2004. *General Plan 2003 – 2025*. Livermore, CA. Available: http://www.ci.livermore.ca.us/general_plan/general_plan.html. Accessed: February 20, 2009.
- City of Pleasanton. 2009a. *The Pleasanton Community*. Pleasanton, CA. Available: <http://www.ci.pleasanton.ca.us/community/pleasanton>. Accessed: March 27, 2009.
- City of Pleasanton. 2009b. *Pleasanton General Plan 2005 – 2025: Land Use Element*. Draft Version. Pleasanton, CA. Available: <http://www.ci.pleasanton.ca.us/pdf/genplan-080918-landuse.pdf>. Accessed: February 20, 2009.
- Coats, R., M. A. Showers, and B. Pavlik. 1988. *A management plan for the Springtown alkali sink wetlands and the endangered plant Cordylanthus palmatus*. San Francisco, CA: Phillip Williams and Associates.
- Collier, G. 1968. Annual Cycle and Behavioral Relationships in the Red-Winged and Tricolored Blackbirds of Southern California. Ph.D. dissertation. University of California. Los Angeles, CA.
- Cook, L. 1996. Nesting Adaptations of Tricolored Blackbirds (*Agelaius tricolor*). Master's thesis. University of California. Davis, CA.
- Corbett, Michael. 2005. *Historical and Cultural Resource Survey, East Alameda County*. Hayward, CA. Prepared for: Alameda County Community Development Agency.
- Crane, R. C. 1995. *Geology of the Mt. Diablo Region and East Bay Hills*. In: *Recent Geologic Studies in the San Francisco Bay Area*. Sangines, Andersen, and Busing (Eds). Fullerton, CA: The Pacific Section of the Society of Economic Paleontologists and Mineralogists. Pp. 87-114.
- Davidson, C., H. B. Shaffer, and M. R. Jennings. 2001. Declines of the California Red-Legged Frog: Climate, UV-B, Habitat, and Pesticides Hypotheses. *Ecological Applications* 11(2):464–479.
- Davidson, C., H.B. Shaffer, and M. R. Jennings. 2002. Spatial test of pesticide drift, habitat destruction, UV-B, and climate-change hypotheses for California amphibian declines. *Conservation Biology* 16: 1588-1601.
- Davis, S. D., V. H. Heywood, O. Herrera-MacBryde, J. Villa-Lobos, A. C. Hamilton (eds.). 1997. *Centres of plant diversity: a guide and strategy for their conservation*. Volume 3: *The Americas*. Cambridge, United Kingdom: The World Wildlife Fund for Nature and the World Conservation Union (IUCN).

- DeHaven R. W., F. T. Crase, and P. P. Woronecki. 1975a. Breeding Status of the Tricolored Blackbird, 1969–1972. California Department of Fish and Game.
- DeSante, D. F., E. D. Ruhlen, and D. K. Rosenberg. 1997. The Distribution and Relative Abundance of Burrowing Owls in California: Evidence for a Declining Population. Unpublished manuscript. Point Reyes Station, CA: The Institute for Bird Populations.
- Dobkin, D. S., I. Olivieri, and P. R. Ehrlich. 1987. Rainfall and the interaction of microclimate with larval resources in the population dynamics of checkerspot butterflies (*Euphydryas editha*) inhabiting serpentine grassland. *Oecologia* 71:161–166.
- DWR (Department of Water Resources). 2001. South Bay Aqueduct. (BethanyReservoir and Lake Del Valle). April. Available: <http://www.water.ca.gov/recreation/brochures/pdf/South-Bay-Aque.pdf>. Accessed: May 26, 2009.
- East Bay Regional Park District. 1997. *East Bay Regional Park District Master Plan*. Oakland, CA. Available: http://www.ebparks.org/files/RPM_Plan97.pdf. Accessed: February 20, 2009.
- Edwards, S. W. 1992. Observations on the prehistory and ecology of grazing in California. *Fremontia* 20(1):3–11.
- Egoscue, H. J. 1962. Ecology and Life History of the Kit Fox in Tooele County, Utah. *Ecology* 43:481–497.
- Eng, L., D. Belk, and C. Eriksen. 1990. Californian Anostraca: Distribution, Habitat, and Status. *Journal of Crustacean Biology* 10(2):247-277.
- Environmental Science Research Institute. 2008. ESRI Data & Maps: Streetmap. ESRI Redlands, California.
- Eriksen, C. and D. Belk. 1999. Fairy shrimps of California's pools, puddles, and playas. Mad River Press, Eureka, California.
- Fellers, G. M., editor. 1994. California/Nevada declining amphibian working group. Newsletter 1, 1 May 1994. 10 pp.
- Fellers, G. M., A E. Launer, G. Rathbun, S. Bobzien, J. Alvarez, D. Sterner, R. B. Seymour, and M. Westphal. 2001. Overwintering tadpoles in the California red-legged frog (*Rana aurora draytonii*). *Herpetological Review* 32: 156-157.

- Fellers, G. and P. Kleeman. 2007. California red-legged frog (*Rana draytonii*) movement and habitat use: Implications for conservation. *Journal of Herpetology* 41:271-281.
- Fisher, R. N. and H. B. Shaffer. 1996. The Decline of Amphibians in California's Great Central Valley. *Conservation Biology* 10:1387-1397.
- Fitch, H .S. 1938. *Rana boylii* in Oregon. *Copeia* 1938(3):148.
- Girard, I. 2001. Field Cost of Activity in the Kit Fox, *Vulpes macrotis*. *Physiological and Biochemical Zoology* 74(2):191–202.
- Giusti, G. A., R. B. Standiford, D.D. McCreary, A. Merenlender, and T. Scott. 2004. *Oak Woodland Conservation in California's Changing Landscape*. University of California, Integrated Hardwood Range Management Program, Division of Agriculture and Natural Resources and University of California, Berkeley.
- Goodman, D. 1987. How do species persist? Lessons for conservation. *Conservation Biology* 1:59–62.
- Graymer, R.W., D.L. Jones, and E.E. Brabb. 1996. Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: Derived from the Digital Database Open-File Report 96-252. Reston, VA: United States Geological Survey.
- Grinnell, J., and A. H. Miller. 1944. The Distribution of the Birds of California. *Pacific Coast Avifauna No. 27*.
- Griffin, J. R. 1971. Oak regeneration in the upper Carmel Valley, California. *Ecology* 52:862–868.
- . 1973. Xylem Sap Tension in Three Woodland Oaks of Central California. *Ecology* 54:152–159.
- . 1977. Oak Woodland. Pages 383–415 in M. G. Barbour and J. Major (eds.), *Terrestrial Vegetation of California*. New York: Wiley and Sons.
- Groom, M. J., G. K. Meffe, and C. R. Carroll. 2006. *Principles of Conservation Biology*. Third edition. Sinauer Associates, Inc. Sunderland, MA.
- Gunther, A. J., J. Hagar, and P. Salop. 2000. *An assessment of the potential for restoring a viable steelhead trout population in the Alameda Creek watershed*. Richmond, CA. Prepared for: Alameda Creek Fisheries Restoration workgroup.

- H. T. Harvey & Associates. 1997. Distribution of the San Joaquin kit fox in the north part of its range. Pleasanton, CA. Prepared for Ted Fairfield.
- H.T. Harvey and Associates. 1999. Santa Clara Valley Water District Foothill Yellow-Legged Frog Distribution and Status-1999. Prepared for Santa Clara Valley Water District, San Jose, CA.
- Hanes, T. L. 1988. California chaparral. Pages 417–469 in M. G. Barbour and J. Major (eds.), *Terrestrial Vegetation of California*. Sacramento, CA: California Native Plant Society.
- Hamilton, W. J., III. 1998. Tricolored Blackbird Itinerant Breeding in California. *Condor* 100:218B226.
- Hamilton, W. J., III. 2000. Tricolored Blackbird 2000 Survey and Population Analysis. Unpublished report. Prepared for U.S. Fish and Wildlife Service, Portland, OR.
- Hamilton, W. J. III. 2004. Management Implications of the 2004 Tricolored Blackbird Survey. Central Valley Bird Club Bulletin. Volume 7, Numbers 2-3.
- Hamilton, W. J. and Meese, R. J. 2006. Habitat and Population Characteristics of Tricolored Blackbird Colonies in California: 2005 Final Report. Prepared for the California Department of Fish and Game, Sacramento, CA.
- Hanes, T. L. 1988. California chaparral. Pages 417–469 in M. G. Barbour and J. Major (Eds.), *Terrestrial Vegetation of California*. Sacramento, CA: California Native Plant Society.
- Harrison, S. 1999. Local and regional diversity in a patchy landscape: native, alien and endemic herbs on serpentine soils. *Ecology* 80:70–80.
- Harrison, S., B. D. Inouye, and H. D. Safford. 2003. Ecological heterogeneity in the effects of grazing and fire on grassland diversity. *Conservation Biology* 17(3):837–845.
- Haug, E. A., B. A. Millsap, and M. S. Martell. 1993. The Burrowing Owl (*Speotyto cunicularia*). In A. Poole and F. Gill (Eds.), *The Birds of North America*, No. 61. Philadelphia, PA: The Academy of Natural Sciences; Washington, D. C: The American Ornithologists' Union.
- Hayes, M. P. and M. R. Jennings. 1986. Decline of Ranid Frog Species in Western North America: Are Bullfrogs (*Rana catesbeiana*) Responsible? *Journal of Herpetology* 20(4):490–509.

- Heady, H. F. 1988. Valley grassland. Pages 491–514 in M.G. Barbour and J. Major (eds.), *Terrestrial Vegetation of California*. Sacramento, CA: California Native Plant Society.
- Heady, H. F., T. C. Foin, M. M. Hektner, D. W. Taylor, M. G. Barbour, and W. J. Barry. 1988. Coastal prairie and northern coastal scrub. Pages 733–760 in M.G. Barbour and J. Major (eds.), *Terrestrial Vegetation of California*. Sacramento, CA: California Native Plant Society.
- Herron, C., M. A. King, and K. MacDonald. 2004. A preliminary assessment of potential steelhead habitat in Sinbad Creek, Alameda County. University of California at Berkeley. Available: http://www.alamedacreek.org/Fish_Passage/Sunol%20Valley/Sinbad%20Creek%20Assessment.pdf. Accessed: April 27, 2009.
- Hilty, J., and A. M. Merelender. 2004. Use of riparian corridors and vineyards by mammalian predators in Northern California. *Conservation Biology* 18:126–135.
- Hilty, J. A., W. Z. Lidicker Jr., and A. M. Merenlender. 2006. *Corridor Ecology*. Washington, DC: Island Press.
- Hobbs, R. J. 1985. Harvester ant foraging and plant species distribution in annual grassland. *Oecologia* 67:519–523.
- Hobbs, R. J., and H. A. Mooney. 1985. Community and population dynamics of serpentine grassland annuals in relation to gopher disturbance. *Oecologia* 67:343–351.
- . 1991. Effects of rainfall variability and gopher disturbance on serpentine annual grassland dynamics. *Ecology* 72:59–68.
- Holland, D. C., M. P. Hayes, and E. McMillan. 1990. Late Summer Movement and Mass Mortality in the California Tiger Salamander (*Ambystoma californiense*). *Southwestern Naturalist* 35:217–220.
- Holland, R. F. 1986. Preliminary descriptions of the terrestrial natural communities of California. Sacramento, CA: Department of Fish and Game.
- Hooper, D. U., and P. M. Vitousek. 1998. Effects of plant composition and diversity on nutrient cycling. *Ecological Monographs* 68:121–149.
- Howard, J. L. 1998. *Bromus hordeaceus*. Fire Effects Information System; U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <http://www.fs.fed.us/database/feis/plants/graminoid/brohor/all.html#FIRE%20EFFECTS> (2005).

- Hunt, G. and T. Hunt. 2006. The Trend of Golden Eagle Territory Occupancy in the Vicinity of the Altamont Pass Wind Resource Area: 2005 Survey. Prepared for the California Energy Commission, contract 500-01-032, to the Predatory Bird Research Group, University of California, Santa Cruz.
- Hunt, W. G., R. E. Jackman, T. L. Brown, D. E. Driscoll, and L. Culp. 1998. A Population Study of Golden Eagles in the Altamont Pass Wind Resource Area: Population Trend Analysis 1997. Prepared for the National Renewable Energy laboratory, subcontract XAT-6-16459-01 to the Predatory Bird Research Group, University of California, Santa Cruz.
- Hunt, W. G., R. E. Jackman, T. L. Brown, J. G. Gilardi, D. E. Driscoll, and L. Culp. 1995. A Population Study of Golden Eagles in the Altamont Pass Wind Resource Area, California. Prepared for the National Renewable Energy laboratory, subcontract XCG-4-14200 to the Predatory Bird Research Group, University of California, Santa Cruz.
- Jennings, M. R. 1988. Natural History and Decline of Native Ranids in California. Pages 61–72 in H. F. DeLisle, P. R. Brown, B. Kaufman, and B. M. McGurty (editors), Proceedings of the Conference on California Herpetology. Southwestern Herpetologists Society, Special Publication (4).
- Jennings, M. R., and M. P. Hayes. 1990. Report on the Status of the California Red-Legged Frog (*Rana aurora draytonii*) in the Pescadero Marsh Natural Preserve. (Final.) Prepared for the California Department of Parks and Recreation under contract No. 4-823-9018 with the California Academy of Sciences.
- Jennings, M. R., and M. P. Hayes. 1994. Amphibian and Reptile Species of Special Concern in California. Prepared for the California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.
- Johnsgard, P. A. 1990. Hawks, Eagles and Falcons of North America: Biology and Natural History. Page 403. Washington and London: Smithsonian Institution Press.
- Jones & Stokes. 2001. Vasco-Laughlin resource conservation plan. Working draft, March. Prepared for the City of Livermore, Livermore, CA.
- Jones & Stokes. 2002. Alameda County ROSAProject: Biologicla Rsources Report, Final Draft. *Prepared for:* Alameda County. December.
- Kelsey, R. 2008. Results of the Tricolored Blackbird Census. 2008. Audubon California, Winters, CA.

- Keeler-Wolf, T., K. Lewis, and C. Roye. 1997. The definition and location of central California sycamore alluvial woodland; unpublished report. State of California, The Resources Agency, Department of Fish and Game, Sacramento, CA.
- Keeley, J. E. 2000. Chaparral. Pages 203–253 in M. G. Barbour and W. D. Billings (eds.), *North American Terrestrial Vegetation* (2nd ed.). Cambridge, England: Cambridge University Press.
- King, R. A. and J. R. Belthoff. 2001. Post-Fledging Dispersal of Burrowing Owls in Southwestern Idaho: Characterization of Movements and Use of Satellite Burrows. *Condor* 103:118-126.
- Klute, D. S., L. W. Ayers, M. T. Green, W. H. Howe, S. L. Jones, J. A. Shaffer, S. R. Sheffield, and T. S. Zimmerman. 2003. Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States. (Biological Technical Publication FWS/BTP-R6001-2003.) Washington, D.C: U.S. Department of Interior, Fish and Wildlife Service. 108 pp.
- Kochert, M.N., K. Steenhof, C.L. McIntyre, and E. H. Craig. 2002. Golden Eagle (*Aquila chrysaetos*). In A. Poole and F. Gill (eds.), *The Birds of North America*, No. 684. Philadelphia, PA: The Birds of North America, Inc.
- Kohlmann, S., J. Alvarez, C. Clark, and R. Nuzum. 2008. A Baseline Assessment of Environmental and Biological Conditions at Five Pillars Farms, Alameda County, California. Unpublished Report. Tierra Resource Management, Castro Valley, CA. 89pp.
- Kruckeberg, A. R. 1954. The ecology of serpentine soils: a symposium. III. Plant species in relation to serpentine soils. *Ecology* 35:267–274.
- . 1984. California Serpentines: Flora, Vegetation, Geology, Soils, and Management Problems. Berkeley, CA: University of California Press.
- Kupferberg, S. J. 1994. Exotic Larval Bullfrogs (*Rana catesbeiana*) as Prey for Native Garter Snakes: Functional and Conservation Implications. *Herpetological Review* 25(3):95–97.
- Kupferberg, S. J. 1996. Hydrologic and geomorphic factors affecting conservation of a river-breeding frog (*Rana boylii*). *Ecological Applications* 6:1332-1344.
- Kyser G. B. and J. M. DiTomaso. 2002. Instability in a grassland community after the control of yellow starthistle (*Centaurea solstitialis*) with prescribed burning. *Weed Science* 50(5):648–657.

- Lamphier & Associates and SWA Group. 2000. *North Livermore specific plan. Draft environmental impact report*. April. Prepared for County of Alameda and City of Livermore. Oakland, CA.
- Larson, C. J. 1987. Badger distribution study. California Department of Fish and Game. Non-game wildlife investigations report. Project W-65-R-4. 8pp. Available: http://www.dfg.ca.gov/hcpb/info/bm_research/bm_pdfrpts/87_14.pdf.
- Lawrence Livermore National Laboratory. 2008a. *Weapons and Complex Integration Cutting-Edge Facilities, Site 300*. Last revised: July 31, 2008. Available: <https://wci.llnl.gov/fac/site300/>. Accessed: February 20, 2009.
- Lawrence Livermore National Laboratory. 2008b. *Site 300 Explosives Test Facility – Prescribed Burn/Smoke Management Plan*. UCRL-AR-154174-REV-5. Revised: March 2008.
- Leidy, R.A., G.S. Becker, and B.N. Harvey. 2003. Historical distribution and current status of steelhead (*Oncorhynchus mykiss*), coho salmon (*O. kiustch*), and Chinook salmon (*O. tshawtyscha*) in streams of the San Francisco Estuary, California. Center for Ecosystem Management and Restoration, Oakland, CA.
- Lind, A. J. 1990. Ontogenetic Changes in the Foraging Behavior, Habitat Use and Food Habits of the Western Aquatic Garter Snakes, *Thamnophis couchii*, at Hurdygurdy Creek, Del Norte County, California. MA thesis. Humboldt State University. Arcata, CA.
- Lindzey, F. G. 1978. Movement patterns of badgers in northwestern Utah. *Journal of Wildlife Management*. 42:418-422.
- Livermore Area Recreation and Park District. 2008. *Parks, Recreation and Trails Master Plan*. Community Development Department. Draft Version. Livermore, CA. Available: http://www.larpd.dst.ca.us/board/LARPD_Master_Plan/LARPDMasterPlanPublicReviewDraft.pdf. Accessed: February 20, 2009.
- Long, C. A. 1972. Taxonomic revision of the North American badger, *Taxidea taxus*. *Journal of Mammalogy*. 53:725-729.
- Long, C. 1999. American badger: *Taxidea taxus*. Pp. 177-179 in D.E. Wilson, S. Ruff, Eds. *The Smithsonian Book of North American Mammals*. Washington, D.C.: Smithsonian Institution Press.
- Loredo, I., D. Van Vuren, and M. L. Morrison. 1996. Habitat Use and Migration Behavior of the California Tiger Salamander. *Journal of Herpetology* 30:282–285.

- Love, M. 2001. Stonybrook Creek fish passage assessment. Prepared for: Alameda County Public Works Agency. April 6. Michael Love & Associates. Arcata, CA. Available: http://www.alamedacreek.org/Reports_Data/Stonybrook%20Fish%20Passage%20Report.pdf. Accessed: April 27, 2009.
- McCarten, N. F. 1987. Ecology of the serpentine vegetation in the San Francisco Bay region. Pages 335-339 in T. S. Elias (ed.), *Conservation and management of rare and endangered plants*. Proceedings from a conference of the California Native Plant Society. Sacramento, CA: California Native Plant Society.
- McNaughton, S. J. 1968. Structure and function in California grasslands. *Ecology* 49:962–972.
- Merenlender, A., and J. Crawford. 1998. Vineyards in an oak landscape: exploring the physical, biological and social benefits of maintaining and restoring native vegetation in and around the vineyard. Davis, CA: University of California Integrated Hardwood Range Management Program.
- Messick, J. P. and M. G. Hornocker. 1981. Ecology of the badger in southwestern Idaho. *Wildlife Monographs*. 76:1-53.
- Miles, S. R., and C. B. Goudey. 1997. *Ecological Subregions of California*. USDA Forest Service, Pacific Southwest Region, R5-EM-JP-005.
- Morey, S. 2005. Foothill Yellow-Legged Frog (*Rana boylii*). California Wildlife Habitat Relationships System, California Department of Fish and Game, California Interagency Wildlife Task Group. Available: www.dfg.ca.gov/whdab/html/A043.html. Accessed: January 5, 2005.
- Murphy, D.D. and S.B. Weiss. 1990. Report on surveys for the Callippe Silverspot butterfly, *Speyeria callippe callippe*, at the proposed Sky Valley development site. 9 pp.
- National Research Council. 2001. *Compensating for Wetland Losses under the Clean Water Act*. Washington, DC: Committee on Mitigating Wetland Losses, Board on Environmental Studies and Toxicology.
- NatureServe. 2009. NatureServe Explorer: An Online Encyclopedia of Life [web application]. Version 4.7. NatureServe, Arlington, Virginia. Available: <http://www.natureserve.org/explorer>. Accessed: February 20, 2009.
- Neff, J. A. 1937. Nesting Distribution of the Tricolored Red-Wing. *Condor* 39:61–81.

- Norris, R. M. and R. W. Webb. 1990. *Geology of California*. Second Edition. New York, NY: John Wiley & Sons. Pp. 359-411.
- Noss, R. F., M. A. O'Connell, and D. D. Murphy. 1997. The Science of Conservation Planning: Habitat Conservation Planning under the Endangered Species Act. Covelo, CA: Island Press.
- Nussbaum, R. A., E.D. Brodie, Jr, and R. M. Storm. 1983. Amphibians and Reptiles of the Pacific Northwest. University Press of Idaho.
- Oakland Museum of California. 2009. Arroyo las Positas watershed map. Available: <http://www.museumca.org/creeks/133B06-OMAPositas.html>. Accessed: April 27, 2009.
- Ollenburger, R.D. 1986. *Source and Stratigraphy of the Livermore Gravels, Alameda County, California*. Master's thesis, California State University, Hayward.
- Orians, G. H. 1961a. The Ecology of Blackbird (*Agelaius*) Social Systems. Ecological Monographs 31:285–312.
- Orians, G. H. 1961b. Social Stimulation within Blackbird Colonies. Condor 63: 330–337.
- Orians, G. H. and G. Collier. 1963. Competition and Blackbird Social Systems. Evolution 17:449–459.
- Orloff, S., F. Hall, and L. Spiegel. 1986. Distribution and Habitat Requirements of the San Joaquin Kit Fox in the Northern Extreme of Their Range. Trans. West. Sect. Wildl. Soc. 22: 60–70.
- Payne, R. 1969. Breeding Seasons and Reproductive Physiology of Tricolored Blackbirds and Red-Winged Blackbirds. Univ. Calif. Publ. Zool. 90:1–137.
- Paysen, T. E., R. J. Ansley, J. K Brown, G. J. Gottfried, S. M. Haase, M. G. Harrington, M. G. Narog, S. S. Sackett, and R. C Wilson. 2000. Fire in western shrubland, woodland, and grassland ecosystems. Pages 121–159 in J. K. Brown and J. K. Smith (eds.), *Wildland Fire and Ecosystems: Effects of Fire on Flora*. (General Technical Report RMRS-GTR-412-Vol. 2.) Ogden, UT: U.S. Department of Agriculture Forest Service, Rocky Mountain Research Station.
- Phillip Williams & Associates. 1988. *A management plan for the Springtown alkali sink wetlands and the endangered plant, Cordylanthus palmatus*. Prepared for the U.S. Fish and Wildlife Service and the California Department of Fish and Game. Sacramento, CA.

Questa Engineering Corporation. 1998. Hydrologic analysis of the Springtown alkali sink, Livermore, California. Prepared for the City of Livermore, the County of Alameda, and the U.S. Bureau of Reclamation.

Reichle, M.S. 2004. *Seismic Hazard Zones Niles Quadrangle*. Sacramento, CA: California Geological Survey. Available: <http://www.conservation.ca.gov/cgs/shzp>. Accessed: February 20, 2009.

Remsen, J.V., Jr. 1978. California Department of Fish and Game: Bird Species of Special Concern in California: Golden Eagle. Available: http://www.dfg.ca.gov/hcpb/species/jsp/more_info/jsp?specy=birds&idNum=35. Accessed: March 7, 2006.

Richards, L.A. 1954. *Origin and Nature of Saline and Alkali Soils*. In: *Diagnosis and Improvement of Saline and Alkali Soils* (Agriculture Handbook #60). Washington, D.C.: United States Department of Agriculture.

Riley, S. P. D., H. B. Shaffer, R. Voss, and B. M. Fitzpatrick. 2003. Hybridization between a Rare, Native Tiger Salamander (*Ambystoma californiense*) and Its Introduced Congener. *Ecological Applications* 13:1263-1275.

RMC. 2006. Zone 7 stream management master plan. Section 1. August. Available: http://www.zone7water.com/images/SMMP_sec.1.bckd.pdf. Accessed: May 26, 2009.

Roderick, P. J. and N. E. Mathews. 1999. Characteristics of Natal and Non-Natal Kit Fox Dens in the Northern Chihuahuan Desert. *Great Basin Naturalist* 59(3):252–258.

Rosenberg, D. K., J. Gervaia, H. Ober, and D. DeSante. 1998. An Adaptive Management Plan for the Burrowing Owl Population at Naval Air Station Lemoore, California.

Rundel, P. W. and R. Gustafson. 2005. *Introduction to the Plant Life of Southern California*. (California Natural History Guide Series No. 85.) Berkeley and Los Angeles, CA: University of California Press.

Safford, H. D., J. H. Viers, and S. P. Harrison. 2005. Serpentine endemism in the California flora: a database of serpentine affinity. *Madroño* 52:222–257.

San Francisco Public Utilities Commission. 2008. *San Francisco Public Utilities Commission: Alameda Watershed*. Last Revised: February 12, 2008. Available: http://www.sfwater.org/detail.cfm/C_ID/92. Accessed: February 23, 2009.

SFPUC. 2007. Alameda Creek Aquatic Resource Monitoring Report 2005. San Francisco Public Utilities Commission, Water Enterprise, Natural Resources and Lands Management Division, Fisheries and Wildlife Section. Sunol, CA. 94 pp.

Sargeant, A. B. and D. W. Warner. 1972. Movement and denning habits of a badger. *Journal of Mammalogy*. 61:375-376.

Sawyer, J.O. and T. Keeler-Wolf. 1995. A Manual of California Vegetation. California Native Plant Society, Sacramento. 471 pp.

Schoenherr, A. A. 1992. *A Natural History of California*. (California Natural History Guide 56.) Berkeley, CA: University of California Press.

Shaffer, H. B., and R. Fisher. 1991. California Tiger Salamander Surveys, 1990. (Final Report.) (Contract FG 9422). Prepared for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.

Shaffer, H. B., and S. Stanley. 1992. California Tiger Salamander Surveys, 1991. (Contract FG 9422). Prepared for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.

Shaffer, H. B. and P. C. Trenham. 2005. *Ambystoma californiense*. Pages 1093–1102 in M.J. Lannoo (Ed.), *Status and Conservation of U.S. Amphibians. Volume 2: Species Accounts*. Berkeley, CA: University of California Press.

Shaffer, H. B., R. N. Fisher, and S. E. Stanley. 1993. Status Report: the California Tiger Salamander (*Ambystoma californiense*). Final report for the California Department of Fish and Game.

Shaffer, H. B., R. N. Fisher, and S. E. Stanley. 1994. Status Report: The California Tiger Salamander (*Ambystoma californiense*). (Final) (Contracts FG 9422 and FG 1383.) Prepared for California Department of Fish and Game, Inland Fisheries Division, Rancho Cordova, CA.

Shanfield, A. N. 1984. Alder, cottonwood and sycamore distribution and regeneration along the Nacimiento River. In R. E. Warner and K. M. Hendrix, *California Riparian Systems: Ecology, Conservation and Productive Management*. Berkeley: University of California Press.

Shefferly, N. 1999. "Taxidea taxus" (On-line), Animal Diversity Web. Accessed January 06, 2009. Available: http://animaldiversity.ummz.umich.edu/site/accounts/information/Taxidea_taxus.html.

Shuford, W.D. and T. Gardali, Eds. 2008. California Bird Species of Special Concern. Studies of Western Birds No. 1. February 4, 2008. Sacramento.

- Smith, J. J. 1998. Steelhead and other fish resources of western Mt. Hamilton streams. December. San Jose State University. San Jose, CA.
- Soil Conservation Service. 1966. Soil survey, Alameda area, California. Davis, CA: United States Department of Agriculture.
- Spiegel, L. K. and M. Bradbury. 1992. Home Range Characteristics of the San Joaquin Kit Fox in Western Kern County, California. Transactions of the Western Section Wildlife Society 28:83–92.
- State of California. 2008. *California State Parks*. Available: <http://www.parks.ca.gov>. Accessed: February 20, 2009.
- Stebbins, R C. 2003. A Field Guide to Western Reptiles and Amphibians. New York, NY: Houghton Mifflin Company.
- Stebbins, R.C. and N.W. Cohen. 1995. A Natural History of Amphibians. Princeton University Press, Princeton, New Jersey.
- Stein, B. A. 2002. States of the Union: Ranking America's Biodiversity. NatureServe: Arlington, VA. Available: <http://www.natureserve.org/Reports/stateofunions.pdf>.
- Stein, B. A., L. S. Kutner, and J. S. Adams. 2000. *Precious heritage: The status of biodiversity in the United States*. Oxford University Press, New York, NY.
- Steinberg, P. D. 2002. *Nassella pulchra*. In U.S. Department of Agriculture Forest Service, *Fire Effects Information System*. Available: <http://www.fs.fed.us/database/feis/plants/graminoid/naspul/all.html>.
- Sullivan, R. and J. Waters. 1980. History of Mount Diablo Coalfield Contra Costa County. *California Geology*. March 1980: Pp.51-59.
- Swaim, K. E. 1994. Aspects of the ecology of the Alameda whipsnake (*Masticophis lateralis euryxanthus*). Masters Thesis, California State University, Hayward, CA. 140 pp.
- Swick, C. D. 1973. Determination of San Joaquin Kit Fox in Contra Costa, Alameda, San Joaquin, and Tulare Counties. Special Wildlife Investigations Program Report W-54-R4, California Department of Fish and Game, Sacramento, California. 14 pp.
- Thomas Reid Associates. 1981. Endangered species survey, San Bruno Mountain. Biological Study -- 1981. Palo Alto, CA.
- Thomsen, L. 1971. Behavior and Ecology of Burrowing Owls on the Oakland Municipal Airport. *Condor* 73:177–192.

- Trenham, P. C. 2001. Terrestrial Habitat Use by Adult California Tiger Salamanders. *Journal of Herpetology* 35:343–346.
- Trenham, P. C., and H. B. Shaffer. 2005. Amphibian upland habitat use and its consequences for population viability. *Ecological Applications* 15:1158–1168.
- Trenham, P. C., W. D. Koenig, and H. B. Shaffer. 2001. Spatially Autocorrelated Demography and Interpond Dispersal in the Salamander *Ambystoma californiense*. *Ecology* 82:3519–3530.
- Tricolored Blackbird Working Group. 2007. Conservation Plan for the Tricolored Blackbird (*Agelaius tricolor*). Susan Kester (ed.). Sustainable Conservation. San Francisco, CA.
- Tri-Valley Conservancy. 2005. *Tri-Valley Conservancy: Preserving Land for Future Generations*. Last Revised: February, 2009. Available: <http://www.trivalleyconservancy.org/history.html>. Accessed February 20, 2009.
- Tri-Valley Conservancy. 2008. North Livermore Priority Landscape Area Resource Conservation Plan Public Review Draft. Prepared for Tri-Valley Conservancy by Nomad Ecology, Martinez, CA. December 2008.
- Trulio, L. 1997. Burrowing Owl Demography and Habitat Use at Two Urban Sites in Santa Clara County, California. *Journal of Raptor Research* 9:84–89.
- U.S. Census Bureau. 2000. *American Fact Finder: Detailed Tables, Total Population*. Last Revised: January 26, 2009. Census 2000 Summary File 1 (SF1) 100-Percent Data.
- U. S. Fish and Wildlife Service. September 19, 1994. Federal Register Final Rule; determination of endangered status for the conservancy fairy shrimp, longhorn fairy shrimp, and the vernal pool tadpole shrimp; and threatened status for the vernal pool fairy shrimp.
- . April 19, 1996. Interim survey guidelines to permittees for recovery permits under Section 10(a) (1)(A) of the Endangered Species Act for the listed vernal pool brachiopods.
- . 1996. Endangered and Threatened Wildlife and Plants: Determination of Threatened Status for the California Red-Legged Frog. 61(110) FR 25813-25833 (May 23).

- . 1997. Endangered and threatened wildlife and plants; determination of endangered status for the Callippe Silverspot butterfly and the Behren's Silverspot butterfly and threatened status for the Alameda Whipsnake. Federal Register 62:64306-64320.
- . 1998. Recovery Plan for Upland Species of the San Joaquin Valley, California. U. S. Fish and Wildlife Service. Region 1, Portland, OR. 319 pp.
- . 2000a. Endangered and Threatened Wildlife and Plants; Final Determination of Endangered Status for the Santa Barbara County Distinct Vertebrate Population Segment of the California Tiger Salamander (*Ambystoma californiense*).
- . 2000b. Endangered and threatened wildlife and plants; final determination of critical habitat for the Alameda Whipsnake (*Masticophis lateralis euryxanthus*). (65:192 FR October 3, 2000).
- . 2002. Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California. Region 1, Portland, OR. xvi + 306 pp.
- . 2002. Recovery Plan for the California Red-Legged Frog (*Rana aurora draytonii*). Pages viii and 173. Portland, OR: U.S. Fish and Wildlife Service.
- . August 6, 2003. Federal Register Final Rule; designation of critical habitat for four vernal pool crustaceans and eleven vernal pool plants in California and southern Oregon.
- . 2003. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Sonoma County Distinct Population Segment of the California Tiger Salamander. (Final Rule) 68 FR 53:13497-13520 (March 19).
- . February 10, 2006. Federal Register Final Rule; Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants, Final Rule. Federal Register 71(28): 7118-7316.
- . 2004. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the California Tiger Salamander; and Special Rule Exemptions for Existing Routine Ranching Activities. (Final Rule.) 69 FR 149:47212-47248 (August 4).
- . 2005a. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the California Tiger Salamander, Central Population, Final Rule. Federal Register 70(162):49380-49458. August 23.

- . 2005b. Endangered and threatened wildlife and plants; proposed determination of critical habitat for the Alameda Whipsnake (*Masticophis lateralis euryxanthus*). (70:200 FR October 18, 2005).
- . 2005. Recovery Plan for Vernal Pool Ecosystems of California and Oregon.
- . 2006. Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for the California Red-Legged Frog and and Special Rule Exemption Associated With Final Listing for Existing Routine Ranching Activities, Final Rule. *Federal Register* 71(71):19244–19346. April 13.
- . February 10, 2006. Federal Register Final Rule; Endangered and Threatened Wildlife and Plants: Designation of Critical Habitat for Four Vernal Pool Crustaceans and Eleven Vernal Pool Plants, Final Rule. *Federal Register* 71(28):7118–7316.
- . 2008. Threatened and Endangered Species list for Alameda County. October. Available online at: <http://www.fws.gov/cno/>
- . 2009. Online species account. Accessed February 9, 2009. Available: http://www.fws.gov/sacramento/es/animal_spp_acct/callippe_silverspot_butterfly.pdf.
- U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). 1996. Habitat Conservation Planning Handbook. November.
- Wagner, D.L., E.J. Bortugno, and R.D. McJunkin. 1990. *Geologic Map of the San Francisco-San Jose Quadrangle, California, Scale 1:250,000*. (Regional Geologic Map Series, Map No. 5A) Sacramento, CA: California Division of Mines and Geology.
- Weiss, S. B. 1999. Cars, cows, and checkerspot butterflies: nitrogen deposition and management of nutrient-poor grasslands for a threatened species. *Conservation Biology* 13:1476–1486.
- Weiss, S. B., and D. H. Wright. 2005. *Serpentine Vegetation Management Project 2005 Report*. (FWS Grant Agreement No 814205G240.) Menlo Park, CA.
- Wellicome, T. I. 1997. Reproductive Performance of Burrowing Owls (*Speotyto cunicularia*): Effects of Supplemental Food. Pages 68-73 in J. L. Lincer and K. Steenhof, (Eds.), *The Burrowing Owl, its Biology and Management: Including the Proceedings of the First International Symposium*. (Raptor Research Report Number 9.).

- Wentworth, C.M., S.E. Graham, R.J. Pike, G.S. Beukelman, D.W. Ramsey, and A.D. Barron. 1997. *Summary Distribution of Slides and Earth Flows in Alameda County, California*. Reston, VA: United States Geological Survey.
- Western Regional Climate Center. 2009. *Livermore, California: Period of Record Monthly Climate Summary*. Available: <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?casjos+sfo>. Accessed: April 2009.
- Wetlands Research Associates, Inc. and Zander Associates. 2004. *Resource Management Plan for the East Dublin Properties*. Draft. San Rafael, CA. Prepared for: City of Dublin, CA.
- White, P. J. and K. Ralls. 1993. Reproduction and Spacing Patterns of Kit Foxes Relative to Changing Prey Availability. *Journal of Wildlife Management*. 57(4):861–867.
- Wild, C. 2002. San Francisco Bay Area Gap Analysis: A Preliminary Assessment of Priorities for Protecting Natural Communities. Oakland, CA. Prepared for the California State Coastal Conservancy.
- Wilen, B. O., and W. E. Frayer. 1990. Status and Trends of United States Wetlands and Deepwater Habitats. *Forest Ecology Management* 33:181–192.
- Williams, D.F. 1986. Mammalian Species of Concern in California. California Department of Fish and Game Report 86-1. 112pp. California Department of Fish and Game, Sacramento, CA.
- Zeiner, D. C., W. F. Laudenslayer, Jr., and K. E. Meyer. 1988. California's Wildlife. Volume I: Amphibians and Reptiles. Sacramento, CA: California Department of Fish and Game.
- Zeiner, D. C., K. E. Meyer and M. White. 1990. California's Wildlife. Volume II: Birds. Sacramento, CA: California Department of Fish and Game.
- Zone 7 Water Agency. 2006. Zone 7 Stream Management Master Plan. Prepared by RMC Water and Environment. August.

6.2 Personal Communications

Diamond, Tanya. Professor, De Anza College. Cupertino, CA. Various communications (email, phone, and in person interviews) with Troy Rahmig, ICF Jones & Stokes about the movement of American badgers in the south Santa Clara Valley.

Appendix A

**Wildlife Species Considered for Inclusion as Focal
Species in the East Alameda Conservation Strategy**

Appendix A. Wildlife Species Considered for Inclusion as Focal Species in the East Alameda Conservation Strategy

Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes
	State	Federal	Range	Status	Threat		
Invertebrates							
Mimic tryonia (=California brackishwater snail) <i>Tryonia initiator</i>	—	—	N	N	N	N	Study area outside of range or current distribution; not expected to become listed during permit term
Bay checkerspot butterfly <i>Euphydryas editha bayensis</i>	—	FT	N	Y	N	N	Study area outside of range or current distribution
Longhorn fairy shrimp <i>Branchinecta longianenna</i>	—	FE	Y	Y	Y?	Y	Population in Brushy Peak Preserve in Livermore and adjacent private land
Vernal pool fairy shrimp <i>Branchinecta lynchii</i>	—	FT	Y	Y	Y	Y	Occurrence information not well documented for study area. Three CNDDDB (2008) records in study area, presumed extant. Vernal pools in Springtown Alkali Sink support the species.
Vernal pool tadpole shrimp <i>Lepidurus packardi</i>	—	FE	N	Y	N	Y	Isolated occurrences in Alameda County; No CNDDB (2007) records listed in study area
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	—	FE	?	Y	?	N	Limited knowledge about species in the study area; species is covered by the SFPUC Alameda Watershed HCP; recommend a limited conservation strategy
Fairmont (=Lunn's) micro-blind harvestman <i>Microcina lumi</i>	—	—	N	N	N	N	Study area outside of range or current distribution; not expected to become listed during permit term
Lee's micro-blind harvestman <i>Microcina leei</i>	—	—	N	N	N	N	Study area outside of range or current distribution; not expected to become listed during permit term
Bridges (=Coast Range) shoulderband <i>Helminthoglypta nickliniana bridgesi</i>	—	—	N	N	N	N	Study area outside of range or current distribution; not expected to become listed during permit term
California linderiella fairy shrimp <i>Linderiella occidentalis</i>	—	—	Y	N	Y	Y	Not expected to become listed during permit term; study area is within known range or current distribution
Curved-foot hygrotus diving beetle <i>Hygronotus curvipes</i>	—	—	Y	N	N	Y	Not expected to become listed during permit term
Monarch butterfly <i>Danaus plexippus</i>	—	—	N	N	N	Y	Roost sites not known to occur in the study area; not expected to become listed during permit term
Fish							
Green sturgeon <i>Acipenser medirostris</i>	CSC	FT	N	Y	N	Y	Out of species range
Central California coast coho salmon <i>Oncorhynchus kisutch</i>	SE	FE	N	Y	N	Y	Out of species range

Appendix A. Continued

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Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes
	State	Federal	Range	Status	Threat		
Central CA coastal steelhead <i>Oncorhynchus mykiss</i>	—	FT	N	Y	N	Y	Steelhead run could return to Alameda Creek if barriers near SF Bay are removed (BART weir). Barriers at Sunol and Niles dams recently removed.
Central Valley spring-run chinook salmon <i>Oncorhynchus tshawytscha</i>	—	FT	N	Y	N	N	Out of species range
Winter-run Chinook salmon, Sacramento River <i>Oncorhynchus tshawytscha</i>	—	FE	N	Y	N	N	Out of species range
River lamprey <i>Lampetra cylindrica</i>	CSC	—	Y	N	N?	Y?	Unsure of threats currently posed to the species and level of understanding of species conservation needs.
Delta smelt <i>Hypomesus transpacificus</i>	ST	FT	N	Y	N	N	Out of species range
Tidewater goby <i>Eucyclogobius newberryi</i>	CSC	FE	N	Y	N	N	Out of species range
Amphibians							
California tiger salamander <i>Ambystoma californiense</i>	CSC	FT	Y	Y	Y	Y	Occurrences of species in study area; mitigation typically required under CEQA and ESA
Western spadefoot <i>Spea hammondi</i>	CSC	—	Y	Y	N	N	Species may be listed in near future but it is not well documented in study area. Conservation opportunities may be limited.
California red-legged frog <i>Rana aurora draytonii</i>	CSC	FT	Y	Y	Y	Y	Occurrences of species in study area; mitigation typically required under CEQA and ESA
Foothill yellow-legged frog <i>Rana boylii</i>	CSC	—	Y	N	Y	Y	Species occurs in several fast moving streams in the study area. Conservation opportunities may be limited outside of additional protection of key reaches.
Reptiles							
Western pond turtle <i>Clemmys marmorata</i>	CSC	—	Y	N	Y	N	Not expected to become listed in near future.
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	ST	FT	Y	Y	Y	Y	Occurrences of species in study area; mitigation typically required under CESA and ESA
San Joaquin coachwhip <i>Masticophis flagellum ruddocki</i>	CSC	—	Y	N	Y	N	Not expected to become listed in near future

Appendix A. Continued

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Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes
	State	Federal	Range	Status	Threat		
California horned lizard <i>Phrynosoma coronatum frontale</i>	CSC	—	Y	N	Y	N	Not expected to become listed in near future; USFWS and CDFG has not covered this species in other regional planning efforts due to limited data; taxonomy uncertain: recent study combined <i>P. c. frontale</i> and <i>P. c. schmidti</i> into new species <i>P. blainvillii</i>
Birds							
Great blue heron (rookery) <i>Ardea herodias</i>	—	MBTA	Y	N	N	Y	Not expected to become listed in near future
Black-crowned night heron (rookery) <i>Nycticorax nycticorax</i>	—	MBTA	Y	N	N	Y	Not expected to become listed in near future
Wood duck <i>Aix sponsa</i>	—	MBTA	Y	N	N	N	Not expected to become listed in near future; not likely to be assessed in CEQA documents
Prairie falcon <i>Falco mexicanus</i>	CSC	MBTA	Y	N	Y	Y	Not expected to become listed in near future; ongoing monitoring program by EBRPD. This species will receive incidental conservation benefits through conservation actions for golden eagle and protection of rock outcrops.
American peregrine falcon <i>Falco peregrinus anatum</i>	SE, FP	FD, MBTA	Y	Y	N	Y	Species is fully protected by the state; take of individuals not allowed; not likely to be listed under the federal ESA because it was recently removed from the list; removal of limited habitat not expected to affect population stability in the county;
California clapper rail <i>Rallus longirostris obsoletus</i>	SE, FP	FE, MBTA	N	Y	N	Y	Study area outside of range or current distribution; Species is fully protected; take of individuals not allowed
Bald eagle <i>Haliaeetus leucocephalus</i>	SE/FP	FD, BGPA, MBTA	Y	Y	N	Y	Some breeding pairs occur near reservoirs in the study area and breeding range may expand; individuals occasionally winter at reservoirs in study area; Species is fully protected; take of individuals not allowed
Sharp-shinned hawk <i>Accipiter striatus</i>	CSC	MBTA	Y	N	Y	Y	Not expected to become listed in near future
Cooper's hawk <i>Accipiter cooperii</i>	CSC	MBTA	Y	N	Y	Y	Not expected to become listed in near future
Red shouldered hawk <i>Buteo lineatus</i>	—	MBTA	Y	N	N	N	Not expected to become listed in the future; not likely to be assessed in CEQA documents
Golden eagle <i>Aquila chrysaetos</i>	CSC/FP	BGPA, MBTA	Y	Y	Y	Y	Eastern Alameda county is important source population for region
Northern harrier <i>Circus cyaneus</i>	CSC	MBTA	Y	N	Y	Y	Not expected to become listed in near future

Appendix A. Continued

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Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes
	State	Federal	Range	Status	Threat		
Ferruginous hawk <i>Buteo regalis</i>	CSC	MBTA	Y	N	N	Y	N
California black rail <i>Laterallus jamaicensis coturniculus</i>	ST/ FP	MBTA	N	Y	N	Y	N
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	CSC	FT, MBTA	N	Y	N	Y	Study area outside of range or current known distribution; little information on use of inland freshwater wetlands; Species is fully protected; take of individuals not allowed
Black skimmer <i>Rynchops niger</i> (nesting colony)	CSC	MBTA	N	N	N	Y	Study area outside of range or current breeding distribution
California least tern <i>Sterna antillarum (albifrons) browni</i> (nesting colony)	SE/ FP	FE, MBTA	N	Y	N	Y	Study area outside of range or current known distribution; No suitable habitat in study area; Species is fully protected; take of individuals not allowed
California brown pelican (nesting colony) <i>Pelecanus occidentalis californicus</i>	SE/ FP	FPD, MBTA	N	Y	N	Y	Study area outside of range or current known distribution; Species is fully protected; take of individuals not allowed
Double-crested cormorant <i>Phalacrocorax auritus</i> (rookery site)	CSC	MBTA	N	N	N	Y	Study area outside of range or current known distribution
California horned lark <i>Eremophila alpestris acia</i>	CSC	MBTA	Y	N	Y	Y	Not expected to become listed in near future
Loggerhead shrike <i>Lanius ludovicianus</i>	CSC	MBTA	Y	N	Y	Y	Not expected to become listed in near future
White-tailed kite <i>Elanus leucurus</i>	FP	MBTA	Y	N	N	Y	Species is fully protected; take of individuals not allowed; species relatively common in study area so not likely to be state or federally listed if fully protected designation is withdrawn
Western burrowing owl <i>Athene cunicularia hypnugea</i>	CSC	MBTA	Y	Y	Y	Y	Species is in decline throughout Bay Area; may become state listed; mitigation typically required under CEQA
Lewis's woodpecker <i>Melanerpes lewis</i>	—	MBTA	Y	N	N	N	Nest sites are in decline but species is not likely to become listed in near future; not typically assessed in CEQA documents
Say's phoebe <i>Sayornis saya</i>	—	MBTA	Y	N	N	N	Species is not likely to be listed in near future; not typically assessed in CEQA documents; will benefit from protection of rocky outcrops and grassland as the result of conservation under this strategy
Yellow-billed magpie <i>Pica nuttalli</i>	—	MBTA	Y	N	Y?	N	Nest sites are in decline but species is not likely to become listed in near future; not typically assessed in CEQA documents

Appendix A. Continued

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Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes
	State	Federal	Range	Status	Threat		
Bank swallow <i>Riparia riparia</i>	ST	MBTA	Y	Y	N	N	No CNDDDB records in study area but species has been recorded in the county. Threats are bank erosion degradation of stream corridors through water development
Western bluebird <i>Sialia Mexicana</i>	—	MBTA	Y	N	N	N	Species not likely to be listed in near future; not typically assessed in CEQA documents
Willow flycatcher <i>Empidonax traillii</i>	—	MBTA	Y	N?	N	N	Not likely to become listed in near future; not typically assessed in CEQA documents
Black-throated gray warbler <i>Dendroica nigrescens</i>	—	MBTA	Y	N?	N	N	Not likely to become listed in near future; not typically assessed in CEQA documents
Salt marsh common yellowthroat (= San Francisco yellowthroat) <i>Geothlypis trichas simosa</i>	CSC	MBTA	N	N	N	N	Study area outside of range or current known distribution
Tricolored blackbird <i>Agelaius tricolor</i>	CSC	MBTA	Y	Y	Y	Y	Number of breeding colonies is in decline; could become federally or state listed; developing conservation for the species is difficult due to the ephemeral nature of breeding colonies. Species would benefit from wetland restoration in the study area
Yellow warbler <i>Dendroica petechia brewsteri</i> (nesting)	CSC	MBTA	Y	N	Y	N	Not expected to become listed in near future
Blue grosbeak <i>Guiraca caerulea</i>	—	MBTA	Y	N	N	N	Not expected to become listed in near future' not likely to be assessed in CEQA documents
Song Sparrow <i>Melospiza melodia</i>	—	MBTA	Y	N	Y	N	Not expected to become listed in near future; not typically a species that is assessed in CEQA documents
Alameda (South Bay) song sparrow <i>Melospiza melodia pusilla</i>	CSC	MBTA	N	N	Y	N	Study area outside of range
Mammals							
Alameda Island mole <i>Scapanus latimanus parvus</i>	CSC	—	N	N	N	N	Study area outside of range
Salt marsh vagrant (wandering) shrew <i>Sorex vagrans halicoetes</i>	CSC	—	N	N	Y?	N	Study area outside of range
Pacific Townsend's (=western) big-eared bat <i>Corynorhinus townsendii townsendii</i>	CSC	—	Y	Y	N	N	Species thought to be declining in the Bay Area; data is somewhat limited
Yuma myotis <i>Myotis yumanensis</i>	—	—	Y	N	Y	N	Not expected to become listed in near future

Appendix A. Continued

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Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes
	State	Federal	Range	Status	Threat		
Greater western mastiff bat <i>Eumops perotis californicus</i>	CSC	—	Y	N	N	Y	N
Pallid bat <i>Antrorous pallidus</i>	CSC	—	Y	N	N	Y	N
Big free-tailed bat <i>Nyctinomops macrotis</i> (= <i>Tadarida m.</i> , <i>T. molossa</i>)	CSC	—	N	N	N	N	Not expected to become listed in near future
Hoary bat <i>Lasionycteris noctivagans</i>	CSC	—	Y	N	N	Y	N
Silver-haired bat <i>Lasionycteris noctivagans</i>	CSC	—	N	N	N	Y	N
San Joaquin pocket mouse <i>Perognathus inornatus inornatus</i>	—	—	Y	N	N	N	Not expected to become listed in near future
Berkeley kangaroo rat <i>Dipodomys heermanni berkeleyensis</i>	—	—	Y	N	N	N	Subspecies possibly extinct; historic distribution in Contra Costa and Alameda Counties with southernmost record at Calaveras Reservoir (1940). Several unconfirmed sightings, one in Alameda Cty in 2000
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	CSC	—	Y	N	Y?	Y	N
Ringtail <i>Bassaris astutus</i>	FP	—	Y	N	N	N	Species is fully protected; take of individuals not allowed; species relatively common so not likely to be state or federally listed if fully protected designation is withdrawn
Salt marsh harvest mouse <i>Reithrodontomy's raviventris</i>	E,FP	E	N	Y	N	Y	Study area outside of range; Species is fully protected; take of individuals not allowed
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	ST	FE	Y	Y	Y	Y	The Altamont Hills provide extensive breeding habitat and a critical linkage in the northern part of species' range
American badger <i>Taxidea taxus</i>	CSC	—	Y	Y	Y	Y?	Species could become state listed. Could be a candidate for guiding conservation of movement corridors in grassland ecosystems.

Species	Status ^a		Criteria ^b			Recommended Focal Species ^c	Notes								
	State	Federal	Range	Status	Threat										
Notes															
a. Status		b. Criteria													
State Status															
FP	Fully Protected	Range: The species is known to occur or is likely to occur within the Conservation Strategy study area, based on credible evidence, or the species is not currently known in the study area but is expected in the study area in the foreseeable future (e.g., through range expansion or reintroduction to historic range).													
SE	State listed as endangered	Status: The species is either:													
ST	State listed as threatened	<ul style="list-style-type: none"> ■ listed under the federal ESA as threatened or endangered, or proposed for listing; ■ listed under CESA as threatened or endangered or a candidate for such listing, or listed under the Native Plant Protection Act as rare; or ■ expected to be listed under ESA or CESA within the permit term. Potential for listing during the permit term is based on current listing status, consultation with experts and Wildlife Agency staff, evaluation of species population trends and threats, and best professional judgment. 													
Federal Status															
BGPA Bald Eagle and Golden Eagle Protection Act															
MBTA Migratory Bird Treaty Act															
FE	Federally endangered	Impact: The species or its habitat would be adversely affected by project related activities in Alameda County.													
FT	Federally threatened	Data: Sufficient data exist on the species' life history, habitat requirements, and occurrence in the study area to adequately evaluate impacts on the species and to develop conservation measures to mitigate these impacts to levels specified by regulatory standards.													
FC	Candidate for federal listing	Species proposed as focal species were limited to those species for which impacts from project in the county were likely, or for which mitigation is often required under CEQA or ESA. However, many other special-status species are expected to benefit from the Conservation Strategy.													
FPT	Federally proposed for threatened listing														
FPD	Federally proposed for delisting														
FD	Federally delisted														
SOC	Species of Concern (National Marine Fisheries Service designation)	c. Recommended Status													
		<ul style="list-style-type: none"> Y recommended as a focal species for East Alameda County Conservation Strategy N not recommended as focal species for East Alameda County Conservation Strategy 													

Appendix B

**Plant Species Considered for Inclusion as Focal
Species for the East Alameda Conservation Strategy**

Appendix B. Plant Species Considered for Inclusion as Focal Species for the East Alameda Conservation Strategy

Species	Status ^a			Criteria ^b			Recommended Focal Species ^c	Notes
	Federal	State	CNPS	Range	Status	Threat		
<i>Allium sharsmithiae</i> Sharsmith's onion	—	—	1B.3	Y	N	Y	N	Occurs in remote part of study area and is likely under little or no threat. Mixed serpentine chaparral will be addressed at the natural community level which will benefit species.
<i>Amsinckia grandiflora</i> large-flowered fiddleneck	FE	SE	1B.1	Y	Y	N	N	One occurrence on Lawrence Livermore Lab property appears to be extirpated; no take designation requested by CNPS; this is a no take plant in ECCC HCP/NCCP
<i>Amsinckia lunaris</i> bent-flowered fiddleneck	—	—	1B.2	Y	N	N	N	Species not expected to become listed in near future; no local threats known; occurrence location not specific
<i>Arctostaphylos pallida</i> pallid manzanita	FT	SE	1B.1	N	Y	N	N	Does not occur in study area
<i>Astragalus tener</i> var. <i>tener</i> alkali milk-vetch	—	—	1B.2	Y	N	N	N	Species not expected to become listed in near future; only known occurrence in study area is extirpated
<i>Atriplex cordulata</i> Heartscale	—	—	1B.2	Y	N	Y	N	Not expected to become listed in near future; taxonomic identity of study area populations in question
<i>Atriplex depressa</i> Brittlescale	—	—	1B.2	Y	N	Y	N	Not expected to become listed in near future; taxonomic identity of study area populations in question
<i>Atriplex joaquiniana</i> San Joaquin spearscale	—	—	1B.2	Y	Y	Y	Y	Covered in the East Contra Costa County HCP/NCCP
<i>Balsamorhiza macrolepis</i> var. <i>macrolepis</i> big-scale balsamroot	—	—	1B.2	Y	N	Y	N	Only occurrence in study area appears to be extirpated
<i>Blepharizonia plumosa</i> big tarplant	—	—	1B.1	Y	Y	Y	Y	Not expected to become listed in near future; road maintenance threatens some occurrences; covered in the East Contra Costa County HCP/NCCP
<i>California macrophylla</i> round-leaved filaree	—	—	1B.1	Y	Y	N	N	No local threats; occurrence locations not specific; covered in the East Contra Costa County HCP/NCCP
<i>Calochortus pulchellus</i> Mt. Diablo fairy-lantern	—	—	1B.2	N	Y	N	N	No occurrences in study area; covered in the East Contra Costa County HCP/NCCP
<i>Campanula exigua</i> chaparral harebell	—	—	1B.2	Y	Y	N	N	Not expected to be listed in near future; no local threats; occurrence locations not specific; covered in the Santa Clara Valley HCP/NCCP

Appendix B. Continued

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Species	Status ^a			Criteria ^b			Recommended Focal Species ^c	Notes
	Federal	State	CNPS	Range	Status	Threat		
<i>Caulanthus coulteri</i> var. <i>lemonii</i> Lemmon's jewelflower	—	—	1B.2	Y	N	N	N	Not expected to be listed in near future; no local threats; occurrence locations not specific
<i>Centromadia parryi</i> ssp. <i>congdonii</i> Congdon's tarplant	—	—	1B.2	Y	Y	Y	Y	Populations concentrated in areas subject to possible future development
<i>Chorizanthe cuspidata</i> var. <i>cuspidata</i>	—	—	1B.2	N	N	N	N	No occurrences in study area
San Francisco Bay spineflower	FE	—	1B.1	N	Y	N	N	No occurrences in study area
<i>Chorizanthe robusta</i> var. <i>robusta</i> robust spineflower	—	—	1B.2	Y	N	Y	N	Occurs in remote part of study area and is likely under little or no threat. Serpentine communities, including seeps will be conserved at the community level.
<i>Cirsium fontinale</i> var. <i>campylion</i> Mt. Hamilton fountain thistle	—	—	4.3	Y?	N	N	N	One non-specific occurrence in the Cedar Mountain region from 1903.
<i>Clarkia concinna</i> ssp. <i>automixia</i> Santa Clara red ribbons	FE	SE	1B	N	Y	N	N	No occurrences in study area
<i>Clarkia franciscana</i>	FE	SE	1B.1	Y	N	N	N	No occurrences in study area
<i>Presidio clarkia</i>	—	—	1B.2	Y	N	N	N	No occurrences in study area
<i>Cordylanthus maritimus</i> ssp. <i>palustris</i> Point Reyes bird's-beak	—	—	1B.1	Y	Y	N	N	Only occurrence in study area in Springtown Wetlands Preserve, threats from potential changes in local hydrology and from recreational uses
<i>Cordylanthus mollis</i> ssp. <i>hispidus</i> hispid bird's-beak	FE	SE	1B.1	Y	Y	Y	Y	Occurrences in study area in Springtown Wetlands Preserve and on adjacent private lands; threats from potential changes in local hydrology and from recreational uses
<i>Cordylanthus palmarius</i> Palmate-bracted bird's-beak	—	—	1B.2	Y	Y	Y	N	Two recorded occurrences in the study area; not expected to become listed in near future
<i>Coreopsis hamiltonii</i> Mt. Hamilton coreopsis	FE	—	1B.1	Y	Y	Y	Y	Very rare within study area; high potential for impacts on populations
<i>Deinandra bacigalupii</i> Livermore Valley tarplant	—	—	1B.2	Y	N	N	N	Occurs in remote part of study area; not expected to become listed in near future
<i>Delphinium californicum</i> ssp. <i>interius</i> Hospital Canyon larkspur	—	—	1B.2	Y	Y	Y	Y	One occurrence in study area; covered in the East Contra Costa County HCP/NCCP
<i>Delphinium recurvatum</i> recurved larkspur	—	—	1B.2	N	N	N	N	No occurrences in study area
<i>Dirca occidentalis</i> western leatherwood	—	—	1B.2	N	N	N	N	No occurrences in study area

Appendix B. Continued

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Species	Status ^a			Criteria ^b			Recommended Focal Species ^c	Notes
	Federal	State	CNPS	Range	Status	Threat		
<i>Eriogonum luteolum</i> var. <i>caninum</i> Tiburon buckwheat	—	—	1B.2	N	N	N	N	No occurrences in study area
<i>Eryngium aristulatum</i> var. <i>hooveri</i> Hoover's button-celery	—	—	1B.1	N	N	N	N	No occurrences in study area; taxonomic problems
<i>Eschscholzia rhombipetala</i> diamond-petaled California poppy	—	—	1B.1	Y	Y	N	N	Known occurrences at Lawrence Livermore National Lab; no local threats (other than small population size)
<i>Fritillaria falcata</i> talus fritillary	—	—	1B.2	Y	N	N	N	Occurs in remote part of study area and is likely under little or no threat. Mixed serpentine chaparral will be addressed at the natural community level which will benefit species.
<i>Fritillaria liliacea</i> fragrant fritillary	—	—	1B.2	N	N	N	N	No occurrences in study area
<i>Helianthella castanea</i> Diablo helianthella	—	—	1B.2	Y	Y	N	N	Occurs in remote part of study area; no known threats; covered in the East Contra Costa County HCP/NCCP
<i>Hesperolinon</i> sp. nov. "serpentinum" Napa western flax	—	—	1B.1	Y	N	Y	N	Not a published species; not expected to become listed in near future
<i>Hoita strobilina</i> Loma Prieta hoita	—	—	1B.1	N	Y	N	N	No occurrences in study area; covered in the Santa Clara Valley HCP/NCCP
<i>Holocarpha macradenia</i> Santa Cruz tarplant	FT	SE	1B.1	N	Y	N	N	No occurrences in study area
<i>Horkelia cuneata</i> ssp. <i>sericea</i> Kellogg's horkelia	—	—	1B.1	N	N	N	N	No occurrences in study area
<i>Lasthenia conjugens</i> Contra Costa goldfields	FE	—	1B.1	N	Y	N	N	No occurrences in study area
<i>Legenere limosa</i> Legenere	—	—	1B.1	Y	N	Y	N	Occurs in remote part of study area; not expected to become listed in near future
<i>Lilacopsis masonii</i> Mason's lilacopsis	—	SR	1B.1	Y	Y	N	N	One population at edge of study area; no known threats
<i>Monardella villosa</i> ssp. <i>gloiosa</i> robust monardella	—	—	1B.2	N	N	N	N	No occurrences in study area
<i>Navarretia prostrata</i> prostrate navarretia	—	—	1B.1	N	Y	N	N	No occurrences in study area

Appendix B. Continued

Appendix C

Glossary

Appendix C Glossary

Definitions of Key Terms And Concepts

Adaptive management. A method for examining alternative strategies for meeting measurable biological goals and objectives, and then if necessary, adjusting future conservation management actions according to what is learned (65 FR 106 35242–35257, June 1, 2000).

Aerial Signature. Characteristic value, color, or texture on an aerial photograph that correlates to a particular land-cover type.

Agriculture. Broad use term used to describe ranching and/or farming activities.

Anthropogenic. Caused or produced through human activity or influence.

Baseline. The existing environmental state, which includes past and present impacts as well as the anticipated impacts of all permitted projects in the inventory area.

Benchmark. A performance monitoring standard that allows a community to periodically measure the extent to which the goals and policies of its General Plan are met. Benchmarking: The process by which a community evaluates indicators, data and performance against established benchmarks to identify its progress toward its planning goals.

Biodiversity. The variety of native organisms considered at all levels, from genetic variants of a single species through arrays of species to arrays of genera, families, and higher taxonomic levels; includes the variety of natural communities and ecosystems.

Biological Assessment (BA): Under section 7 of the ESA. A document prepared to determine whether a proposed action is likely to affect listed species or designated critical habitat. BA's must be prepared for "major construction activities." The outcome of the BA determines whether formal consultation with the USFWS is necessary.

Biological opinion (BO). The document stating the opinion of the U.S. Fish and Wildlife Service and/or the National Oceanic and Atmospheric Administration's National Marine Fisheries Service as to whether or not a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat (50 CFR 402.02). A biological opinion is one of the decision documents of a consultation under Section 7 of the federal Endangered Species Act.

Biological goals. Guiding principles for conservation within the study area based on the conservation needs of the focal species and natural communities. The goals describe the vision for the focal species and natural communities to be achieved through implementation of a successful conservation program. Biological goals are typically qualitative rather than quantitative (65 FR 106 35242–35257, June 1, 2000).

Biological objectives. Measurable targets that will be sought to achieve the biological goal. Biological objectives are typically quantitative or at least measurable (65 FR 106 35242–35257, June 1, 2000).

Broad goals (or program goals). Broad guiding principles for the entire Strategy. These goals represent a summary of the “project purpose and need” for the Strategy and may be incorporated as a mission statement for the process and the plan. These are a different set of goals than the biological goals and objectives.

Buffer Zone. A strip of land created to separate and protect one type of land use from another; for example, as a screen of planting or fencing to insulate the surroundings from the noise, smoke, or visual aspects of an industrial zone or junkyard.

California Endangered Species Act (CESA). Section 2080 of the Fish and Game Code prohibits “take” of any species that the commission determines to be an endangered species or a threatened species. CESA allows for take incidental to otherwise lawful development projects. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate mitigation planning to offset project-caused losses of listed species populations and their essential habitats.

California Environmental Quality Act (CEQA). Created in 1970, shortly after the Federal Government created the National Environmental Policy Act (NEPA), CEQA is the basis for environmental law and policy to protect environmental quality in the State of California. CEQA does not directly regulate land uses but describes how project information and impacts are analyzed. CEQA requires state and local agencies to make decisions with environmental consequences in mind by mandating that they: Disclose the potential environmental effects of a proposed project to decision makers and the public (in Environmental Impact Reports (EIR) for example, etc.); Identify methods to minimize those effects to

the environment; Identify feasible mitigation measures and/or alternatives to the project; and Solicit and respond to comments from the public and from other agencies concerned with the project.

CEQA species. Plant and animal species that are considered endangered, threatened, or rare under the California Environmental Quality Act (CEQA) and thus must be considered in CEQA documents, but are not focal species in the Strategy (670.2 or 670.5, Title 14, CCR). See also *endangered species* and *threatened species*.

City limits. Official jurisdictional boundary of a city.

Compensation, U.S. Fish and Wildlife Service: Compensation measures are actions that minimize or offset potential adverse effects of a proposed activity on species covered by the §7 consultation.

Condition of Approval. A condition placed on a development entitlement without which final approval may be withheld, often required to be satisfied prior to recording a Final Map, or receiving a grading or building permit. Similar to mitigation, although mitigations are often monitored over longer periods. For example, ‘prior to receiving a building permit, the Dept. of Fish & Game must be consulted.’ Or, “prior to receiving a Building Permit, the applicant must dedicate 10 acres to East Bay Regional Park District.”

Conservation. According to the federal Endangered Species Act, *conserve*, *conserving*, and *conservation* are the methods and procedures necessary to bring any endangered or threatened species to the point at which the measures provided under the Act are no longer necessary. Such methods and procedures include, but are not limited to, activities associated with resource management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transportation (16 USC 1532 [3]). According to the Natural Community Conservation Planning Act, *conserve*, *conserving*, and *conservation* are the use of methods and procedures within the Plan area that are necessary “to bring any covered species to the point at which the measures provided pursuant to [the California Endangered Species Act] ... are not necessary, and for covered species that are not listed pursuant to [the California Endangered Species Act] ..., to maintain or enhance the condition of a species so that listing pursuant to [the California Endangered Species Act] ...will not become necessary.” In other words, the Natural Community Conservation Planning Act defines *conservation* as the steps necessary to remove a species from the California threatened or endangered species list (Cal. Fish & Game Code 2085[d]).

Conservation actions –Specific activities that will be carried out to meet the conservation needs of the focal species and natural communities in order to achieve the biological goals and objectives.

Conservation Bank. A parcel of land containing natural resource values that are conserved and managed in perpetuity for specified listed species and used to offset impacts occurring elsewhere to the same resource values on non-bank lands.

Conservation Easement. A tool for acquiring open space with less than full-fee purchase; the public agency or not-for-profit corporation buys only certain specific rights from the landowner in order to restrict the development, management or use of the land. A landowner (grantor) voluntarily sells and/or donates permanent legal restrictions on a property, to a qualified third party (grantee), to limit or prohibit development in order to protect conservation values such as cultural or historic structures, biodiversity, water quality, wildlife habitat, agricultural uses, etc. The restriction is recorded and 'runs with the land' through successive owners. The restriction reduces the "highest and best" economic use of the property so that the property's value reflects only the allowed uses; property taxes may be reduced as a result. If the landowner donates the easement as a gift, this reduction in value may become a charitable tax deduction. An easement also can be sold to non-profit or government agencies to provide revenue. Sometimes referred to as a 'negative' easement since a conservation easement doesn't allow the grantee to do anything other than monitor and enforce the restrictions.

Conservation Values. Wildlife habitat, open space, historic, or recreational resources. For example, land may have a high conservation value if it contains habitat for endangered species or if it has open space in a highly developed area. Conservation values are usually assessed and included in the purposes section of a conservation easement.

Conservation strategy. The Strategy's overall and unified approach for achieving the biological goals and objectives. The conservation strategy is the collection of all conservation actions that will be implemented.

Construction monitoring. Monitoring by biologists of construction activities to ensure that conservation actions are implemented and impacts to biological resources are avoided or minimized in accordance with Strategy requirements.

Contribute to recovery. Actions that measurably increase the baseline conditions necessary to support focal species and that contribute to the eventual delisting of a listed species or prevention of listing of a nonlisted species. A contribution to recovery does not include actions necessary to avoid, minimize, or mitigate impacts of covered activities.

Cover (also canopy cover, areal cover). The area of ground covered by vegetation of particular species or vegetation type, generally expressed as a percentage.

Critical habitat. An area designated as critical habitat by the U.S. Fish and Wildlife Service or by the National Marine Fisheries Service pursuant to the federal Endangered Species Act. Critical habitat areas are specific geographic areas that may or may not be occupied by listed species, that are determined to be essential for the conservation and management of listed species, and that have been formally described and designated in the Federal Register (16 USC 1532 [5]).

Cumulative Impacts. The incremental environmental impacts of an individual project reviewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects considered together in order to ascertain the overall effect on the environment of a particular project. Also two or more environmental effects which, when considered together, are considerable or which compound or increase other environmental impacts. An assessment of cumulative impacts is a requirement of CEQA.

Deed Restrictions. Terms are placed in the deed to the property that restrict certain uses of the real estate by future owners. No income tax benefits; possible estate tax benefits.

Discretionary Project. A project which requires the exercise of judgment or deliberation when the public agency or body decides to approve or disapprove a particular activity, as distinguished from situations where the public agency or body merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations. Discretionary projects and approvals trigger CEQA review.

Easement. A grant by a property owner of a positive right for a specific use of the property or a defined part to a second party. It may be temporary or permanent, is legally recorded and ‘runs with the land’. It can be donated or purchased. Example: a landowner may grant an access easement, an easement to allow hunting, wood cutting, mining, etc. Some easements can be temporary.

Easement Value. The difference between a property's value before an easement is placed on it and the value after the easement is placed on it.

Ecological integrity. Ecosystems have *ecological integrity* when their native components are intact, including abiotic components, biodiversity, and ecosystem processes.

Ecosystem. A community of organisms and their physical environment interacting as an ecological unit.

Ecosystem function. The sum total of processes operating at the ecosystem level, such as the cycling of matter, energy, and nutrients.

Ecosystem restoration. The reestablishment of ecological functions within an area that historically supported those functions.

Endangered species. A native species, subspecies, variety of organism, or distinct population segment (DPS) which is in serious danger of becoming extinct throughout all or a significant portion of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease (16 USC 1532[6], Cal. Fish & Game Code Section 2062).

Endangered Species Act (ESA). Created in 1973, the ESA provides a program for the conservation of federally threatened and endangered plants and animals and the habitats in which they are found. The U.S. Fish and Wildlife Service of the Department of the Interior maintains a worldwide list which, as of February 20, 2008, included 1574 endangered species (599 are plants) and 351 threatened species (148 are plants). Species include grasses, flowers, trees, insects, crustaceans, fish, amphibians, reptiles, birds, and mammals. Anyone can petition USFWS to include a species on this list (7 USC §136; 16 USC §460 et seq).

Endemic. A species, subspecies, or variety found only in the region defined.

Environmental gradient. A shift in physical and ecological parameters across a landscape, such as changes in topography, climate, land cover types, or natural communities.

Environmental Impact Report (EIR). In CEQA, a document used to evaluate the potential environmental impacts of a project, evaluate reasonable alternatives to the project, and identify mitigation measures necessary to minimize the impacts. The California Environmental Quality Act (CEQA) requires that the agency with primary responsibility over the approval of a project (the lead agency) evaluate the project's potential impacts in an Environmental Impact Report (EIR). EIRs typically have a draft (DEIR) and a Final (FEIR) stage.

EIS: Environmental Impact Statement – Environmental impact document prepared pursuant to NEPA, in place of the term EIR which is used in CEQA.

Environmental Assessment: Under NEPA - A document that briefly discusses the environmental consequences of a proposed action and alternatives.

Ephemeral stream. Stream that flows only in response to rain events and receives no groundwater input.

Extinct species. A species no longer in existence.

Extirpated species. A species no longer surviving in regions that were once part of its range.

Farming. Narrow use term used to describe cultivation activities, including orchards, vineyards, hay, or grain farming, truck farming, and activities on irrigated and/or drylands.

Federal Action: Discretionary actions authorized, funded, or carried out by federal agency.

Federal Nexus. Occurring at the discretion of a federal agency, whether it be through permitting, funding, or direct implementation of a project.

Focal species. Those species addressed in the Strategy for which mitigation actions will be described.

Gap Analysis. A comparison of the distribution of elements of biodiversity with that of areas managed for their long-term viability to identify elements with inadequate representation.

Geographic Information System (GIS). Computer-based mapping technology that manipulates geographic data in digital layers and facilitates a wide array of environmental analyses.

Genetic Diversity. Variety among individuals within a species -- or, more specifically, the variety in the DNA of a species. See also "alleles."

Habitat. The environmental conditions that support occupancy of a given organism in a specified area (Hall et al. 1997). In scientific and lay publications, habitat is defined in many different ways and for many different purposes. For the purposes of the Conservation Strategy, habitat is defined as the specific places where the environmental conditions (i.e., physical and biological conditions) are present that are required to support occupancy by individuals or populations of a given species. Habitat may be occupied (i.e., individuals or a population of the species are or have recently been present) or unoccupied. See also *unoccupied habitat*.

Habitat Conservation Plan (HCP): Under section 10 of the ESA. A plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species; usually includes measures to minimize impacts, and may include provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area. Required before an incidental take permit may be issued.

Habitat creation. The establishment of a natural community in an area that did not previously support it. For example, stock ponds can be created in areas that previously did not support them by grading and installing a check dam.

Habitat enhancement. The improvement of an existing degraded natural community. Habitat enhancement involves improving one or more ecological factors, such as species richness, species diversity, overall vegetative cover, or wildlife value. Enhancement activities typically occur on substrates that are largely intact.

Habitat quality. The ability of the environment to provide conditions that support the persistence of individuals and populations (Hall et al. 1997). The precise meaning of habitat quality varies by species and depends on the subject species' specific needs in the context of a particular area. High-quality habitat for some species comprises only foraging and resting elements; for others it comprises foraging, resting, and nesting elements; for still others it may encompass all elements needed for the species to complete its lifecycle. Low-quality habitat would include only the minimal elements that support occurrence of the species. High-quality habitat tends to support larger numbers of species than low-quality habitat.

Habitat restoration. *See Restoration.*

Harass. An intentional or negligent act or omission that creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3). One component of the legal definition of "take" under the federal Endangered Species Act.

Harm. An act that kills or injures wildlife. Such an act may include significant habitat modification or degradation which results in injury of or death to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harm is one component of the legal definition of "take" under the federal Endangered Species Act.

Highest And Best Use. The most profitable likely and legal use to which a parcel of land is likely to be put (a determination made in calculating value).

Hydrology. The movement of surface and subsurface water flows in a given area. The hydrology of an area is intimately connected with its precipitation, soils, and topography.

In perpetuity. Always; forever.

Incidental take. Any take otherwise prohibited, if such take is incidental to and not the purpose of the carrying out of an otherwise lawful activity (50 CFR 17.3).

Incidental Take Permit: A permit issued under section 10(a)(1)(B) of the ESA to a non-Federal party undertaking an otherwise lawful project that might result in take of an endangered or threatened species. Application for an incidental take permit is subject to certain requirements, including preparation by the permit

applicant of a conservation plan, generally known as a "Habitat Conservation Plan" or "HCP."

Indicator species. A species, the presence or absence of which is indicative of a particular habitat, community, or set of environmental conditions (Lincoln et al. 1998).

Infrastructure. A general term describing public and quasi-public utilities and facilities such as roads, bridges, sewers and sewer plants, water lines, parks and other public spaces, power lines, schools, police and fire protection, and health and welfare services, etc. necessary for the functioning of an urban area.

Initial Study. In CEQA, a preliminary analysis prepared by the Lead Agency to determine whether an EIR or a Negative Declaration must be prepared or to identify the significant environmental effects to be analyzed in an EIR.

In-kind/on-site mitigation. Establishing a vegetative community or habitat that would provide the same ecological values over time as the habitat affected. This created habitat must be within, or in proximity to, the site where habitat will be lost. Proximity requirements vary by resource. For focal species, those requirements would depend on the natural history traits and home range of the species and specific requirements would be determined on a case-by-case basis. Since habitat created with this type of mitigation is essentially equal and near to the affected habitat, it would directly benefit those populations impacted by development and is a preferred means of mitigation.

In-kind/off-site mitigation. Establishing a vegetative community or habitat that would provide the same ecological values over time as the habitat affected. This created habitat may be distant from the site experiencing habitat loss and does not fall under the proximity requirements of on-site creation for that resource. This form of mitigation would only be appropriate in cases where in-kind habitat would be inferior if created on-site. Since habitat created with this type of mitigation is off-site, it does not necessarily benefit those populations impacted by development.

Intermittent stream. A stream that is supplied by both rainfall runoff and groundwater; intermittent streams tend to be seasonal, flowing during the rainy season and into the late spring or early summer.

Invasive species. A species that is non-native to the ecosystem and whose introduction causes or is likely to cause economic or environmental harm or harm to human health (Atkinson et al. 2004; EO 13112).

Jeopardy: Under the ESA, jeopardy occurs when an action is reasonably expected, directly or indirectly, to diminish a species' numbers, reproduction, or distribution so that the likelihood of survival and recovery in the wild is appreciably reduced.

Keystone predator. The dominant predator, often the top predator in a given food web; a predator having a major influence on community structure, often in excess of that expected from its relative abundance (Lincoln et al. 1998).

Keystone species. A species whose impacts on its community or ecosystem are large, and much larger than would be expected from its abundance (Meffe and Carroll 2005).

Land-cover type. The dominant feature of the land surface discernible from aerial photographs and defined by vegetation, water, or human uses.

Land-use designation. The designation, by parcel, in an adopted city or county General Plan of the allowable uses.

Less than Significant Impact. In CEQA, an impact that would not result in a substantial and adverse change in the environment and would not require mitigation.

Linkage/Corridor. A linkage is an area of land that supports or contributes to the long-term movement of wildlife and genetic material. A corridor is a specific route that is used for movement and migration of species. A corridor may be different from a linkage because it represents a smaller or narrower avenue for movement.

Listed Species. These are plant and animal species that are federally listed as endangered or threatened. The Secretary of the Interior publishes these lists in the Federal Register.

Management Agreement. A landowner and a governmental agency or land trust enter into a generally informal contract concerning how the property's natural resources are to be managed. More formal management agreements are often associated with mitigation properties.

Mesic. Intermediate in moisture, without extremes; neither wet (hydric) nor dry (xeric).

Metapopulation. A group of partially isolated populations belonging to the same species that are connected by pathways of immigration and emigration. Exchange of individuals occurs between such populations, enabling recolonization of sites from which the species has recently become extirpated (Lincoln et al. 1998).

Mitigation. Actions or project design features that reduce environmental impacts by avoiding, minimizing, or compensating for adverse effects (Fulton 1999).

Mitigation, U.S. Fish and Wildlife Service: Mitigation measures are actions that reduce or address potential adverse effects of a proposed activity on species covered by a HCP, under §10 ESA.

Mitigation, U.S. Army Corps of Engineers: actions taken to offset the adverse effects of the loss of wetlands.

Mitigation Bank. Large blocks of land preserved, restored, and enhanced for purposes of consolidating mitigation for and mitigating in advance for projects that take listed species or affect protected natural resources.

Mitigated Negative Declaration. In CEQA, a Negative Declaration that incorporates mitigation measures into the design of the project or establishes measures as conditions of project approval to avoid significant effects.

Mitigation Monitoring Program. In CEQA, when a lead agency adopts a mitigated negative declaration or an EIR, it must adopt a program of monitoring or reporting which will ensure that mitigation measures are implemented.

Natural community. A collection of species that co-occur in the same habitat or area and interact through trophic and spatial relationships. Communities are typically characterized by reference to one or more dominant species.

Negative Declaration. In CEQA, a written statement prepared by the Lead Agency that briefly describes the reasons that a project, not exempt from CEQA, will not have a significant effect on the environment and therefore does not require the preparation of an EIR.

Non-native species. A species that is not native to the ecosystem under consideration.

Out-of-kind/on-site mitigation. Establishing a similar vegetative community that will, over time, develop some of the same ecological functions and values as the affected habitat. This created habitat must be within, or in proximity to, the site where habitat will be lost. Proximity requirements vary by resource. For focal species, those requirements would depend on the natural history traits and home range of the species and specific requirements would be determined on a case-by-case basis. Since the habitat created by this type of mitigation is unequal to the affected habitat, it should only be used in instances where there is a compelling biologically-based rationale.

Out-of-kind/off-site mitigation. Establishing a similar vegetative community that will, over time, develop some of the same ecological functions and values as the affected habitat. This created habitat may be distant from the site experiencing habitat loss and does not fall under the proximity requirements of on-site creation for that resource. Since the habitat created by this type of

mitigation is unequal to, and distant from, the affected habitat, it is a less acceptable means of mitigation.

Perennial stream. Year-round stream that is supplied by both rainfall runoff and groundwater, as well as by substantial dry-season inputs.

Performance indicator. An environmental variable that is quantitatively measured over time to determine whether enhanced, created, or restored natural communities have successfully met the Strategy's biological goals and objectives.

Performance objective. In monitoring, the optimal desired value for each performance indicator. Performance objectives establish a higher threshold for each indicator than that established for performance standards. Funding, design, and management objectives for enhanced, created, or restored natural communities are established at levels that are designed to ensure that the performance objectives are achieved. Failure to meet a performance objective would not constitute a changed circumstance or require remedial measures.

Performance period. In monitoring, the time over which performance standards must be met.

Performance standard. In monitoring, a minimum requirement necessary to achieve biological goals and objectives. Failure to achieve a performance standard could constitute a changed circumstance and require that remedial measures be implemented.

Population. A group of individuals of the same species inhabiting a given geographic area, among which mature individuals reproduce or are likely to reproduce. Ecological interactions and genetic exchange are more likely among individuals within a population than among individuals of separate populations of the same species.

Practicable. Referring to an action, available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose (45 FR 85344, December 24, 1980: U.S. Environmental Protection Agency, Part 40 CFR 230.3, Definitions).

Preconstruction surveys. Surveys conducted for certain biological resources immediately prior to construction, as directed by the permitting process under the CEQA, ESA, or CESA, to ensure that species are adequately protected and that habitat avoidance and minimization measures can be effectively implemented during construction or implementation of project activities.

Preservation. Preventing changes in land use from a natural state by, for example, acquiring land or a conservation easement.

Project description. In CEQA, describes the basic characteristics of the project including location, need for the project, project objectives, technical and environmental characteristics, project size and design, project phasing and required permits. The level of detail provided in the project description varies according to the type of environmental document prepared.

Recovery goal. An established goal, usually quantitative, in a U.S. Fish and Wildlife Service or by the National Marine Fisheries Service recovery plan that identifies when a listed species is restored to a point at which the protections of the federal Endangered Species Act are no longer required.

Range. The geographic area a species is known or believed to occupy.

Recovery plan. A document published by U.S. Fish and Wildlife Service or by the National Marine Fisheries Service that lists the status of a listed species and the actions necessary to remove the species from the endangered species list.

Recovery. The process by which the decline of an endangered or threatened species is arrested or reversed or threats to its survival neutralized so that its long-term survival in nature can be ensured. Recovery entails actions to achieve the conservation and survival of a species (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998), including actions to prevent any further erosion of a population's viability and genetic integrity, as well as actions to restore or establish environmental conditions that enable a species to persist (i.e., the long-term occurrence of a species through the full range of environmental variation).

Regulatory Agencies. U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game, U.S. Army Corps of Engineers, San Francisco Bay Regional Water Quality Control Board.

Restoration. Establishment of a natural community or habitat in an area that historically supported it, but no longer supports it because of the loss of one or more required ecological factors. Restoration typically involves altering the substrate or physical features to improve a site's ability to support the historic natural community or habitat.

Riparian habitat or vegetation. Vegetation associated with river, stream, or lake banks and floodplains. Also defined by USFWS (1998) as: Plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (i.e., rivers, streams, lakes, or drainage ways). Riparian areas have one or both of the following characteristics: 1) distinctively different vegetation than adjacent areas, 2) species similar to adjacent areas but exhibiting more vigorous or robust growth forms due to the greater availability of surface and subsurface water.

Ruderal. A species or plant community that occurs on a highly disturbed site.

Setback. A minimum distance required by zoning to be maintained between two structures or between a structure and property lines.

Significant effect on the environment. Under CEQA, a significant effect on the environment means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. Mitigation measures are proposed, where feasible, to reduce the magnitude of significant impacts.

Significant and Unavoidable Impact. Under CEQA, an impact that would result in a substantial adverse effect on the environment which would not be mitigable to a less-than-significant level. A project with such an impact could still proceed, provided the Lead Agency prepares a Statement of Overriding Considerations, pursuant to Section 15093 of the CEQA Guidelines, explaining why the Agency would proceed with the project despite the occurrence of such an impact.

Special-status species. Plants and animals that are legally protected under ESA, CESA, or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing.

Species. A taxonomic level; a group of organisms that resemble one another in appearance, general behavior, ecological niche, chemical makeup and processes, and genetic structure. Organisms that reproduce sexually are classified as members of the same species only if they can actually or potentially interbreed with one another and produce fertile offspring.

Study area. Geographic area studied by the Strategy.

Succession. The change in the composition and structure of a biological community over time. Successional patterns often shift dramatically following a major disturbance (e.g., fire, flood, anthropogenic clearing of land).

Suitable habitat. Habitat that exhibits the characteristics necessary to support a given species.

Take. According to the federal Endangered Species Act (16 USC 1532 [19]), *take* means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. According to California Fish and Game Code (Cal. Fish & Game Code Section 86), *take* means to hunt, pursue, catch, capture, or kill, or to attempt to hunt, pursue, catch, capture, or kill.

Threatened species. A native species, subspecies, variety, or distinct population segment (DPS) of an organism that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future throughout all of a significant portion of its range (16 USC 1532 [5], Cal. Fish & Game Code Section 2067).

Unoccupied habitat. Habitat that exhibits all the constituent elements necessary for a species, but which surveys have determined is not currently occupied by that species. The lack of individuals or populations in the habitat is assumed to be the result of reduced numbers or distribution of the species such that some habitat areas are unused. It is expected that these areas would be used if species numbers or distribution were greater. See also *suitable habitat*.

Urban growth boundary (UGB). An officially adopted and mapped line dividing land to be developed from land to be protected for natural or rural uses, including agriculture. UGBs are regulatory tools, often designated for 20 or more years to provide greater certainty for both development and conservation goals.

Urban service area. The area within a city's sphere of influence where utilities such as gas, water, sewer, and electricity, and public services such as police, fire, schools, and parks and recreation are and will be provided.

Vernal Pools. Vernal pools are land depressions that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall. These wetlands range in size from small puddles to shallow lakes and are usually found in a gently sloping plain of grassland. Although generally isolated, they are sometimes connected to each other by small drainages known as vernal swales. Beneath vernal pools lies either bedrock or a hard clay layer in the soil that helps keep water in the pool.

Wetland. An area inundated or saturated by surface or ground water at a frequency sufficient to support vegetation types adapted to wet soil conditions. Note that within the study area, presence of wetland soils, vegetation, or wetted area is generally sufficient to characterize an area as a wetland. Wetlands in the study area include vernal pools, ponds, streams and marshes.

Wildland-urban interface. The area where structures and other human development meet or intermingle with undeveloped wildland (University of Wisconsin n.d.).

Wildlife Corridor. A natural corridor, such as an undeveloped ravine, a creek or a habitat area, that is frequently used by wildlife to travel from one area to another.

Xeric. Dry or desert-like.

Appendix D

Species Accounts

Appendix D

Species Accounts

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San Joaquin Spearscale (*Atriplex joaquiniana*)

Distribution

San Joaquin spearscale occurs along the western side of the Great Valley from Glenn County to Merced County and in the small valleys of the inner Coast Ranges, including the Livermore Valley. It occurs in the broad flood basins of the valley floor and on alluvial fans associated with the major streams draining from the inner Coast Ranges foothills. It is generally found at low elevations, but has been collected up to 1,055 feet above sea level.

Occurrences within the Study Area

There are 12 documented occurrences of San Joaquin spearscale in the study area. All are presumed extant and occur north of I-580. These documented populations range in size from several hundred individual plants to several thousand. Concentrations occur in alkaline drainages off of Dolan Road north of Livermore and in Springtown Preserve. There are two populations near the junction of Dyer Road and Altamont Pass Road and one occurrence in the northeastern corner of the study area, east of Mountain House Road near the Delta Mendota Canal (CNDBB 2009).

Ecology

San Joaquin spearscale typically occurs in alkali grassland and alkali meadow, or on the margins of alkali scrub. It blooms from April through October and occurs on clay soils, often in areas of high alkalinity.

Species Associated with San Joaquin Spearscale

<i>Allenrolfea occidentalis</i>	iodine bush
<i>Atriplex coronata</i>	crownscale
<i>Atriplex depressa</i>	brittlescale
<i>Centromadia pungens</i>	common spikeweed
<i>Cordylanthus palmatus</i>	palmate bird's-beak
<i>Distichlis spicata</i>	saltgrass
<i>Frankenia salina</i>	alkali heath
<i>Hordeum depressum</i>	low barley
<i>Hordeum marinum</i> ssp. <i>gussoneanum</i>	Mediterranean barley
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Nitrophila occidentalis</i>	western niterwort
<i>Salicornia subterminalis</i>	Parish's pickleweed
<i>Spergularia macrotheca</i>	large-flowered sand-spurry
<i>Suaeda moquinii</i>	bush seepweed

Threats

San Joaquin spearscale is a CNPS List 1B.2 species, considered fairly endangered in California (CNPS 2009). The principal threat to San Joaquin spearscale has been the historic conversion of much of the alkali grassland to agriculture. Present threats include habitat conversion to urban use, overgrazing, invasive

annual species, and impacts associated with road and utility line construction and maintenance (CNDDB 2009).

Modeled Habitat Distribution in Study Area

Model Assumptions

The San Joaquin spearscale habitat model includes the following land covers types: alkali meadow and scald and alkali wetland. The model also includes other areas with alkaline soils and is restricted to elevations below 1,055 feet.

Model Results

Figure D-1 in Appendix D shows the modeled potential habitat for San Joaquin spearscale within the study area. The number of known occurrences is sufficient to verify model results and the modeled habitat predicts 9 of the 12 known populations. The model's extent is restricted to the northern portion of the study area where alkaline soils are present.

Recurved Larkspur (*Delphinium recurvatum*)

Distribution

Historically, recurved larkspur was widely distributed in California's Great Valley, ranging from Butte County to Kern County. Most of the remaining occurrences are in Kern, Tulare, and San Luis Obispo Counties. The species now appears to be very rare outside the southern San Joaquin Valley (CNDBB 2009).

Occurrences within the Study Area

One occurrence of recurved larkspur has been documented in the north east corner of the study area. It is located on the west side of Burns Road about 0.6 miles north of Kelso Road, just south of the Contra Costa/Alameda County line.

Ecology

Recurved larkspur occurs on sandy or clay alkaline soils, generally in annual grasslands or in association with saltbush scrub or valley sink scrub habitats, ranging in elevation from 100 to 2,000 feet above sea level (CNDBB 2009). It blooms from March through May (CNPS 2009).

Species Associated with Recurved Larkspur

<i>Atriplex polycarpa</i>	allscale
<i>Atriplex spinifera</i>	spinescale
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome
<i>Centromadia pungens</i>	common spikeweed
<i>Distichlis spicata</i>	saltgrass
<i>Erodium cicutarium</i>	red filaree
<i>Frankenia salina</i>	alkali heath
<i>Isocoma acradenia</i> var. <i>bracteosa</i>	alkali goldenbush
<i>Lasthenia californica</i>	California goldfields
<i>Sporobolus airoides</i>	alkali sacaton
<i>Suaeda moquinii</i>	bush seepweed

Threats

Recurved larkspur is a CNPS List 1B.2 species, considered fairly endangered in California (CNPS 2009). The principal threat to this species has been the historic conversion of much of the alkali habitat of the Great Valley to agriculture. At present, the primary threat to recurved larkspur is overgrazing. Other threats include road and utility line construction, which in turn increase competition from invasive plants (CNDDB 2009).

Modeled Habitat Distribution in Study Area

Model Assumptions

The recurved larkspur habitat model contains the following parameters: annual grassland land cover, elevation from 100-2,000 feet, sandy or clay alkaline soils. Additionally, potential habitat was restricted to areas east of the Diablo Range crest.

Model Results

Figure D-2 in Appendix D shows the modeled potential habitat for recurved larkspur as being very restricted within the study area. The model predicted several very small areas of potential habitat in the northeast corner of the study area. The predicted habitat does not include the one occurrence of recurved larkspur just south of the Alameda/Contra Costa County line.

Big Tarplant (*Blepharizonia plumosa*)

Distribution

Big tarplant is endemic to California and is found primarily in eastern Contra Costa, eastern Alameda, and western San Joaquin Counties; with smaller populations in Stanislaus and Solano Counties (Hoover 1937, CNDDB 2009).

Occurrences within the Study Area

Six occurrence of big tarplant are known within the study area (CNDDB 2009). One occurrence is located along the eastern edge of the study area between Midway Road and a power substation. The other five occurrences are clustered along Tesla Rd between Livermore and Tracy in the Carnegie State Vehicular Recreation Area.

Ecology

Big tarplant occurs in annual grassland on clay to clay-loam soils, usually on slopes and often in burned areas, below 1,500 feet (CNDDB 2009). Seedlings appear in early spring, but the plants do not begin to bloom until mid-summer. The blooming period, during which the plants produce many heads with white flowers, generally occurs between July-October.

Two species of big tarplant are present in the study area: big tarplant and viscid big tarplant (*Blepharizonia laxa*). Viscid big tarplant is the more widely distributed species, ranging throughout most of the south Coast Ranges and reaching its northern limit in Contra Costa County, just north of the study area. The two species, which often occur in adjacent populations, can be differentiated by their branching patterns, the amount and color of the simple and glandular hairs on the stems and leaves, the chemical compounds produced by the glands, and by genetic markers (Hickman 1993, Baldwin et al. 2001, Preston pers. comm.). The two species can hybridize, but the hybrids are infertile (Baldwin et al. 2001).

Species Associated with Big Tarplant

<i>Avena species</i>	wild oats
<i>Bromus species</i>	brome grasses
<i>Epilobium brachycarpum</i>	panicked willow-herb
<i>Eriogonum angulosum</i>	angle-stemmed wild buckwheat
<i>Eriogonum gracile</i>	slender woolly wild buckwheat

Species Associated with Big Tarplant	
<i>Grindelia camporum</i>	Great Valley gumplant
<i>Holocarpha obconica</i>	San Joaquin tarplant
<i>Holocarpha virgata</i>	virgate tarplant
<i>Lagophylla ramosissima</i>	common hareleaf
<i>Lolium multiflorum</i>	Italian ryegrass
<i>Nassella pulchra</i>	purple needlegrass

Threats

Big tarplant occurs in only a few highly restricted populations and is considered seriously endangered in California (CNPS List 1B.1) (CNPS 2009). The primary threat to big tarplant has been habitat loss from conversion to urban development and lack of disturbance in areas where natural processes are restricted. Ground disturbance and erosion caused by cattle grazing and competition from invasive exotics such as yellow star-thistle (*Centaurea solstitialis*) may also pose a threat to populations (CNDDB 2009).

Modeled Habitat Distribution in Study Area

Model Assumptions

The big tarplant habitat model includes the following parameters: annual grassland land cover, soils consisting of clay and clay loam, elevations up to 1,827 feet, and on slopes of 10-31 degrees. The model restricts habitat to those areas within the Diablo Range that are underlain by Great Valley Sequence geologic landforms.

Model Results

Figure D-3 in Appendix D shows the modeled potential habitat for big tarplant within the study area. Potential habitat is restricted to areas in the Diablo Range with parent material from the Great Valley Sequence (Bartosh pers. comm.). Known occurrences are generally within the vicinity of predicted habitat. The exception is the population along Midway Road near the Alameda/San Joaquin County line, which does not fall within the modeled habitat. The small number of clustered occurrence in the study area is not sufficient to provide a high level of confidence in the model results.

Congdon's Tarplant (*Centromadia parryi* ssp. *congdonii*)

Distribution

Congdon's tarplant is known from East San Francisco Bay Area, Salinas Valley, and Los Osos Valley.

Occurrences within the Study Area

Seven occurrences have been documented in the northern portion of the study area (CNDDB 2009). These include populations that have been recorded at: Camp Parks Reserve Forces Training Area (10,000 individuals reported in 2003) along Tassajara Road north of Livermore (4000+ plants and 9600 plants observed at two locations in 1998), east of Livermore along North Livermore Road (370,000 plants observed in 1998), and along the Contra Costa/Alameda County line along Collier Canyon Road (321,000 plants observed in 1998) (CNDDB 2009).

Ecology

Congdon's tarplant blooms from May through October and occurs in annual grassland on lower slopes, flats, and swales below 800 feet. This species can be associated with alkaline or saline soils. Hybridization with the subspecies *Centromadia parryi* ssp. *rudis* was reported on 1998 survey forms for the North Livermore Road population (CNDDB 2009).

Threats

Congdon's tarplant is a CNPS List 1B.2 species that is considered fairly endangered in California. The species is severely threatened by development in most areas, including road widening that accompany development (CNDDB 2009). In other more natural settings mowing or heavy grazing can impact this species, though it has been documented in areas where both mowing and grazing occur. The biggest threat is the loss of natural disturbance in areas where natural processes are restricted. This allows annual invasive species to outcompete this species.

Modeled Habitat Distribution in Study Area

Model Assumptions

The Congdon's tarplant habitat model parameters include the annual grassland land cover and clay, clay loam, and silty clay loam soils. Additionally, model habitat was restricted to areas west of the Diablo Range crest to better fit the known extent of occurrence data from Alameda County.

Model Results

Figure D-4 in Appendix D shows the modeled potential habitat for Congdon's tarplant within the study area. Predicted habitat is scattered in the Livermore and Amador Valley areas. The number of known occurrences is sufficient to verify model results. Five of the seven occurrences fall within modeled habitat for this species.

Palmate-bracted bird's-beak (*Cordylanthus palmatus*)

Distribution

The Palmate-bracted bird's-beak is state and federally endangered. Palmate-bracted bird's-beak is known from scattered locations in the Central Valley from Colusa County to Fresno County. There is a lone population in the Springtown Preserve north of Livermore.

Occurrences within the Study Area

One occurrence of Palmate-bracted bird's-beak has been reported in the study area, located northeast of Livermore in the Springtown Preserve. This population has been surveyed repeatedly over the last 20 years. The population has varied in size from 9,000 plants in 1990 to nearly 53,000 in 1997 (CNDDB 2009).

Ecology

Palmate-bracted bird's-beak is associated with alkaline sites in grassland and chenopod scrub from 10-500 feet elevation. This species blooms from May through October. Seeds are dispersed by water, making the local hydrology very important to the extent of a population.

Threats

Palmate-bracted bird's-beak is listed as endangered both at the federal and state level. It is a CNPS List 1B.1 species and is seriously endangered in California. This species is threatened by agriculture, grazing, urbanization and development, unauthorized off-road vehicle use, and altered hydrology. Non-native annual grasses are becoming a threat to this species. Targeted grazing programs or other forms of non-native grass control may be beneficial at abating this threat.

Modeled Habitat Distribution in Study Area

This species not modeled due to low number of occurrences in the study area and the known occurrences being well documented in Springtown Alkali Preserve.

Livermore tarplant (*Deinandra bacigalupii*)

Distribution

Livermore tarplant is endemic to California and known from three occurrences, all near Livermore, Alameda County.

Occurrences within the Study Area

All three occurrences of Livermore tarplant are known within the study area, located northeast of Livermore in the foothills of the Diablo Range. Two of those populations are located just south of I-580 between the junction of Greenville Road and Las Positas Road and Hawthorne Road. These two populations are just east of Greenville Road. The third population is located near the intersection of Ames Street and Raymond Road north of Livermore.

Ecology

Livermore tarplant blooms from June through October and occurs in seeps and meadows, often associated with alkali meadows at 500-600 feet in elevation.

Threats

This species is a CNPS List 1B.2 species and is considered fairly endangered in California. This species is threatened by development including road widening that could occur as the result of development pressure.

Modeled Habitat Distribution in Study Area

This species not modeled due to low number of occurrences throughout the species range and the known extent of populations within the study area.

Longhorn Fairy Shrimp

Distribution

The longhorn fairy shrimp is federally listed as endangered and is extremely rare. It is known to occur in alkali sink and scrub plant communities. The four known populations of longhorn fairy shrimp include areas within the Carrizo Plain National Monument, San Luis Obispo County; areas within San Luis National Wildlife Refuge Complex; areas within the Brushy Peak Regional Preserve, Alameda County, and areas within the Vasco Caves Preserve, near the town of Byron in Contra Costa County (USFWS 2007a). Three of the four populations are found within public lands that are protected and managed for vernal pool species (USFWS 2007a). The Livermore Vernal Pool Region is listed as a core recovery area (USFWS 2007a).

Occurrences within the Study Area

The species is known to occur at one location within the Conservation Strategy study area (Brushy Peak Regional Preserve) (USFWS 2007a). Critical habitat has been designated for the species within the study area (U.S. Fish and Wildlife Service 2006). Brushy Peak Regional Preserve is owned by the Livermore Area Recreation and Park District and managed by EBRPD. All of the known localities of this species in the study area are within this preserve, which is currently protected (USFWS 2007a).

Ecology

Longhorn fairy shrimp occurrences are rare and highly disjunct with specific pool characteristics largely unknown (USFWS 2003). Typical habitat for listed fairy shrimp in California include vernal pools, seasonally ponded areas within vernal swales, ephemeral freshwater habitats and artificial habitats (railroad toe-drains, roadside ditches, abandoned agricultural drains, ruts left by heavy construction vehicles, and depressions in firebreaks) (Eng et al. 1990, USFWS 2003).

Habitat for longhorn fairy shrimp in Alameda County is primarily in water pooled in sandstone depressions. Vernal pools in other parts of California that support these fairy shrimp are either loam and sandy loam or shallow, alkaline pools (USFWS 1994). The seasonal pool habitat is subject to seasonal variations, and it is thought that longhorn fairy shrimp are dependent on the ecological characteristics of those variations. These characteristics include duration of inundation and presence or absence of water at specific times of the year (U.S. Fish and Wildlife Service 1994). The longhorn fairy shrimp is capable of living in

vernal pools of relatively short duration (pond 6 to 7 weeks in winter and 3 weeks in spring) (Eriksen and Belk 1999).

Longhorn fairy shrimp are omnivorous filter-feeders (Eriksen and Belk 1999). They are a component of the planktonic crustacea within seasonal temporary pools and can occur in densities as high as 200 per liter of water (Eriksen and Belk 1990).

Predator consumption of fairy shrimp cysts (resting eggs) aids in distributing populations. Predators expel viable cysts in their excrement, often at locations other than where they were consumed (Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts can also be transported in mud carried on the feet of animals, including livestock that may wade through their habitat (Eriksen and Belk 1999). Beyond inundation of the habitat, the specific cues for hatching are largely unknown (Eriksen and Belk 1999), although temperature is believed to play a role. Longhorn fairy shrimp have been reported to co-occur with the vernal pool fairy shrimp (*Branchinecta lynchi*), throughout its range.

Threats

Longhorn fairy shrimp are threatened by the same activities as other vernal pool invertebrates. These threats include the conversion of vernal pool habitat to agricultural lands and urban development, and extinction due to the small and isolated nature of remaining populations (U.S. Fish and Wildlife Service 1994). The limited and disjunct distribution of vernal pools, coupled with the even more limited distribution of the longhorn fairy shrimp, means that any reduction in vernal pool habitat could adversely affect this species.

Recolonization opportunities are diminished when physical barriers, such as development or lack of vernal pool habitat, isolate populations from one another or inhibit transport of cysts. Isolated populations could be more susceptible to inbreeding depression, which can result in local extinction or reduced fitness (Gilpin and Soule 1986, Goodman 1987). However, this has never been demonstrated for branchiopod crustaceans.

Activities that alter the suitability of vernal pool habitat could impact the special-status crustaceans that depend on them. These activities include damaging the impermeable clay and /or hardpan layers of the habitat bottom, filling in the habitat, altering (e.g. through contaminants) or destroying the watershed that conveys overland flow into the habitat. Additionally, introduction of non-native plants, destruction or degradation of the surrounding upland habitat, introduction of fish (such as *Gambusia* spp.) into special-status shrimp habitats, and activities that would discourage or prevent waterfowl and waders from feeding at occupied habitats and thereby restrict gene-flow

between populations would also significantly affect longhorn fairy shrimp populations.

Modeled Habitat Distribution in Study Area

Model Assumptions

The longhorn fairy shrimp habitat model includes all seasonal wetlands and rock outcrops that were identified within the study area. Data from vernal pool surveys (Holland 1996), and critical habitat were also include in the map to capture the likely extent of the species distribution in east Alameda County.

Model Results

Figure D-5 in Appendix D shows the modeled potential habitat for the longhorn fairy shrimp within the study area. In addition to its presence at Brushy Peak Regional Preserve, there is one CNDDDB occurrence for the species. The number of known occurrences is not sufficient to verify model results. The model's extent is restricted to the northern, central portion of the study area where rock outcrop formations are prevalent. Due to the ephemeral nature of vernal pool habitats it is likely that the model underestimates potential habitat in the study area. During wet years habitat for vernal pool species would be more extensive than in dry years.

Vernal Pool Fairy Shrimp

Distribution

The vernal pool fairy shrimp is federally listed as threatened. The vernal pool fairy shrimp is found from southern Oregon to southern California, throughout the Central Valley, and west to the central Coast Ranges. Disjunct populations occur in San Luis Obispo County, Santa Barbara County, and Riverside County. This species has been observed in the eastern portions of Alameda County (Eriksen and Belk 1999). In 1996, the U.S. Fish and Wildlife Service reported that there were 32 known populations of the vernal pool fairy shrimp.

The Livermore Vernal Pool Region straddles Alameda, Contra Costa, and Santa Clara Counties, extending into southwestern San Joaquin County (USFWS 2007b). There are 12 occurrences of vernal pool fairy shrimp in the Livermore Vernal Pool Region: eight in the Altamont Hills core area, four of which are in areas planned for development (USFWS 2007b). The core recovery area includes portions of Brushy Peak Regional Preserve, which is inside of the EACCS study area (USFWS 2007b).

Occurrences within the Study Area

There are three CNDDDB occurrence records for this species in the study area: at the Springtown Natural Communities Reserve near Livermore, in an alkali sink containing vernal pools; in a seasonal wetland with an annual grassland upland, north of Interstate 580 near Livermore; and south of Frick Lake, in a heavily grazed pasture (CNDDDB 2009). Vernal pool fairy shrimp may also be found elsewhere throughout the study area in vernal pool habitats. The lack of data points could be due to a lack of survey effort.

Ecology

This species is usually associated with vernal pools, but can also be found in association with other ephemeral habitats including alkali pools, seasonal drainages, stock ponds, vernal swales, rock outcrops and artificially created ephemeral habitats (railroad toe-drains, roadside ditches, abandoned agricultural drains, ruts left by heavy construction vehicles, and depressions in firebreaks) (Eng et al. 1990, Vollmar 2002).

Vernal pools are subject to seasonal variations, and vernal pool fairy shrimp are dependent on the ecological characteristics of those variations. These characteristics include duration of inundation and presence or absence of water at specific times of the year (U.S. Fish and Wildlife Service 1994). The vernal pool fairy shrimp is capable of living in Central Valley vernal pools of relatively

short duration (pond 6 to 7 weeks in winter and 3 weeks in spring) (Eriksen and Belk 1999). Other factors contributing to the suitability of pools for vernal pool fairy shrimp include alkalinity 22 to 274 ppm (parts per million), total dissolved solids (TDS) (48 to 481 ppm), and pH (6.3 to 8.5) (U.S. Fish and Wildlife Service 1994; Eriksen and Belk 1999). Water in pools occupied by vernal pool fairy shrimp typically has low conductivity and chloride (USFWS 1994). Vernal pool fairy shrimp have been found in pools ranging from 0.05 acre to 0.1 acre but occur more frequently in small, deep pools (Eriksen and Belk 1999). Vernal pool fairy shrimp are omnivorous filter-feeders. Fairy shrimp indiscriminately filter particles from the surrounding water, including bacteria, unicellular algae, and micrometazoa (Eriksen and Belk 1999).

Like the longhorn fairy shrimp, vernal pool fairy shrimp are a component of the planktonic crustacea within seasonal temporary pools and can occur in densities as high as 200 per liter of water. Predator consumption of fairy shrimp cysts (resting eggs) aids in distributing populations of fairy shrimp. Predators expel viable cysts in their excrement, often at locations other than where they were consumed (e.g. Wissinger et al. 1999). If conditions are suitable, these transported cysts may hatch at the new location and potentially establish a new population. Cysts can also be transported in mud carried on the feet of animals, including livestock, that may wade through the habitat (USFWS 2007b).

Beyond inundation of the habitat, the specific cues for hatching are unknown (Eriksen and Belk 1999), although temperature is believed to play a large role. Typically, midvalley fairy shrimp mature in about 16 days when water temperatures reach at least 20 degrees Celsius (Eriksen and Belk 1999).

Vernal pool fairy shrimp commonly co-occur with the California linderiella (*Linderiella occidentalis*) and has also been reported co-occurring with the midvalley pool fairy shrimp (*Branchinecta mesovallensis*) (Eriksen and Belk 1999). In most cases, the vernal pool fairy shrimp does not co-occur with other fairy shrimp species and is not numerically dominant when other fairy shrimp species are present (Eng et al. 1990).

Threats

Vernal pool fairy shrimp are threatened by the same activities as other vernal pool invertebrates. These threats include the conversion of vernal pool habitat to agricultural lands and urban development, and stochastic extinction because of the small and isolated nature of remaining populations (U.S. Fish and Wildlife Service 1994). The limited and disjunct distribution of vernal pools, coupled with the even more limited distribution of the vernal pool fairy shrimp, means that any reduction in vernal pool habitat quantity could adversely affect this species.

Recolonization opportunities are diminished when physical barriers, such as development or lack of vernal pool habitat, isolate populations from one another or inhibit transport of cysts. Isolated populations could be more susceptible to inbreeding depression, which can result in local extinction or reduced fitness (Gilpin and Soule 1986, Goodman 1987). However, this has never been demonstrated for branchiopod crustaceans.

Activities that alter the suitability of vernal pool habitat may impact the special-status crustaceans dependent on those habitats. These activities include damaging the impermeable clay and /or hardpan layers of the habitat bottom, filling in the habitat, and altering (e.g. through contaminants) or destroying the watershed that conveys overland flow into the habitat. Additionally, introduction of non-native plants, destruction or degradation of the surrounding upland habitat, introduction of fish (such as *Gambusia* spp.) into special-status shrimp habitats, and activities that would discourage or prevent waterfowl and waders from feeding at occupied habitats and thereby restrict gene flow between populations would also significantly affect mid-valley fairy shrimp populations.

Modeled Habitat Distribution in Study Area

Model Assumptions

The vernal pool fairy shrimp habitat model includes all seasonal wetlands that were identified within the study area. Vernal pools and other suitable microhabitats occur at too small a scale to be mapped in the area (e.g., vernal pools are subsumed within “seasonal wetlands”). However, data from vernal pool surveys (Holland 1996), critical habitat and core recovery areas listed in the USFWS recovery plan were added to the potential habitat figure (Figure D-6) for vernal pool fairy shrimp.

Model Results

Figure D-6 in Appendix D shows the modeled potential habitat for the vernal pool fairy shrimp within the study area. The modeled potential habitat for the vernal pool fairy shrimp can be found in Appendix D. The model fits the known occurrences from the CNDDB well, in Alameda County. Due to the ephemeral nature of vernal pool habitats it is likely that the model underestimates potential habitat in the study area. During wet years habitat for vernal pool species would be more extensive than in dry years.

Callippe Silverspot Butterfly

Distribution

The Callippe silverspot is federally listed as endangered. The Callippe silverspot (*Speyeria callippe callippe*) is endemic to the San Francisco Bay area and is best known from San Bruno Mountain in San Mateo County. Historically, populations occurred on the west side of San Francisco Bay from Twin Peaks in San Francisco to the vicinity of La Honda in San Mateo County (Arnold 2008). In the East Bay, populations were known from northwestern Contra Costa County southward to the Castro Valley area of Alameda County (Arnold 2008).

Additional populations of the species *S. callippe* occur in the Sky Valley-Lake Herman area of southern Solano County and in the north central and northeastern portions of Alameda County (Arnold 1981; Murphy and Weiss 1990). Since 1988, callippe silverspot butterflies have been recorded at San Bruno Mountain and Sign Hill near South San Francisco (San Mateo County), in the hills near Pleasanton (Alameda County), at Sears Point (Sonoma County), and in the hills between Vallejo and Cordelia (USFWS online 02/09/09).

Currently the only population known on the San Francisco Peninsula is at San Bruno Mountain, while populations in the East Bay are limited to southern Solano County and the Pleasanton-Sunol areas (Arnold 1981). A closely related subspecies, *S. callippe comstocki*, is difficult to distinguish from *S. callippe callippe* and is known to occur in the San Francisco Bay area. Critical habitat for the Callippe silverspot, designated July, 1978. There is no designated critical habitat in the study area (78 CFR 28938-28945).

There are no CNDDB occurrences in the study area (CNDDB 2009), but there have been records in the hills near Pleasanton (USFWS online 02/09/09)

Ecology

The callippe silverspot butterfly occurs in grasslands where its sole larval food plant, johnny jump-up (*Viola pedunculata*), grows. It has been observed in both grazed and ungrazed grasslands. The callippe silverspot butterfly occurs in hilly terrain with a mixture of topographic relief. Adults will visit the margins of oak woodlands and riparian areas in search of nectar, as well as disturbed areas if favored nectar plants grow there (Arnold 1981). The three primary habitat requirements of the callippe silverspot butterfly are:

- grasslands supporting its larval food plants;
- hilltops near suitable habitat for mate location; and
- nectar plants, which can occur in grasslands or nearby oak woodlands, riparian areas, or disturbed areas.

Because the butterfly has been observed flying distances of approximately 1 mile (Thomas Reid Associates 1981), these three habitat features do not necessarily have to be adjacent to each other.

The adult flight season is about 6 to 8 weeks in length, starting in mid-May and terminating in mid-July. When available, the adult silverspot feed on nectar plants including mints, especially *Monardella*, and thistles, such as *Silybum*, *Carduus*, and *Cirsium*, and buckeyes (*Aesculus*) (Arnold 1981). Adults tend to congregate on hilltops, a behavior known as hilltopping, where they search for potential mates.

Because the leaves of *Viola pedunculata* are typically dry by the start of the adult flight season, females frequently lay their eggs in or near areas where *Viola* grows. For this reason, newly hatched larvae do not feed before they find a suitable diapause location. When *Viola* sprouts during the following winter, the larvae have to search for the food plant. Also, developing larvae usually feed at night, but crawl off of the food plant and hide nearby during the daytime. Thus, short distance dispersal, probably on the order of tens of feet, occurs routinely during the larval stage.

Threats

Loss and alteration of habitat, primarily through urbanization and habitat degradation by non-native plants, are some of the factors contributing to the decline of the callippe silverspot butterfly in the study area. Overgrazing can be detrimental, but properly managed grazing can enhance grassland habitat by preventing other species from outcompeting host plants (USFWS 1997). Increased frequency of fire may also be detrimental, but this impact would require further study. Other threats include trampling by hikers, bikers and equestrians (Arnold 1981). Dust from quarrying operations has been reported as a threat to the species, because abundant dust could clog the spiracles of larvae and adults, interfering with their respiration (USFWS 1997). Callippe silverspot butterflies are also very sensitive to pesticide use.

Modeled Habitat Distribution in Study Area

Model Assumptions

The potential habitat model shown in Figure D-7 includes all native and annual grassland habitats within its historic range, which includes the Pleasanton-Sunol-Castro Valley areas of Alameda County (Arnold 2004). The range was extended to the edge of eastern Livermore to account for potential habitat that has been previously unsurveyed.

Model Results

Figure D-7 in Appendix D shows the modeled potential habitat for the Callippe silverspot butterfly based on suitable grassland habitat and previously published ranges. Since there are no occurrence data to corroborate this model, any potential habitat shown would need to be surveyed for the presence of host plants, first, and then for the presence of the butterfly to determine whether an area provides habitat for the species.

California Tiger Salamander

Distribution

The California tiger salamander is divided into three distinct population segments (DPS) and each has a separate designation under the federal ESA. The Sonoma DPS and Santa Barbara DPS are listed as federally endangered. The Central California DPS (which overlaps with the study area) is federally threatened. The California tiger salamander is also state listed as threatened (50 CFR 47212-47248, August 4, 2004) (California Department of Fish and Game, February 5, 2009).

The California tiger salamander is endemic to California. Historically, the California tiger salamander probably occurred in grassland habitats throughout much of the state. Although this species still occurs within much of its historic range, it has been extirpated from many areas it once occupied (Fisher and Shaffer 1996, Stebbins 1995). The loss of California tiger salamander populations has been primarily due to habitat loss within their historic range (Fisher and Shaffer 1996).

Based on genetic analysis, there are six populations of California tiger salamanders, distributed as follows: (1) Santa Rosa area of Sonoma County, (2) Bay Area (central and southern Alameda, Santa Clara, western Stanislaus, western Merced, and the majority of San Benito counties), (3) Central Valley (Yolo, Sacramento, Solano, eastern Contra Costa, northeast Alameda, San Joaquin, Stanislaus, Merced, and northwestern Madera counties), (4) southern San Joaquin Valley (portions of Madera, central Fresno, and northern Tulare and Kings counties), (5) Central Coast range (southern Santa Cruz, Monterey, northern San Luis Obispo, and portions of western San Benito, Fresno, and Kern counties), and (6) Santa Barbara County (Shaffer and Trenham 2005).

Most populations occur at elevations below 1,500 feet, but California tiger salamanders have been recorded at elevations up to 3,660 feet (Trenham pers. comm.). Although populations have declined, the species continues to breed at a large number of locations within its current range (59 FR § 18353–18354, April 18, 1994). At most historic breeding sites below 200 feet elevation, ponds remain present but are typically occupied by non-native species and no longer support California tiger salamanders (Fisher and Shaffer 1996).

Occurrence in Study Area

There are 136 occurrences within the study area on both private and public lands (EBRPD, Carnegie SVRA, SFPUC watershed lands, Lawrence Livermore Laboratories) (CNDDB 2009). Occurrences on EBRPD land include Frick Lake, Del Valle Reservoir, Sunol Regional Wilderness, Pleasanton Ridge Regional Park

(Bobzien and DiDonato 2007). Critical habitat (CV-18) has been designated within the study area, north of Livermore (70 FR 49379-49458; August 23, 2005).

Ecology

California tiger salamanders require two major habitat components: aquatic breeding sites and terrestrial upland sites. California tiger salamanders inhabit valley and foothill grasslands and the grassy understory of open woodlands, usually within one mile of water (Jennings and Hayes 1994). Following metamorphosis California tiger salamanders are terrestrial animals that spend most of their time underground in subterranean refuge sites. Underground retreats are usually California ground squirrel (*Spermophilus beechyi*) or pocket gopher (*Thomomys bottae*) burrows and, occasionally, human-made structures. Adults emerge from underground to breed, but only for brief periods during the year. California tiger salamanders breed and lay their eggs primarily in vernal pools and other ephemeral ponds that fill in winter and often dry out by summer (Loredo et al. 1996); they sometimes use permanent human-made ponds (e.g., stock ponds), reservoirs, and small lakes that do not support predatory fish or bullfrogs (Stebbins 1995, Zeiner et al. 1988). Streams are rarely used for reproduction.

Adult salamanders migrate from upland habitats to aquatic breeding sites during the first major rainfall events of early winter and return to upland habitats after breeding. This species requires small-mammal burrows for cover during the non-breeding season and during migration to and from aquatic breeding sites (Zeiner et al. 1988). California tiger salamanders also use logs, piles of lumber, and shrink-swell cracks in the ground for cover (Holland et al. 1990). California tiger salamanders have been documented up to 1.3 miles from their breeding sites (Jennings and Hayes 1994; USFWS 2004, Trenham and Shaffer 2005).

The California tiger salamander is particularly sensitive to the duration of ponding in aquatic breeding sites. Because at least 10 weeks are required to complete metamorphosis, aquatic sites that are considered suitable for breeding should retain water for a minimum of 10 weeks; these tend to be larger pools. Large vernal pool complexes, rather than isolated pools, probably offer the best quality habitat; these areas can support a mixture of aquatic breeding sites and nearby upland refuge sites (Shaffer et al. 1994, Jennings and Hayes 1994).

Aquatic larvae feed on algae, small crustaceans, and small mosquito larvae for about six weeks after hatching (U.S. Fish and Wildlife Service 2000a). Larger larvae feed on zooplankton, amphipods, mollusks, and smaller tadpoles of Pacific treefrogs (*Pseudacris regilla*), California red-legged frogs (*Rana aurora draytoni*), western toads (*Bufo boreas*) and spadefoot toads (*Spea* spp.) (Zeiner

et al. 1988, U.S. Fish and Wildlife Service 2000a). Adults eat earthworms, snails, insects, fish, and small mammals (Stebbins 1972).

Dispersal of juveniles from natal ponds to underground refuge sites could occur throughout the year. While juveniles will move short distances from breeding ponds once they start to dry up in the late spring and summer, longer distances from breeding ponds are attained during rainy periods.

California tiger salamander larvae and embryos are susceptible to predation by fish, herons and egrets, bullfrogs, and possibly garter snakes (Shaffer and Fisher 1991, Shaffer and Stanley 1992, Shaffer et al. 1993, Shaffer et al. 1994). Because of their secretive behavior and limited periods above ground, adult California tiger salamanders have few predators (U.S. Fish and Wildlife Service 2000a).

Threats

California tiger salamander populations have declined as a result of two primary factors: widespread habitat loss and habitat fragmentation. Residential development and land use changes in the California tiger salamander's range have removed or fragmented vernal pool complexes, eliminated refuge sites adjacent to breeding areas, and reduced habitat suitability for the species over much of the Central Valley (Barry and Shaffer 1994, Jennings and Hayes 1994). Grading activities have probably also eliminated large numbers of salamanders directly (Barry and Shaffer 1994).

Non-native species (bullfrogs, Louisiana red swamp crayfish, and non-native fishes (mosquitofish, bass, and sunfish)) prey on tiger salamander larvae and may eliminate larval populations from breeding sites (Jennings and Hayes 1994, USFWS 2000). Rodent control through destruction of burrows and release of toxic chemicals into burrows can cause direct mortality to individual salamanders and may result in a decrease of available habitat (USFWS 2000a).

Vehicular-related mortality is an important threat to California tiger salamander populations (Barry and Shaffer 1994, Jennings and Hayes 1994). California tiger salamanders readily attempt to cross roads during migration, and roads that sustain heavy vehicle traffic or barriers that impede seasonal migrations may have impacted tiger salamander populations in some areas (Shaffer and Fisher 1991, Shaffer and Stanley 1992, Barry and Shaffer 1994). Hybridization between California tiger salamander and an introduced congener, *A. tigrinum*, has been documented and may be extensive (Riley et al. 2003).

Modeled Habitat Distribution in Study Area

Model Assumptions

California tiger salamanders require two major habitat components: aquatic breeding sites and upland or refuge sites.

1. Breeding and Foraging

Potential breeding habitat within the study area is assumed to be all ponds, perennial freshwater marshes, alkali wetlands and seasonal wetlands within riparian, grassland, oak woodland, and conifer woodland land cover types, up to 3,660 feet in elevation. This species sometimes use permanent human-made ponds (e.g., stock ponds), reservoirs, and small lakes that do not support predatory fish or bullfrogs (Zeiner et al. 1988). Streams are rarely used for reproduction.

2. Upland Refuge Sites and Dispersal Habitat

Upland habitats that provide subterranean refuge sites for this species are assumed to be within 1.3 miles of primary habitat (USFWS 2004) in grassland, chaparral and coastal scrub, oak woodland, riparian forest/scrub, riparian forest/woodland wetlands, conifer woodlands, and agricultural areas, except for urban, rural, residential, landfill and canal/aqueduct cover types.

Model Results

Figure D-8 in Appendix D shows the modeled potential habitat for the California tiger salamander within the plan area. The model output designates breeding habitat and bases upland and dispersal habitat on known movement distances from that habitat. Suitable habitat for this species is spread evenly throughout the undeveloped portions of the study area, primarily due to the even distribution of stock ponds and other aquatic habitat. Upland and dispersal habitat covers most of the non-urbanized plan area. The known occurrences of this species fall within the modeled habitat. Due to the seasonal nature of most aquatic breeding habitat (e.g. vernal pools), breeding habitat may be under mapped. Site specific conditions should be surveyed to determine whether habitats on the site would support California tiger salamander.

California Red-Legged Frog

Distribution

The California red-legged frog is federally listed as threatened and is a California species of special concern. The taxon is known from isolated locations in the Sierra Nevada, North Coast, and northern Transverse Ranges. It is relatively common in the San Francisco Bay area and along the central coast. The California red-legged frog is believed to be extirpated from the floor of the Central Valley (USFWS 2002). California red-legged frogs occupy many areas of suitable habitat throughout Alameda County (USFWS 2002; CNDDDB 2009).

Occurrence in Study Area

There are 124 occurrences within the study area, many within small farm and stock ponds, as well as creeks and drainages (CNDDDB 2009). California red-legged frogs occur at Brushy Peak Regional Preserve, Del Valle Reservoir, Ohlone Regional Wilderness, Pleasanton Ridge Regional Park and Sunol Regional Wilderness (Bobzien and DiDonato 2007). The study area is within the East San Francisco Bay core area (USFWS 2002). Over two thirds of the study area has been designated as critical habitat (75 FR 12815 to 12959; March 17, 2010). The study area contains the following critical habitat units: CCS-2, ALA-2, and the eastern portions of ALA-1A and ALA-1B.

Ecology

California red-legged frogs use a variety of habitat types; these include various aquatic systems as well as riparian and upland habitats (USFWS 2002). However, they may complete their entire life cycle in a pond or other aquatic site that is suitable for all life stages (66 Federal Register [FR] 14626). California red-legged frogs inhabit marshes; streams; lakes; ponds; and other, usually permanent, sources of water that have dense riparian vegetation (Stebbins 2003). The highest densities of frogs are found in habitats with deepwater pools (at least 2.5 feet deep) with dense stands of overhanging willows (*Salix* sp.) and a fringe of tules (*Scirpus* sp.) or cattails (*Typha* sp.) (Jennings 1988; Jennings and Hayes 1994). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergent vegetation. Although red-legged frogs can inhabit either ephemeral or permanent streams or ponds, populations probably cannot be maintained in ephemeral streams in which all surface water disappears (Jennings and Hayes 1994).

As adults, California red-legged frogs are highly aquatic when active but depend less on permanent water bodies than do other frog species (USFWS 2002). Adults may take refuge during dry periods in rodent holes or leaf litter in

riparian habitats (USFWS 2002). Adult California red-legged frogs have been observed using large cracks in the bottom of dried ponds as refugia (Alvarez 2004). Although red-legged frogs typically remain near streams or ponds, marked and radio-tagged frogs have been observed to move more than two miles through upland habitat. These movements are typically made during wet weather and at night (USFWS 2002).

California red-legged frogs typically lay their eggs in clusters around aquatic vegetation from December to early April (Jennings 1988). Larvae undergo metamorphosis 3.5–7 months after hatching (Jennings and Hayes 1990). However, larvae have been observed to take more than a year to complete metamorphosis in four counties in the central coast of California (Fellers et al. 2001).

Threats

The decline of the California red-legged frog is attributable to a variety of factors. Large-scale commercial harvesting of red-legged frogs led to severe depletions of populations at the turn of the century (Jennings and Hayes 1985). Subsequently, exotic aquatic predators such as bullfrogs, crayfish, and various species of predatory fish became established and contributed to the continued decline of the species (Hayes and Jennings 1986). Habitat alterations such as conversion of land to agricultural and commercial uses, reservoir construction which effects downstream riparian environments, and in some places unauthorized off-highway vehicle use threaten remaining populations (Zeiner et al. 1988, Jennings and Hayes 1994).

Modeled Species Distribution in Study Area

Model Assumptions

Breeding and Foraging Habitat

All perennial freshwater marsh, seasonal wetland, ponds (natural and man-made), rivers and habitat within 150 feet of these, up to an elevation of 3500 feet, were considered potential breeding and foraging habitat for California red-legged frog. Within the study area, stock ponds may be used as breeding sites by this species. All existing ponds and streams within the area were, therefore, considered potential suitable breeding habitats for California red-legged frogs.

Movement and Refuge Sites

All grassland, chaparral and coastal scrub, oak woodland, riparian forest/scrub, conifer woodland, and agriculture land cover types beyond 150 feet but within 2

miles of breeding and foraging habitat are characterized as movement and refuge habitat. This is habitat that might be used by individuals during seasonal movements between breeding and summer habitat.

During dry weather, California red-legged frogs likely remain in or near water. However, as ponds dry out, these frogs disperse from their breeding sites to other areas with water or to temporary shelter or aestivation sites. This latter habitat may include small mammal burrows, incised stream channels, shelter under boulders, rocks, logs, leaf litter, agricultural drains, watering troughs, abandoned sheds, or unused farm equipment (Jennings and Hayes 1994). Dispersal distances are believed to depend on the availability of suitable habitat and prevailing environmental conditions, and may be up to 1.7 miles (2.8 km) (Fellers and Kleeman 2007). Because the actual movement patterns of California red-legged frogs in these habitats is generally not known, for this model it was conservatively estimated that all non-urban land cover areas within a radius of two miles from all potential breeding sites were potential migration and/or aestivation habitats for California red-legged frogs.

Model Results

Figure D-9 in Appendix D shows the modeled potential habitat for the California red-legged frog within the study area. Due to the abundance of aquatic habitat in the moderate to high elevations of the study area the associated upland refuge sites and dispersal habitat covers most of the study area. The known occurrences of this species fall within the modeled habitat.

Foothill yellow-legged frog

Distribution

Historically, foothill yellow-legged frogs occurred from west of the crest of the Cascade mountains in Oregon south to the Transverse ranges in Los Angeles County, and in the Sierra Nevada foothills south to Kern County (Stebbins 2003). The known elevation range of the species extends from near sea level to approximately 2,040 meters (6,700 feet) above sea level (Stebbins 2003). The current range excludes coastal areas south of northern San Luis Obispo County and foothill areas south of Fresno County, where the species is apparently extirpated (Jennings and Hayes 1994). The foothill yellow-legged frog is still common along the north coast of California (G. Fellers cited by Stebbins and Cohen 1995). Fellers (1994) reported healthy, reproducing populations throughout suitable habitat in the Diablo Range in Alameda, western Stanislaus, Santa Clara, San Benito, and western Fresno counties.

Occurrences in Conservation Strategy Area

Of the six CNDDB occurrences within the Conservation Strategy Area, four were within Alameda Creek; one was located in the headwaters of Corral Hollow Creek; and one at Arroyo Mocho, upstream of the Hetch-Hetchy pumping station bridge (CNDDB 2009). Foothill yellow-legged frogs are also found in Sunol Regional Wilderness and Ohlone Regional Wilderness (Bobzien and DiDonato 2007).

Ecology

Foothill yellow-legged frogs are a highly aquatic amphibian, spending most or all of their life in or near streams, though frogs have been documented underground and beneath surface objects more than 50 meters (165 feet) from water (Nussbaum et al. 1983). Foothill yellow-legged frogs require shallow, flowing water in small to moderate-sized streams with at least some cobble-sized substrate (Hayes and Jennings 1988, Jennings 1988). This species has been found in streams without cobble (Fitch 1938), but it is not clear whether these habitats are regularly used (Hayes and Jennings 1988, Jennings and Hayes 1994). Foothill yellow-legged frogs are usually absent from habitats where introduced aquatic predators, such as various fishes and bullfrogs, are present (Hayes and Jennings 1986, Kupferberg 1994). The species deposits its egg masses on the downstream side of cobbles and boulders over which a relatively thin, gentle flow of water exists (Fitch 1936, Kupferberg 1996).

Garter snakes are predators on foothill yellow-legged frog tadpoles (Jennings and Hayes 1994). Salamanders, including the rough-skinned newt (*Taricha torosa*), are believed to prey on the species' eggs.

Threats

Threats include stream scouring (which may negatively impact frogs in streambed hibernation sites), introduced incompatible aquatic animals, riverine and riparian impacts of nonselective logging practices, and stabilization of historically fluctuating stream flows. Poorly timed water releases from upstream reservoirs can scour egg masses of this species from their oviposition substrates (Jennings and Hayes 1994), and decreased flows can force adult frogs to move into permanent pools, where they may be more susceptible to predation (Hayes and Jennings 1988). Introduced predators include bullfrog larvae (Kupferberg 1997) and centrarchid fishes (e.g., bass) (Morey 2005). Other threats include airborne agrochemicals (Davidson et al. 2002), habitat destruction, climate change, and UV-B radiation.

Modeled Species Distribution in Study Area

Model Description

Model Assumptions

Breeding and Foraging Habitat

All perennial rivers and streams in all land cover types except as they pass through urban, rural residential and landfill land covers were determined to be potential habitat. Foothill yellow-legged frogs are stream-dwelling amphibians that require shallow, flowing water in small to moderate-sized perennial streams with at least some cobble-sized substrate, but occasionally found in perennial streams without cobble (Hayes and Jennings 1988, Jennings 1988, H.T. Harvey and Associates 1999).

Upland/Movement Habitat

The species has been documented up to 165 feet from water (Zeiner et al. 1988). A buffer of 165-feet around all breeding and foraging habitat was considered upland habitat.

Model Results

Figure D-10 in Appendix D shows the modeled potential habitat for the foothill yellow-legged frog within the study area. Suitable habitat appears to be present in all areas that maintain some perennial stream flow at moderate elevations. This includes nearly all streams in the study area with the exception of the very small tributaries and some heavily modified stream channels on the valley floor. The known occurrences in the study area fall within the modeled habitat. Since it is unknown which streams are perennial during most years and which of those have cobblestone substrate, the model likely overestimates foothill yellow-legged frog habitat substantially. Site surveys would need to verify whether each stream was suitable for the species.

Alameda Whipsnake

Distribution

The Alameda whipsnake is a federally and state listed as threatened. The Alameda whipsnake's range is restricted to the inner Coast Range in western and central Contra Costa and Alameda Counties (U.S. Fish and Wildlife Service 2000). The historical range of the Alameda whipsnake has been fragmented into five disjunct populations (U.S. Fish and Wildlife Service 1997): Tilden–Briones, Oakland–Las Trampas, Hayward–Pleasanton Ridge, Sunol–Cedar Mountain, and the Mount Diablo–Black Hills (U.S. Fish and Wildlife Service 1997).

Occurrences within the Conservation Strategy Area

Of the four CNDBB occurrences (CNDBB 2009), one is located in the northern portion of the study area, southwest of Dublin (CNDBB 2009). Three CNDBB occurrences are located in the southern portion of the study area (CNDBB 2009). In addition to the CNDBB occurrences, in the northern portion of the study area, two documented occurrences occur in the vicinity of the Alameda county –Contra Costa County border (Tri-Valley Conservancy 2009). The Brushy Peak Regional Preserve contains several unconfirmed observations of Alameda whipsnake and the habitat in this area is considered suitable (Tri-Valley Conservancy 2008, Swaim pers. comm.). Areas adjacent to Brushy Peak (especially north and south of Frick Lake) have been identified as high priority areas (Tri-Valley Conservancy 2008).

Four recovery units are located within the study area: Hayward-Pleasanton Ridge, Sunol-Cedar Mountain, Mount Diablo/Black Hills and Niles Canyon-Sunol Corridor (U.S. Fish and Wildlife Service 1997).

Designated critical habitat occurs in three parts of the study area, south of Highway 580: East of highway 680 on the north of 580 (AWS-3); south of 580 on the east side of the county (AWS-5A) and south of 580 on the west side of the county (AWS-5B) (USFWS 71 FR 58175 to 58231; October 2, 2006).

Ecology

The Alameda whipsnake occurs primarily in coastal scrub and chaparral communities, but also forages in a variety of other communities in the inner Coast Range, including grasslands and open woodlands (Swaim 1994). Rock outcrops with deep crevices or abundant rodent burrows are important habitat components for overnight dens, refuges from predators and excessive heat, foraging, egg laying and winter hibernacula (winter residence where snakes

hibernate) (Swaim 1994, USFWS 2000b). Suitable habitat for this species includes communities that support mixed chaparral, coastal scrub, and annual grassland and oak woodlands that are adjacent to scrub habitats (USFWS 2000b). Grassland areas that are linked to scrub by rock outcrops or river corridors are also considered primary constituent elements for the species (USFWS 2000b).

Whipsnake habitat must consist of a mix of sunny and shady sites in order to provide a range of temperatures for the snake's activities (Swaim 1994, U.S. Fish and Wildlife Service 2000b). A sparse shrub canopy is ideal because it also provides a visual barrier from avian predators (Swaim 1994). The Alameda whipsnake is non-migratory. Alameda whipsnakes spend November through March in a winter hibernaculum (U.S. Fish and Wildlife Service 2000b).

Mating occurs from late March through mid-June (U.S. Fish and Wildlife Service 2000b). Whipsnakes lay a clutch of 6 to 11 eggs (Stebbins 1985), probably in loose soil or under logs or rocks (Zeiner et al. 1988). According to Swaim (1994), female Alameda whipsnakes will use grassland habitat for egg laying.

Whipsnakes prey on a variety of vertebrate species, including frogs, lizards, nestling birds, and rodents (Zeiner et al. 1988). Studies indicate that the Alameda whipsnake prefers lizard prey and may be an example of a feeding specialist. Rock outcrops are particularly important foraging habitat for the Alameda whipsnake because they support many of the species' prey (U.S. Fish and Wildlife Service 2000b). Additionally, the Alameda whipsnake has been observed foraging in grassland habitats adjacent to native Diablan sage scrub habitats (Swaim 1994).

Diurnal predators, especially raptors, prey on adult Alameda whipsnakes. Nocturnal mammals likely prey on Alameda whipsnake eggs (Zeiner et al. 1988). Basking in open terrain may expose snakes to predators such as red-tailed hawks (Fitch 1949 in Swaim 1994).

Threats

Alameda whipsnake populations have declined from loss of habitat resulting from urban expansion (U.S. Fish and Wildlife Service 2000b). Urban development, particularly road and highway construction, has also fragmented Alameda whipsnake populations and made them more vulnerable to extinction (U.S. Fish and Wildlife Service 1997). Urban development adjacent to whipsnake habitat increases the likelihood of predation from feral cats and injury or death from public recreational use. Other significant threats to this species' recovery include inappropriate grazing practices which remove shrub cover and reduce grass cover, and alteration of habitat through fire suppression (U.S. Fish and Wildlife Service 1997).

Fire suppression alters suitable Alameda whipsnake habitat by increasing the likelihood of large catastrophic fires occurring in areas where vegetation has become overgrown or by creating a closed scrub canopy which tends to reduce the diversity of microhabitats that whipsnakes require (Swaim 1994).

Incompatible land uses include fire suppression, off-road vehicle use, some grazing practices, unauthorized collecting and mining.

Species Distribution in Study Area

Due to the nuances of Alameda whipsnake habitat in the study area, specific model parameters were not able to be distinguished. Recovery units described above and shown in Figure D-11 were used to delineate potential Alameda whipsnake habitat within the study area. Mitigation guidance and conservation planning for the Alameda whipsnake will be determined based on these Recovery Units. The presence or absence of Alameda whipsnakes or suitable habitat for Alameda whipsnake will ultimately need to be determined through an on-the-ground habitat assessment.

Central California Coast Steelhead

Distribution

The historical range of central California coast steelhead includes coastal streams from the Russian River south to and including Soquel Creek in Santa Cruz County. This includes the stream tributaries of the San Francisco Bay and San Pablo Bay basins. Central California coast steelhead is still present in most of the coastal streams in their historic range, though abundance may be reduced and/or distribution within individual basins may be restricted. See Figure 2-10 for the range map of the central California coast steelhead distinct population segment (DPS).

Occurrences within the Study Area

Current distribution of central California coast steelhead is up to the Bay Area Rapid Transit (BART) weir, located in the Lower Alameda Creek flood control channel, which is the lowermost barrier in Alameda Creek. However, rainbow trout occur throughout the Alameda watershed including the upper watershed, which is in the study area. The occurrence of all life stages (juveniles and adults) in the upper watershed suggests suitable rearing and spawning habitat is available in the study area. Trout were found in: Niles Canyon, Upper Alameda Creek and Little Yosemite Creek, Upper Alameda Creek above Alameda Diversion, Indian Joe Creek, La Costa Creek, San Antonio Creek, and Arroyo Hondo Creek (Gunther et al 2000).

Ecology

Smith (1999) describes two different habitat types used by central California coast steelhead and resident trout. The primary habitat consists of shaded pools of small, cool, low-flow upstream reaches typical of the original steelhead habitat in the region. In addition, they use warm water habitats below some dams or pipeline outfalls, where summer releases provide high summer flows and fast-water feeding habitat. Trout metabolic rate and thus food demand increases with temperature. Trout rely heavily on insect drift for food, and drift increases with flow velocity. Under conditions of low flow and high temperatures, trout have increasing difficulty obtaining sufficient food to meet metabolic costs.

Steelhead select spawning sites with gravel substrate and sufficient flow velocity to maintain circulation through the gravel, providing a clean, well-oxygenated environment for incubating eggs. Preferred flow velocity is in the range of 1 to 3 feet per second (Raleigh et al 1986). Preferred gravel substrate is in the range

of 0.25 to 4 inches in diameter for steelhead, and 0.25 to 2.5 inches in diameter for resident rainbow trout (Bjornn and Reiser 1991).

After emergence from the gravel, fry inhabit low velocity areas along the stream margins. As they feed and grow, they gradually move to deeper and faster water. In central California streams, steelhead typically rear for one or two years. Cover is provided by boulders, undercut banks, logs, or other objects. Heads of pools generally provide classic conditions for older trout. Trout can inhabit very small streams, particularly in coastal areas.

Steelhead along the central California coast enter freshwater to spawn from late October through the end of May, with peaks between mid-December and mid-April (Shapovalov and Taft 1954).

In the Bay Area, trout are typically found in clear, cool, shaded portions of the middle or upper reaches of perennial streams in relatively undisturbed watersheds. In headwater streams, the gradient is relatively high, water is usually clear, and streams are well shaded, have relatively cold temperatures, (seldom exceeding 21° C), and are saturated with oxygen. The lower extent of trout distribution is regulated largely by temperature. In freshwater habitats, steelhead parr and rainbow trout feed primarily on small invertebrates. Juveniles, particularly fry, are vulnerable to predation by birds including kingfishers, mergansers, green herons, great blue herons, and night herons. Garter snakes also prey on juveniles, as do raccoons, particularly in situations where fish are trapped in isolated pools during the dry season.

Abundance estimates for the central California coast steelhead are poor. Juveniles in this DPS have been observed in 82 percent of streams in which it was historically found, but their abundance has decreased. Due to impassable dams in some basins, which have limited access to historical spawning areas, National Marine Fisheries Service predicts that this DPS will become “endangered within the foreseeable future” (71 FR 852 January 5, 2006).

Threats

Urbanization, particularly in lower watershed areas, has resulted in habitat degradation and has created migration barriers where streams have been modified for flood control, placed in long underground culverts, bridged, culverted, and channelized. Urbanization has also altered patterns of stream flow due to decreased drainage efficiency, increases in impervious areas, and in some cases, increased summer irrigation. Water supply projects have also altered stream flow through water diversion, storage, and water delivery projects. Dams for water supply or recreational use have eliminated access to many headwater areas important to steelhead and rainbow trout. Watershed activities, especially urbanization, have increased delivery of fine sediments to

streams and have lead to the deterioration of substrate conditions for spawning and food availability. Increased water diversions by landowners have reduced summer baseflows in some areas. Expanded human populations have resulted in increased frequency of contact and higher levels of exploitation through poaching and even legal fishing activities. Climate change and particularly variation in ocean conditions may result in periods of lower productivity and reduced survival in the ocean environment for steelhead, particularly in California where they are near the southern edge of their range. Global increase in temperature threatens to alter both stream temperature and rainfall patterns with uncertain consequences.

Modeled Species Distribution in Study Area

Model Assumptions

Steelhead distribution in the study area was based on existing information on the potential for the species within the streams of eastern Alameda County.

Model Results

Figure D-12 shows the potential habitat for steelhead in the study area and areas of current use by rainbow trout. These areas will not be connected to ocean environments until downstream barriers are removed.

Golden Eagle

The golden eagle is considered a special-status species in California. It is protected by the federal Migratory Bird Treaty Act and the Bald and Golden Eagle protection Act. This species is also protected by California Fish and Game Code and is a Fully Protected Species by the State of California. It is considered a species of special concern by the California Department of Fish and Game.

Distribution

The golden eagle is predominately a western North American species ranging from northern Alaska through the western states and Great Plains to Mexico with some breeding and wintering locations in eastern North America (Kochert et al. 2002). Within California, the golden eagle is a year-round resident generally inhabiting mountainous and hilly terrain throughout the open areas of the state.

Occurrences Within the Study Area

Four golden eagle nest occurrences are reported in the CNDDDB, at Del Valle Reservoir, San Antonio Reservoir and Mission Peak Park and Lover's Peak in Sunol Regional Park (CNDDDB 2009). The four sites had nesting adults with fledglings (CNDDDB 2009). In addition, a pair nests along a tributary to Tassajara Creek, on the northwest side of the Dublin Ranch Development.

Ecology

Golden eagles use nearly all terrestrial habitats of the western states except densely forested areas. In the interior central Coast Ranges of California, golden eagles favor open grasslands and oak savanna, with lesser numbers in oak woodland and open shrublands (Hunt et al. 1998). Secluded cliffs with overhanging ledges and large trees are used for nesting and cover. Preferred territory sites include those that have a favorable nest site, a dependable food supply (medium to large mammals and birds), and broad expanses of open country for foraging. Hilly or mountainous country where takeoff and soaring are supported by updrafts is generally preferred to flat habitats (Johnsgard 1990). Deeply cut canyons rising to open mountain slopes and crags are ideal habitat (Kochert et al. 2002).

Breeding densities are directly related to territorial spacing and foraging requirements for the species. Territory size has been estimated to average 124 square kilometers (sq km) in northern California (Smith and Murphy 1973) but can vary largely with habitat conditions. Mating occurs from late January through August, with peak activity in March through July. Eggs are laid from

early February to mid-May. Clutch size varies from one to four eggs, but two is the most common size (Johnsgard 1990, Hunt et al. 1995). Incubation lasts 43–45 days (Kochert et al. 2002), and the fledging period is about 72–84 days (Johnsgard 1990). The young usually remain dependent on their parents for as long as eleven weeks afterward. Golden eagles are the top avian predator in the grassland/savanna ecosystem of the central Coast Range in California. They may directly compete with ferruginous hawks (*Buteo regalis*) and other smaller hawks for small mammals, and with California condors (*Gymnogyps californianus*) for carrion.

The species is relatively common in some areas of its range. Local threats or declines do not pose a major conservation problem from a population perspective (NatureServe 2006), though local populations could be effected by high mortality rates. This species was once a common resident throughout the open areas of California; numbers are now reduced near human population centers, but in general, populations seem stable (Remsen 1978). Within West Central California, including Alameda County, the golden eagle population is apparently stable (Hunt and Hunt 2006).

Threats

The primary existing threats to golden eagle survival throughout its range include loss or alteration of both foraging and nesting habitat. In California, this is due to reclamation of grasslands for agriculture, urbanization, and the elimination of annual grassland habitat. Human disturbance of nesting birds and fatalities caused by contact with infrastructure (e.g., power facilities, buildings, fences, wind turbines) also pose threats to this species. An analysis of the causes of fatalities in 61 golden eagles radio-tagged and recovered in the Diablo Range from January 1994 to December 1997 found that 37% were killed by wind turbine strikes, 16% by electrocution, and 5% by lead poisoning (Hunt et al. 1998). The remaining birds were lost due to shootings (2%), car strikes (5%), botulism (2%), territorial fights with other eagles (5%), collision with fences (3%), fledgling mishaps (10%), and other unknown factors (15%) (Hunt et al. 1998). A portion of the Altamont Pass Wind Resources Area is within the study area. As noted above wind turbines could be effected the local population of golden eagles due to high mortality rates.

Modeled Species Distribution in the Study Area

Model Assumptions

Nesting habitat

Traditional nesting sites as identified by researchers include secluded cliffs with overhanging ledges and large trees adjacent to suitable foraging habitat. Therefore, nesting habitat includes cliffs and large trees in oak woodland, riparian forest, and conifer woodland.

Foraging habitat

All land cover types (grassland, chaparral and coastal scrub, agriculture, cropland, ruderal) excluding those that have been designated as nesting habitat and any urban areas, orchards and vineyards.

Model Results

The suitable nesting habitat that is mapped for this species likely overestimates the potential for eagles to nest within the study area. All land cover types that could contain large trees have been included as nesting habitat but more site-specific information will be necessary to deduce whether a particular project might impact nesting golden eagles. The same is true for secluded cliffs that could provide nest sites. Foraging habitat is widespread in the study area and is depicted on Figure D-13. In general, golden eagles favor open grasslands and oak savanna, with fewer numbers in oak woodland and open shrublands (Hunt et al. 1998).

Figure D-13 in Appendix D shows the modeled potential habitat for the golden eagle within the study area. Potential nesting habitat is found throughout most of the southern and western portion of the study area. Most of the study area contains potential foraging habitat. The four golden eagle occurrences reported in the CNDDDB were included in the modeled potential habitat.

Tricolored Blackbird

The tricolored blackbird is considered a special-status species in California. It is protected by the federal Migratory Bird Treaty Act and by California Fish and Game Code. It is considered a species of special concern by the California Department of Fish and Game.

Distribution

Tricolored blackbirds are endemic to the west coast of North America and primarily to California. The species' historical breeding range in California included the Sacramento and San Joaquin Valleys, lowlands of the Sierra Nevada south to Kern County, the coast region from Sonoma County to the Mexican border, and sporadically on the Modoc Plateau (Neff 1937; Grinnell and Miller 1944). Though individuals move and utilize different habitats within the region, depending on time of year, long distance migration has not been verified in this species.

Tricolored blackbirds are largely endemic to California, and more than 99 percent of the global population occurs in the state (Beedy and Hamilton 1999). In any given year, more than 75 percent of the breeding population can be found in the Central Valley (Hamilton 2000). Small breeding populations also exist at scattered sites in Oregon, Washington, Nevada, and the western coast of Baja California (Beedy and Hamilton 1999).

Tricolored blackbirds are considered "itinerant breeders" (i.e., nomadic breeders) where individuals or colonies can breed in different regions within the same year (Hamilton 1998, Hamilton 2004). Breeding colonies of tricolored blackbirds often go unreported because of their similar appearance to the common red-winged blackbird (*Agelaius phoeniceus*).

Occurrences in the Study Area

Six tri-colored blackbird occurrences are listed in the CNDDB, at the following locations: Sunol Valley (approximately 1200 in 1971, 150 in 1994); along Altamont Pass Road, east of Dyer Road 45 adults observed nesting in 1992; east of Pleasanton (16 pair in 1980; Kaiser gravel pit); Arroyo del Valle, south west of Livermore (1974; possibly extirpated); Isabel gravel pits (1994); and a colony adjacent to California aqueduct, south end of Bethany Reservoir in 2003 (CNDDB 2009).

In 2005 there were three nesting colonies within the study area: Broadmoor pond (200 birds); northwest of Altamont Pass and Dyer Road (30 birds); and southwest of Altamont Pass and Dyer roads (25 birds) (Hamilton and Meese 2006).

Results of a 2008 census reported only one active colony in Alameda county, at Ames and Dolan roads near Livermore (April 27 2008, 27 nesting pairs) (Kelsey 2008). There were no nesting tricolored blackbirds at the following historic colony sites: Altamont Creek, Broadmoor Pond, Dagnino Road, Dyer Road, Laughlin Road, North Flynn Road, Vallecitos Lane (Kelsey 2008).

Ecology

Tricolored blackbirds have three basic requirements for selecting their breeding colony sites: open, accessible water; a protected nesting substrate, including either flooded, thorny, or spiny vegetation; and a suitable foraging space providing adequate insect prey within a few miles of the nesting colony (Hamilton et al. 1995; Beedy and Hamilton 1997, 1999). Almost 93 percent of the 252 breeding colonies reported by Neff (1937) were in freshwater marshes dominated by cattails and bulrushes (*Schoenoplectus* spp.). The remaining colonies in Neff's study were in willows (*Salix* spp.), blackberries (*Rubus* spp.), thistles (*Cirsium* and *Centaurea* spp.), or nettles (*Urtica* spp.).

An increasing percentage of tricolored blackbird colonies in the 1980s and 1990s were reported in Himalayan blackberries (*Rubus discolor*) (Cook 1996), and some of the largest recent colonies have been in silage and grain fields (Hamilton et al. 1995, Beedy and Hamilton 1997, Hamilton 2000). Other substrates where tricolored blackbirds have been observed nesting include giant cane (*Arundo donax*), safflower (*Carthamus tinctorius*) (DeHaven et al. 1975), tamarisk trees (*Tamarix* spp.), elderberry/poison oak (*Sambucus* spp. and *Toxicodendron diversilobum*), and riparian scrublands and forests (e.g., *Salix*, *Populus*, *Fraxinus*) (Beedy and Hamilton 1999). Ideal foraging conditions for tricolored blackbirds are created when shallow flood-irrigation, mowing, or grazing keeps the vegetation at an optimal height (<15 cm) (Tricolored Blackbird Working Group 2007). Preferred foraging habitats include agricultural crops such as rice, alfalfa, irrigated pastures, and ripening or cut grain fields (e.g., oats wheat, silage, and rice), as well as annual grasslands, cattle feedlots, and dairies. Tricolors also forage in remnant native habitats, including wet and dry vernal pools and other seasonal wetlands, riparian scrub habitats, and open marsh borders (Information Center for the Environment 2007).

As many as 20,000 or 30,000 tricolored blackbird nests have been recorded in cattail marshes of 4 hectares (9 acres) or less (Neff 1937; DeHaven et al. 1975), and individual nests may be built less than 0.5 meter (1.5 feet) apart (Neff 1937). Tricolored blackbird's colonial breeding system may have adapted to exploit a rapidly changing environment where the locations of secure nesting habitat and rich insect food supplies were ephemeral and likely to change each year (Orians 1961a; Orians and Collier 1963; Collier 1968; Payne 1969). During the breeding season, tricolored blackbirds exhibit itinerant breeding, commonly moving to different breeding sites each season (Hamilton 1998). In the

northern Central Valley and northeastern California, individuals move after their first nesting attempts, whether successful or unsuccessful (Beedy and Hamilton 1997). Banding studies indicate that significant movement into the Sacramento Valley occurs during the post-breeding period (DeHaven et al. 1975).

Wintering populations shift extensively within their breeding range in California (Beedy and Hamilton 1999). Concentrations of more than 15,000 wintering tricolored blackbirds may gather at one location and disperse up to 32 kilometers (20 miles) to forage (Neff 1937; Beedy and Hamilton 1999). Local, regional, and statewide tricolored blackbird populations have experienced major declines since 1994.

Threats

The greatest threats to this species are the direct loss and alteration of habitat; however, other human activities, as well as predation, also threaten tricolored blackbird populations in the Central Valley (Beedy and Hamilton 1999). Most native habitats that once supported nesting and foraging tricolored blackbirds have been altered by urbanization and unsuitable agricultural uses, including vineyards, orchards, and row crops (Hamilton et al. 1995; Beedy and Hamilton 1997). Many former agricultural areas within the historical range of tricolored blackbirds are now being urbanized. Nests and nest contents in cereal crops and silage are often destroyed by agricultural operations (Hamilton et al. 1995; Beedy and Hamilton 1997). Harvesting of silage and plowing of weedy fields are currently the most common reasons that tricolored blackbird nesting colonies are destroyed in agricultural areas. Typically tricolored blackbirds have not completed their nesting cycle when fields are plowed, creating a situations where birds are attracted to an area to breeding, because there is ample foraging opportunities, but then nests are destroyed as a result of the agricultural operations. California Audubon Society has worked with local land owners to delay plowing until tricolored blackbirds have completed their nesting cycle and moved out of the area. Financial incentives have been offered to land owners to offset the cost of a delayed harvest. Other factors that may affect the nesting success of colonies in agricultural areas include herbicide and pesticide applications, and spraying ponds for mosquito abatement (Beedy and Hamilton 1999). A primary reason for limited nesting success in agricultural areas (particularly in rice fields) is predation of fledgling by black-crowned night herons (*Nycticorax nycticorax*) (Hamilton 2004).

Modeled Species Distribution in the Study Area

Model Assumptions

More recent colonies have been observed in a diversity of upland and agricultural areas (Collier 1968, Cook 1996, Hamilton 2004), riparian scrublands and woodlands (Orians 1961, Hamilton et al. 1995, Beedy and Hamilton 1999). Small breeding colonies have been documented at public and private lakes, reservoirs, and parks surrounded by shopping centers, subdivisions, and other urban development. Adults from these colonies generally forage in nearby undeveloped upland areas. Beedy and Hamilton (1999) predict that these small, urban wetlands and upland foraging habitats may continue to accommodate tricolored blackbirds in the future unless they are eliminated entirely by development. High-quality foraging areas include irrigated pastures, lightly grazed grasslands, dry seasonal pools, mowed alfalfa fields feedlots, and dairies (Beedy and Hamilton 1999). Lower quality foraging habitats include cultivated row crops, orchards, vineyards, and heavily grazed rangelands.

Breeding habitat

Habitats suitable for breeding and foraging during the breeding season were modeled using freshwater marsh and ponds within grassland, oak woodland, riparian, agriculture, and golf course land cover types. In addition to CNDDB occurrences, historic colony locations were added to the figure (Online website: tricolor.ice.ucdavis.edu/node/2520, Accessed 03/25/09 (Appendix D)).

Year-round foraging habitat

Areas that provide suitable foraging and wintering habitats include seasonal wetlands, all grasslands, riparian, agricultural, golf courses, and rural-residential land cover types (Appendix D).

Model Results

Figure D-14 in Appendix D shows the modeled potential habitat for the tricolored blackbird within the study area. Breeding habitat is limited within the study area and it should be noted that by including all riparian areas the available breeding habitat is likely overestimated. Site specific conditions need to be verified to determine if these riparian areas currently provide breeding habitat. Breeding habitat will actually be limited to small ponds/wetlands that occur in slow water portions of these riparian corridors. Foraging habitat is prevalent throughout the area. Many historic colony sites and CNDDB occurrences are included within the modeled habitat.

Burrowing Owl

The burrowing owl is considered a special-status species in California. It is protected by the federal Migratory Bird Treaty Act and the California Fish and Game Code. It is considered a species of special concern by the California Department of Fish and Game.

Distribution

The burrowing owl is found throughout western North America, west of the Mississippi River and south into Mexico. In California, the range of burrowing owl extends through the lowlands south and west from north central California to Mexico, with small, scattered populations occurring in the Great Basin and the desert regions of the northeastern and southwestern part of the state, respectively (DeSante et al. 1997). They are absent from the coast north of Sonoma County and from high mountain areas such as the Sierra Nevada and the Transverse Ranges extending east from Santa Barbara County to San Bernardino County. Burrowing owls once occurred in suitable lowland habitats throughout the Bay Area (Grinnell and Miller 1944). This species utilized what was once vast open valley floors and low sloping foothills year round. Burrowing owl populations have been greatly reduced or extirpated from most of the San Francisco Bay Area (Trulio 1997) and along the California coast to Los Angeles.

Occurrences in the Study Area

There are 52 known occurrences of burrowing owls in the study area (CNDDB 2009). Of those, 36 are occurrence records from within the breeding season (February 1 to August 30). All occurrences are in the northern portion of the Strategy area, in open fields, annual grassland, grazed grassland, alkali sinks and in the vicinity of business developments (CNDDB 2009) (Appendix D).

Ecology

Throughout their range, burrowing owls require habitats with three basic attributes: open, well-drained terrain; short, sparse vegetation; and underground burrows or burrow facsimiles (Klute et al. 2003). During the breeding season, they may also need enough permanent cover and taller vegetation within their foraging range to provide them with sufficient prey, which includes large insects and small mammals (Wellicome 1997). Burrowing owls occupy grasslands, deserts, sagebrush scrub, agricultural areas (including pastures and untilled margins of cropland), earthen levees and berms, coastal uplands, and urban vacant lots, as well as the margins of airports, golf courses, and roads.

Burrowing owls typically select sites that support short vegetation, even bare soil, presumably because they can easily see over it. However, they will tolerate tall vegetation if it is sparse. Owls will perch on raised burrow mounds or other topographic relief such as rocks, tall plants, fence posts, and debris piles to attain good visibility (Haug et al. 1993).

This opportunistic feeder will consume arthropods, small mammals, birds, amphibians, and reptiles (Haug et al. 1993). Insects are often taken during the day, while small mammals are taken at night. In California, crickets and meadow voles were found to be the most common food items (Thomsen 1971).

Nocturnal foraging can occur up to several kilometers away from the burrow (Haug et al. 1993). In urban areas, burrowing owls are often attracted to streetlights, where insect prey congregates. Western burrowing owls most commonly live in burrows created by California ground squirrels (*Spermophilis beecheyi*). Burrowing owls may compete incidentally with other predators such as coyotes, other owls and hawks, skunks, weasels, and badgers for rodents and a variety of insects (Rosenberg et al. 1998).

Little information exists on the migration routes, timing of migration, and wintering areas, especially for the California population (DeSante et al. 1997).

Threats

The most immediate threats to the burrowing owl are the conversion of grassland habitat to urban and some agricultural uses (vineyards, orchards, and some row crops) and the loss of more suitable agricultural lands to development. Equally important is the loss of fossorial rodents, such as ground squirrels across much of the owl's historical habitat. Eradication programs have decimated populations of these rodents over time and have in turn disrupted the ecological relationships on which owls depend; because western burrowing owls typically need other animals to dig their burrows, the loss of fossorial rodents limits the extent of year-round owl habitat throughout their range (Haug et al. 1993).

Modeled Species Distribution in Study Area

Model Assumptions

Breeding and Overwintering Habitat

All annual grassland, serpentine bunchgrass grassland, and ruderal land cover types; and valley oak woodland, and blue oak woodland land cover types within 300 m of grassland were considered potential overwintering habitat, in areas where the slope was 0 to 25%.

Model Results

Figure D-15 in Appendix D shows the modeled potential habitat for the western burrowing owl within the study area. Suitable habitat is spread widely throughout the northern portion of the area. Some suitable habitat in developed areas may not show up in the output because it cannot be distinguished at this mapping resolution. These are typically small vacant lots or the margins of other land cover types. Most known occurrences fall within modeled habitat, but the range of the suitable habitat is large, and many areas that the model indicates as suitable have no owl occurrences. In all cases site specific conditions will dictate whether burrowing owls could be present. Protocol level nesting surveys are recommended to determine if burrowing owls are breeding on a site and how many owls the site supports. Other parameters that the model was not able to capture may be driving burrowing owl occurrence such as prey abundance.

American Badger

The American badger is considered a special-status species in California. It is considered a species of special concern by the California Department of Fish and Game.

Distribution

In North America, American badgers occur as far north as Alberta, Canada and as far south as central Mexico. Their distribution through the United States is expanding and presently extends from the Pacific Coast eastward to Texas, Oklahoma, Missouri, Illinois, Indiana, and Ohio (Long 1972, Williams 1986). The American badger has a broad altitudinal range, from below sea level at Death Valley up to 12,000 feet (3,660 meters) at the Arctic-Alpine Life Zone (Long 1972). In California, American badgers occur throughout the state except in humid coastal forests of northwestern California in Del Norte and Humboldt Counties (Williams 1986).

The American badger has been decreasing in numbers throughout California over the last century (Williams 1986). A distribution study for American badgers in California conducted through the 1970's and 1980's determined that there was no change in the overall range of this species since early in the century (Larson 1987). However, changes in the abundance of badgers in California could not be accurately determined by this study (Larson 1987).

Occurrences Within the Study Area

The eleven American badger occurrences listed in the CNDDB, were in the northern half of the study area (CNDDB 2009). Badgers occurred on short grass and dry pasture and some scrub habitat near Del Valle Reservoir and on Lawrence Livermore Laboratories and Department of Defense property (CNDDB 2009). One adult near a burrow and a female with two juveniles were observed at the DOD site (CNDDB 2009). One vehicle mortality was located on Kelso Road (CNDDB 2009).

Ecology

American badgers occur in a wide variety of open, arid habitats but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub (Stephenson and Calcarone 1999). The principal habitat requirements for this species appear to be sufficient food (burrowing rodents), friable soils, and relatively open, uncultivated ground (Williams 1986). American badgers are primarily found in areas of low to moderate slope (Stephenson and Calcarone 1999). Burrows are used for denning, escape, and predation on

burrowing rodents (Long 1973). A recent study in the Bay Area documented the use suburban areas as movement corridors between larger patches of grassland (T. Diamond, pers. comm.).

Young are born in burrows dug in relatively dry, often sandy, soil, usually in areas with sparse overstory. American badgers mate in summer and early autumn and young are born in March and early April (Long 1973). Juveniles may leave their natal grounds at 3 – 4 months of age, disperse up to 110 km, and use disturbed habitats and agricultural areas (Messick and Hornocker 1981).

Badgers are solitary animals, but they are not known to defend an exclusive territory (Long 1999). Typical population density is about 5 animals per square kilometer (Shefferly 1999). Although home range size varies according to geographic area, distribution of food resources, and season, the general range of this species is 395 acres – 2,100 acres (137 –850 hectares) (Lindzay 1978, Messick and Hornocker 1981, Sargeant and Warner 1972). Males occupy larger home ranges than females (2.4 versus 1.6 square kilometers).

American badgers are mostly nocturnal but also forage and disperse during the daytime (Lindzay 1978, Messick and Hornocker 1981). This species is active year round, except at high elevations and latitudes, where they become torpid during the winter. At lower elevations, the American badger in the winter exhibits reduced surface activity (Long 1973).

American badgers are carnivorous and are relatively opportunistic predators, feeding on a number of rodent species such as mice, chipmunks, ground squirrels, gophers, rabbits, and kangaroo rats (Zeiner et al. 1990). They will also eat reptiles, insects, birds and their eggs, and carrion (Williams 1986, Zeiner et al. 1990). The American badger is a ferocious fighter (Long 1973) and has very few predators. Predators include coyotes, golden eagles, mountain lions, bears and gray wolves throughout its range (Long 1973; Shefferly 1999).

Threats

Common threats to the American badger include habitat conversion to urban and agricultural uses, shooting and trapping, poisoning, automobile fatalities, and reduction of prey base from rodent control activities (Williams 1986). In the west, infill of formerly open woodlands and encroachment of forests into grassland as a result of effective fire suppression has eliminated or degraded much badger habitat (Natureserve 2009). Some populations are estimated to be up to 80% yearlings or young of the year, suggesting high mortality rates (Long 1999). Badgers may be attracted to roads, both because ground squirrels often burrow alongside them, and because they are good travel routes (T. Diamond, pers. comm.).

Modeled Species Distribution in Study Area

Model Assumptions

Denning and Movement

All grassland, alkali meadows/scalds, valley oak woodland, developed agriculture, cropland, ruderal and rural residential land cover types were considered suitable denning and foraging habitat for this species. Habitat patches smaller than 85 acres were not considered suitable habitat.

Model Results

Figure D-16 in Appendix D shows the modeled potential habitat of the American badger within the Conservation Strategy area. Potential habitat encompasses a large portion of the area. All occurrences, except one at Del Valle Reservoir, are in the northern portion of the study area. The least fragmented modeled habitat is in the northern portion of the study area. Since there are so few documented occurrences of the kit fox from within the study area it is difficult to state what the accuracy of the model is relative to actual presence of the species.

San Joaquin Kit Fox

Distribution

The San Joaquin kit fox is federally and state listed as endangered. San Joaquin foxes occur in some areas of suitable habitat on the floor of the San Joaquin Valley and in the surrounding foothills of the Coast Ranges, Sierra Nevada, and Tehachapi Mountains from Kern County north to Contra Costa, Alameda, and San Joaquin Counties (U.S. Fish and Wildlife Service 1998). There are known occurrences in Alameda, Contra Costa, Fresno, Kern, Kings, Madera, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Stanislaus, and Tulare Counties (California Natural Diversity Database 2008). The largest extant populations of kit fox are in Kern County (Elk Hills and Buena Vista Valley) and San Luis Obispo County in the Carrizo Plain Natural Area (U.S. Fish and Wildlife Service 1998).

Although the precise historical range of San Joaquin kit fox is unknown, it is believed to have extended from Contra Costa and San Joaquin Counties in the north to Kern County in the south. Surveys conducted between 1969 and 1975 extended the known range of the kit fox back into portions of its historical range in the northern San Joaquin Valley, including Contra Costa, Alameda, and San Joaquin Counties (Orloff et al. 1986). At this time, kit foxes were also found in three counties outside the originally defined historical range: Monterey, Santa Clara, and Santa Barbara counties (Orloff et al. 1986).

Occurrence in the Conservation Strategy Area

The 15 San Joaquin kit fox occurrences were in the northern half of the study area, in grazed grassland, pasture, annual grassland and alkali sink scrub (California Natural Diversity Database 2009). They were located at Bethany Reservoir, Livermore Area RPD, on private lands and SFPUC land (CNDDDB 2009).

Ecology

San Joaquin kit foxes occur in a variety of habitats, including grasslands, scrublands, vernal pool areas, alkali meadows and playas, and an agricultural matrix of row crops, irrigated pastures, orchards, vineyards, and grazed annual grasslands (U.S. Fish and Wildlife Service 1998). They prefer habitats with loose-textured soils (Egoscue 1962) that are suitable for digging, but they occur on virtually every soil type. Dens are generally located in open areas with grass or grass and scattered brush, and seldom occur in areas with thick brush. Preferred sites are relatively flat, well-drained terrain (U.S. Fish and Wildlife Service 1998, Roderick and Mathews 1999). They are seldom found in areas with shallow soils due to high water tables or impenetrable bedrock or hardpan

layers (U.S. Fish and Wildlife Service 1998). However, kit foxes may occupy soils with a high clay content where they can modify burrow dug by other animals, such as California ground squirrels (*Spermophilus beecheyi*) (Orloff et al. 1986).

In the northern part of its range (including San Joaquin, Alameda, and Contra Costa Counties) where most habitat on the valley floor has been eliminated, kit foxes now occur primarily in foothill grasslands (Swick 173, U.S. Fish and Wildlife Service 1998), valley oak savanna, and alkali grasslands (Bell 1994). Retaining a linkage between San Joaquin kit fox populations in western Merced County north into San Joaquin, Alameda, and Contra Costa Counties is an important recovery goal for this species (U.S. Fish and Wildlife Service 1998). Less frequently, foxes will den within small parcels of native habitat that are surrounded by intensively maintained agricultural lands and adjacent to dryland farms (Orloff et al. 1986, U.S. Fish and Wildlife Service 1998), and forage in tilled and fallow fields and irrigated row crops (Bell 1994).

Kit foxes may range up to 20 miles at night during the breeding season and somewhat less (6 miles) during the pup-rearing season (Girard 2001). The species can readily navigate a matrix of land use types. Home ranges vary from less than one square mile up to approximately 12 square miles (Spiegel and Bradbury 1992, White and Ralls 1993). The home ranges of pairs or family groups of kit foxes generally do not overlap (White and Ralls 1993).

San Joaquin kit foxes prey upon a variety of small mammals, ground-nesting birds, and insects. They are in turn subject to predation by such species as coyote, non-native red foxes, domestic dog, eagles, and large hawks (Ralls and White 1995, U.S. Fish and Wildlife Service 1998).

Threats

Continued fragmentation of habitat is a serious threat to this species. Increasing isolation of populations through habitat degradation and barriers to movement, such as aqueducts and busy highways, can limit dispersal to and occupancy of existing and former lands. The threat of being struck by vehicles is high, particularly for dispersing individuals, crossing roadways with median barriers. Livestock grazing is not thought to be necessarily detrimental to the kit fox (Morrell 1975, Orloff et al. 1986), but it may affect the number of prey species available, depending on the intensity of grazing (U.S. Fish and Wildlife Service 1998). Moderate grazing is thought to benefit the species because it can potentially enhance the prey base and reduce vegetation to allow kit fox to more easily detect and avoid predators. The use of pesticides to control rodents and other pests also threatens kit fox in some areas, either directly through poisoning or indirectly through reduction of prey abundance.

Modeled Species Distribution in Study Area

Model Assumptions

Core Habitat—Denning and Movement

All grassland land cover types and all oak woodlands within 500 feet from grasslands were considered suitable denning and foraging habitat for this species. Urban and suburban land cover types, and the area within the boundary created by Highways 580, 680 and 84 were excluded, as well as any areas within 200 m of highways (Gerrard et al. 2001). Small fragments of habitat that were disconnected from contiguous habitat blocks were removed from the results to better represent actual movement potential for the species in a connected landscape.

Additional modeling was conducted to determine the most likely routes that could be used by San Joaquin kit fox in the northeastern corner of the study area. This analysis took into account the importance of land cover, topography, and barriers created by roadways and canals on the movement tendencies of the species. The intent was to determine how individuals could move through the study area between the northernmost extent of their range in Contra Costa County to areas in southern San Joaquin County, on the eastern side of the study area. The methodology is discussed below under wildlife linkages and the results are shown in Figure D-17.

Low Quality Movement Habitat

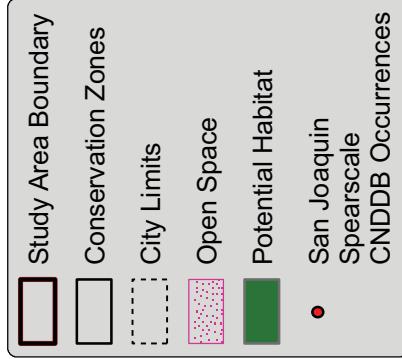
Areas that the San Joaquin kit fox may use occasionally for movement include developed agriculture, cropland, ruderale, and ruderale-residential land cover types within one mile of core habitat. These were intended to represent areas that individuals might pass through while moving between other more suitable habitat types.

Model Results

Figure D-17 in Appendix D shows the modeled potential habitat of the San Joaquin kit fox within the study area. Potential core habitat encompasses a large portion of the area, but all occurrences are in the northern portion. Very little habitat is within the low quality movement habitat. Since there are so few documented occurrences of the kit fox from within the study area it is difficult to state what the accuracy of the model is relative to actual presence of the species.

**Figure D-1
Potential San Joaquin
Spearscale (*Atriplex*
joaquiniana) Habitat**

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008.

Source: California Natural Diversity Database, California Dept. of Fish & Game, Nov. 2008, California Spatial Information Library;

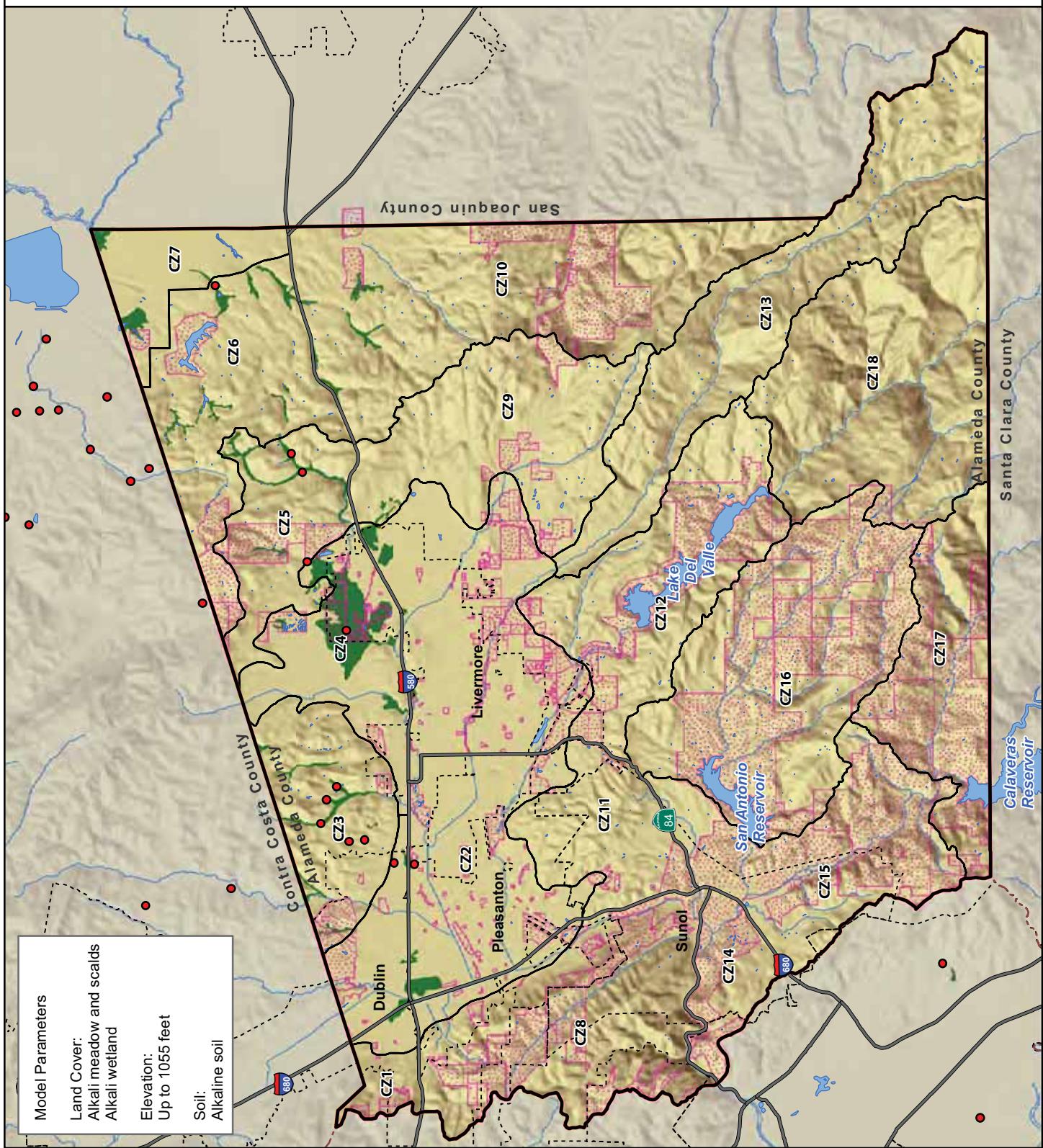
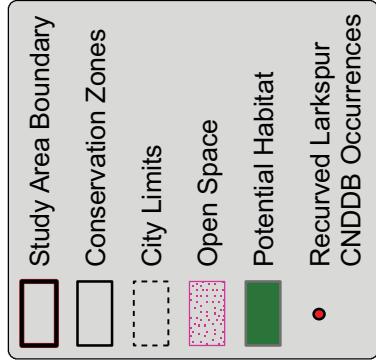


Figure D-2
**Potential Recurved
 Larkspur (*Delphinium
 recurvatum*) Habitat**

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should not be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008, Source: California Dept. of Fish & Game, May 2008, California Spatial Information Library

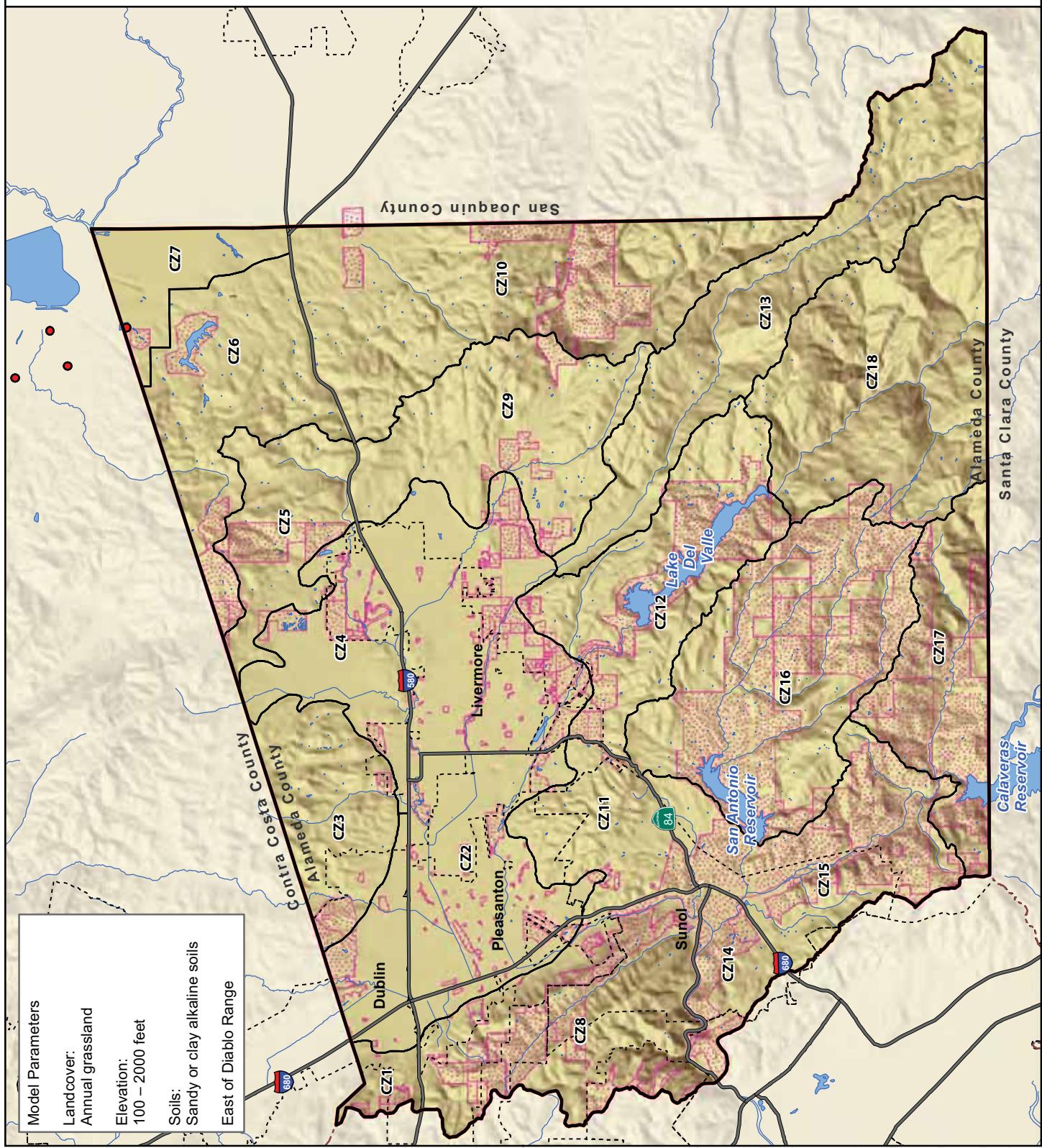
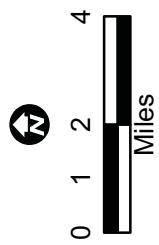
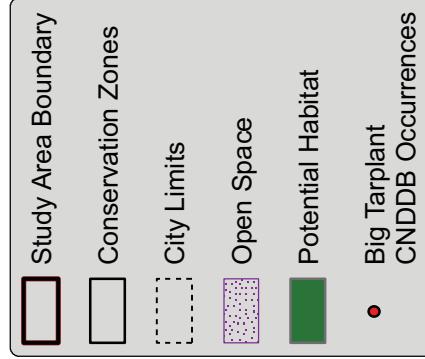


Figure D-3
Potential Big Tarplant
(Blepharizonia plumosa
ssp. plumosa) Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited; where field surveys have been conducted, some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008.

Source: California Natural Diversity Database, California Dept. of Fish & Game, Nov. 2008. California Spatial Information Library;

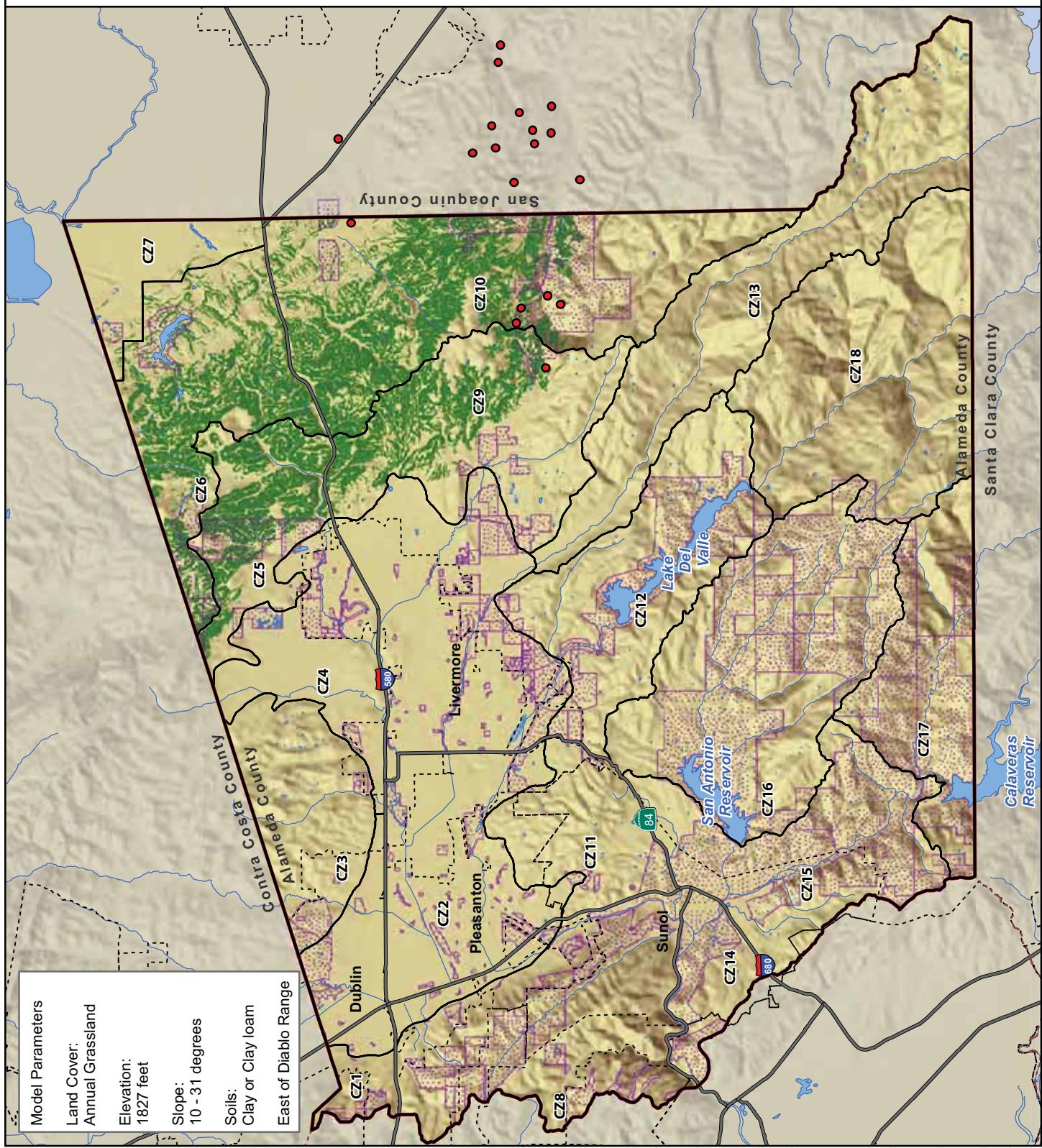
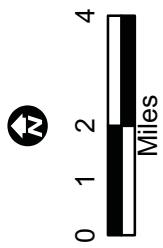
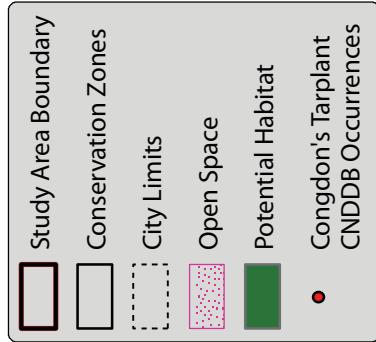


Figure D-4
Potential Congdon's
Tarplant (*Centromadia*
*parryi ssp. *congdonii**)
Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.
 The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008. Source: California Natural Diversity Database, California Dept. of Fish & Game, Nov. 2008. California Spatial Information Library, 2008.

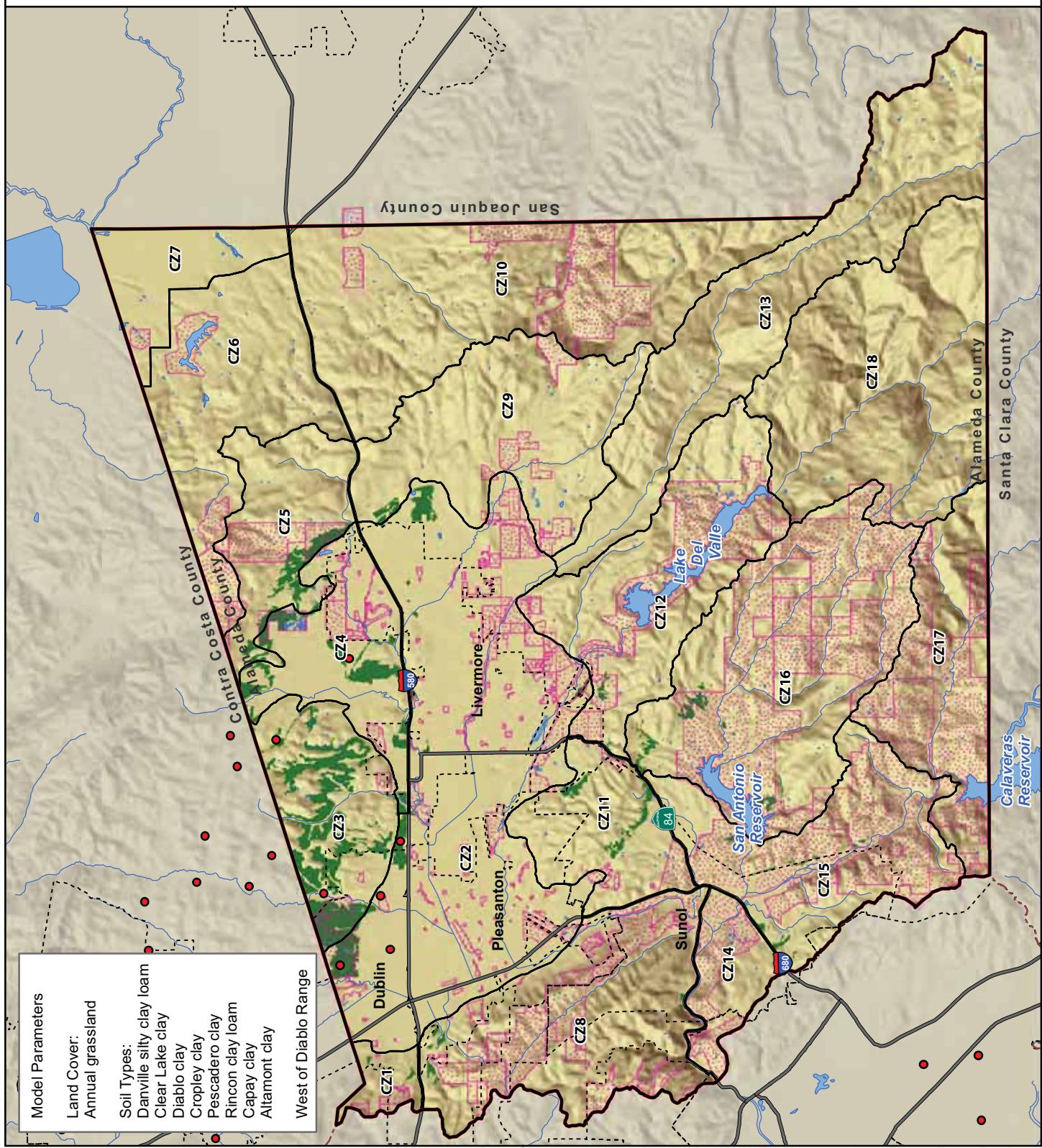
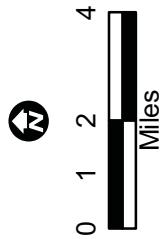
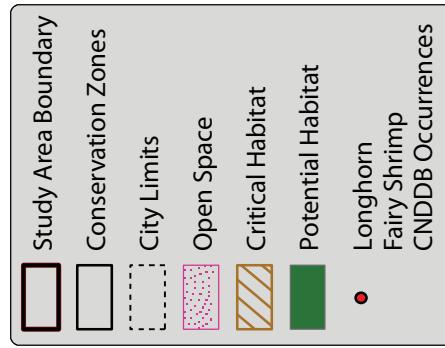


Figure D-5
**Potential Longhorn Fairy
 Shrimp (*Branchinecta
 longiantenna*) Habitat**

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008. Source: California Natural Diversity Database, California Dept. of Fish & Game 2008; Critical habitat for vernal pool crustaceans 2006; Holland 1996; Helm 1998; Ericksen and Belk 1999.

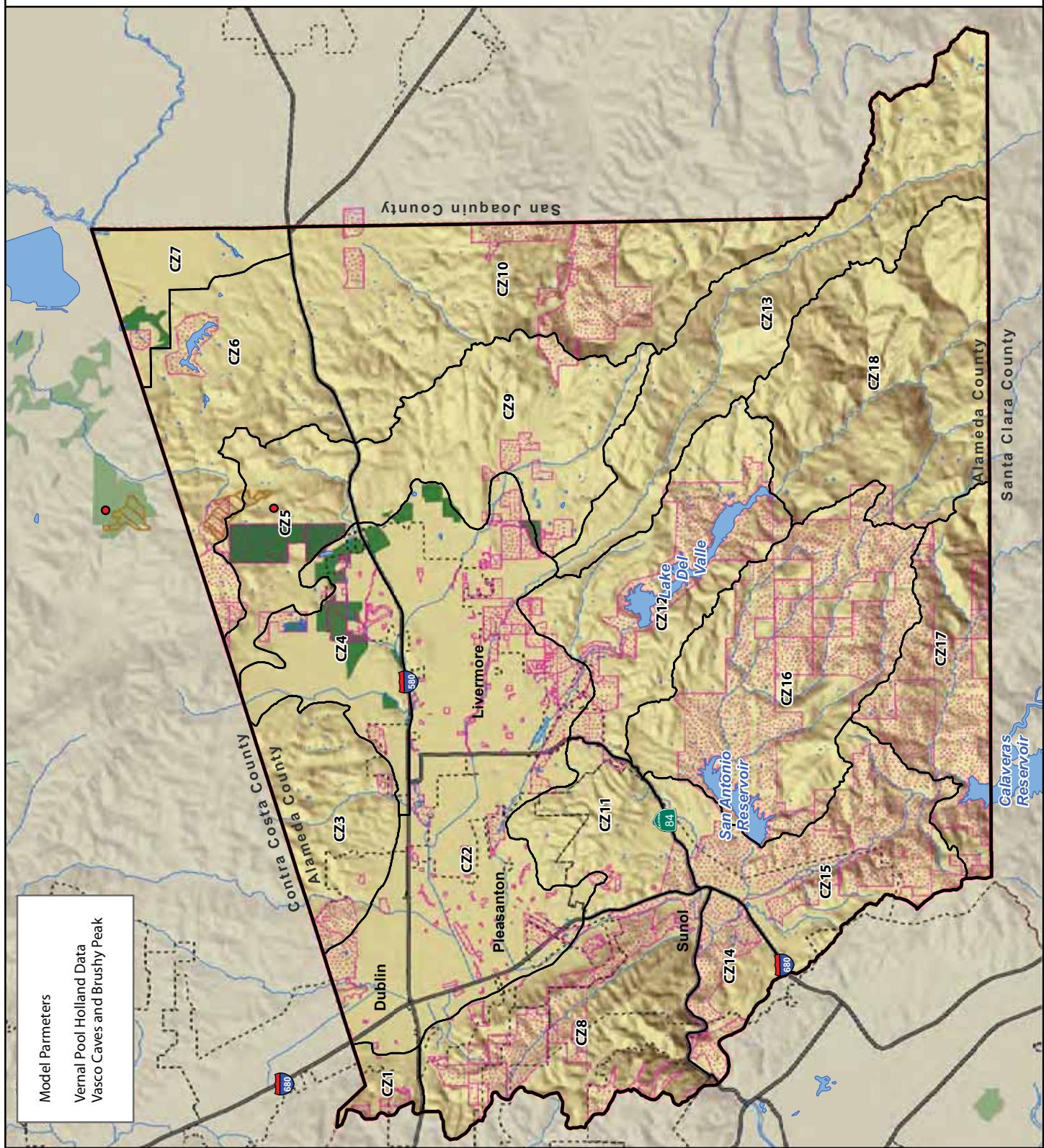
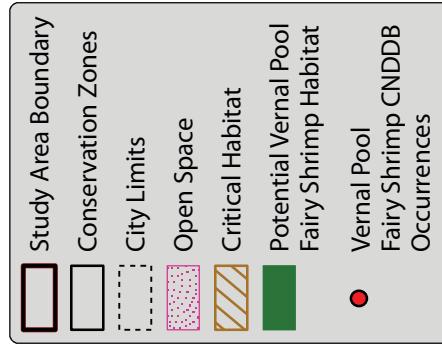


Figure D-6
**Potential Vernal
 Pool Fairy Shrimp
 $(Branchinecta lynchii)$
 Habitat**

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008. Source: California Natural Diversity Database, California Dept. of Fish & Game, Nov. 2008. California Spatial Information Library, Holland 1998

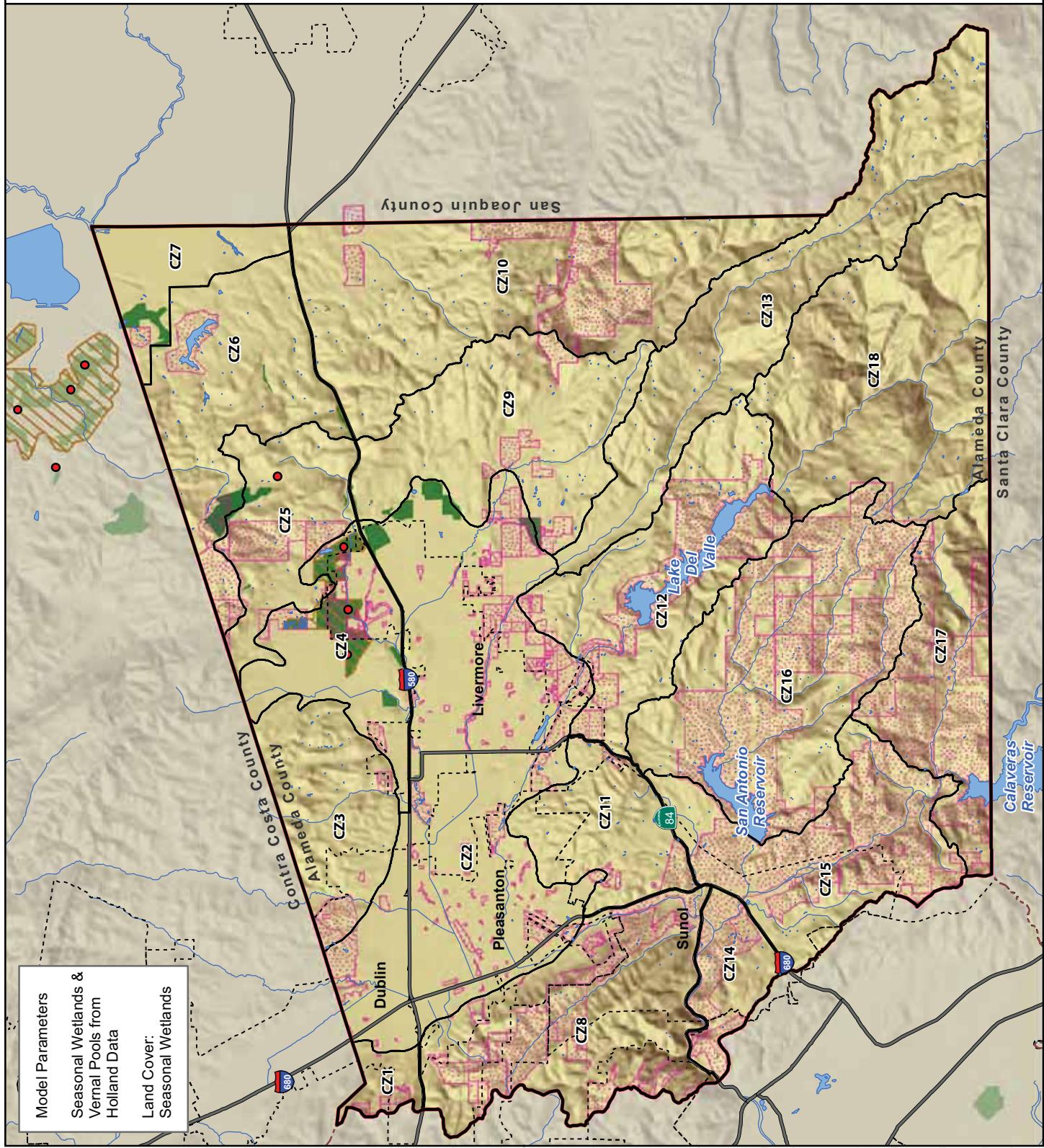
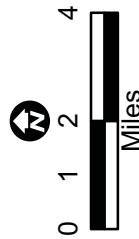
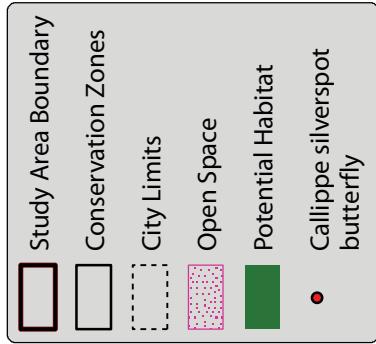


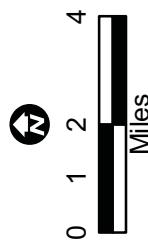
Figure D-7
Potential Callippe
Silverspot Butterfly
(Speyeria callippe
callippe) Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008, Source: Recovery Plan; Personal communication from species experts



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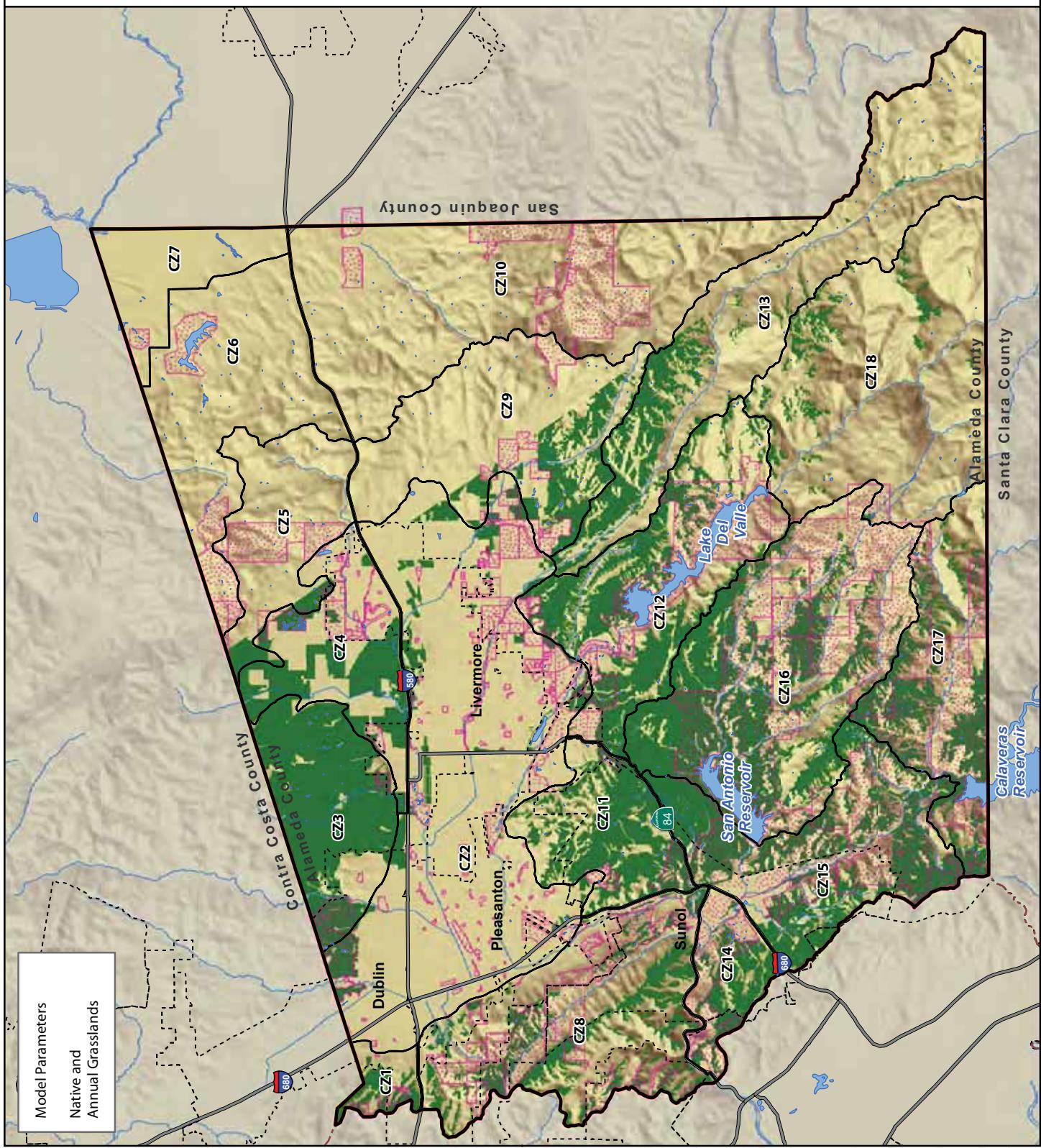
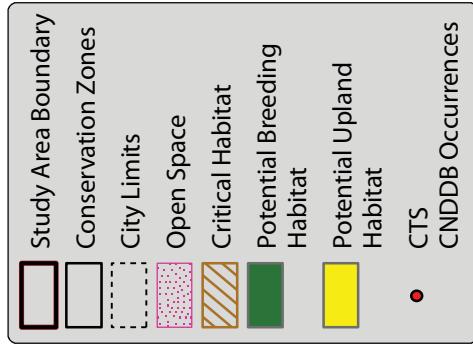


Figure D-8
**Potential California Tiger
 Salamander (*Ambystoma
 californiense*) Habitat**

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning, and should not be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008, California Dept. of Fish & Game, Nov. 2008, California Spatial Information Library; CR listing and critical habitat documents; Orloff 2007; Trenham et al. 2001; S. Sweet, personal communication; Cook et al. 2006.

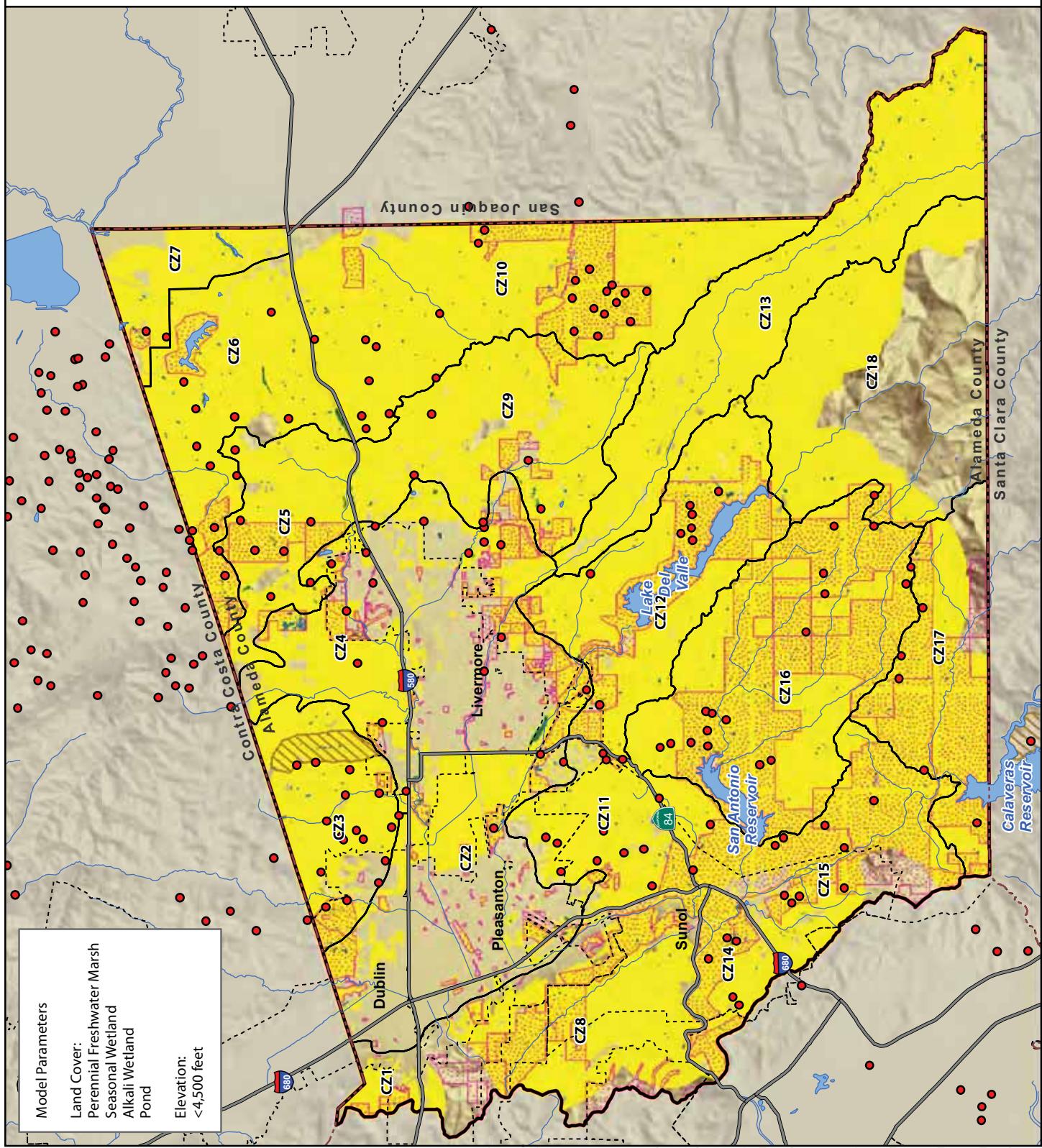
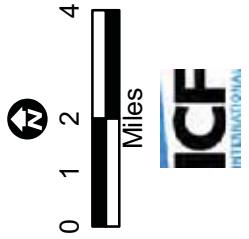
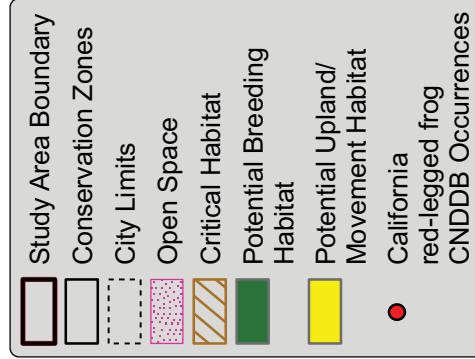


Figure D-9
Potential California Red-Legged Frog (*Rana draytonii*) Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008.

Source: California Natural Diversity Database, 2008.

California Dept. of Fish & Game, Nov. 2008.

California Spatial Information Library.

Recovery Plan, FRI listing and critical habitat documents; Fellers and Kleeman 2007; Marsh

and Trenham 2000; Burger 1998

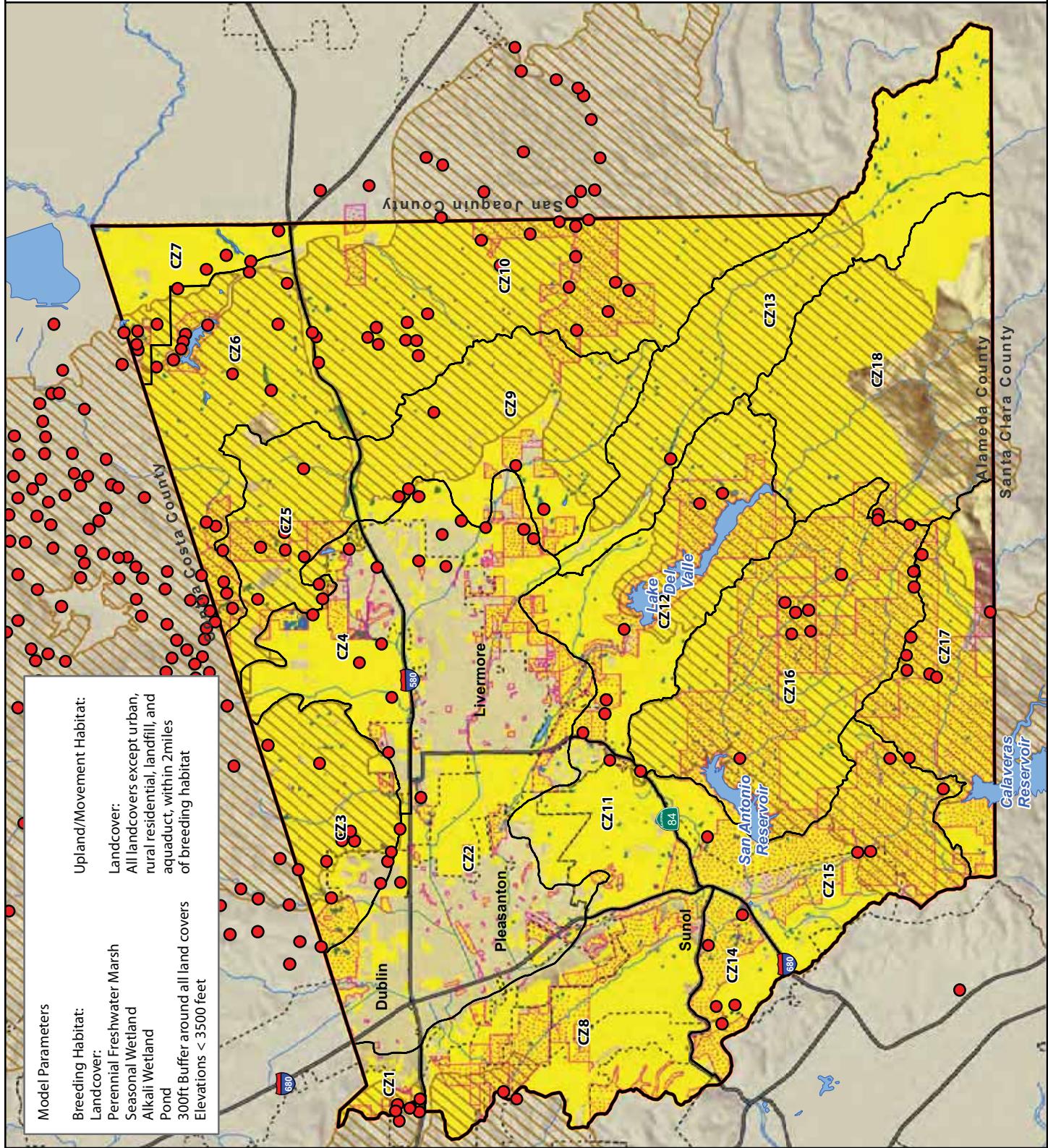
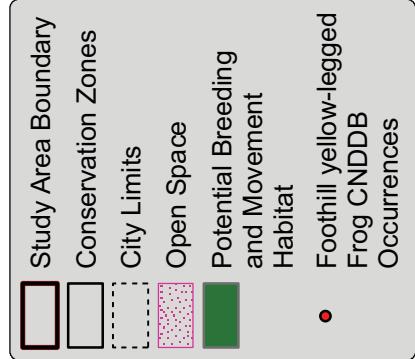


Figure D-10
Potential Foothill
Yellow-legged Frog
(Rana boylii) Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should not be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008.

Source: California Natural Diversity Database, California Dept. of Fish & Game, Nov. 2008. California Spatial Information Library Recovery Plan, FR listing and critical habitat documents, Fellers and Kleeman 2007; Marsh and Trenham 2000; Bulger 1998

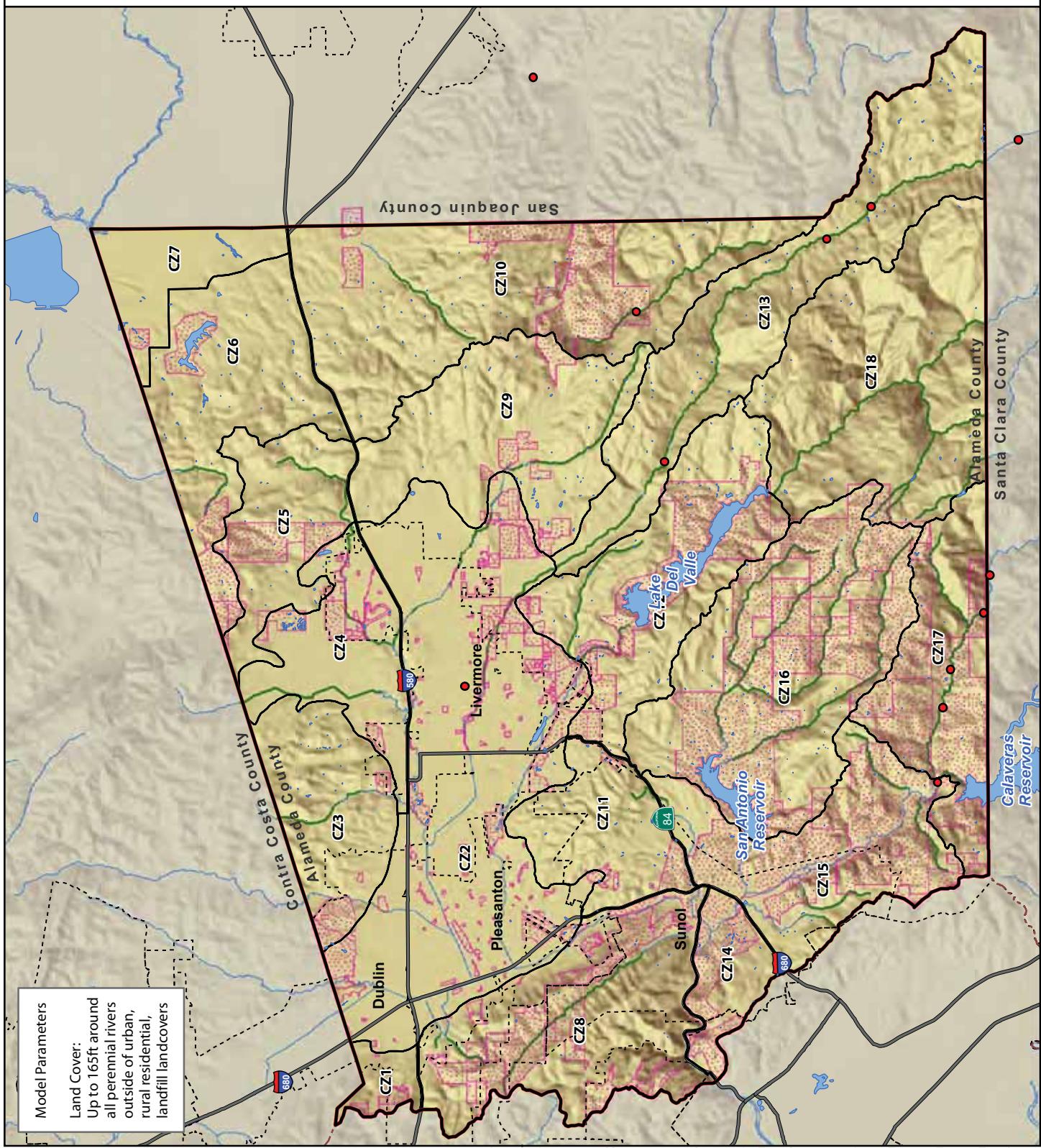
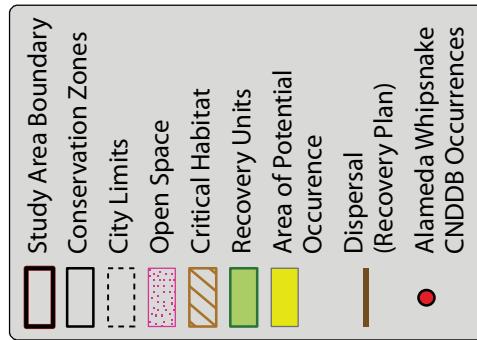


Figure D-11
Potential Alameda Whipsnake (*Masticophis lateralis euryxanthus*) Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the map is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008. Additional occurrences have been recorded in the study area but they are not publicly available and therefore are not displayed on this figure.

Source: California Natural Diversity Database, California Dept. of Fish & Game, Aug. 2008.

U.S. Fish and Wildlife Service, 2002.

USFWS Recovery Plan

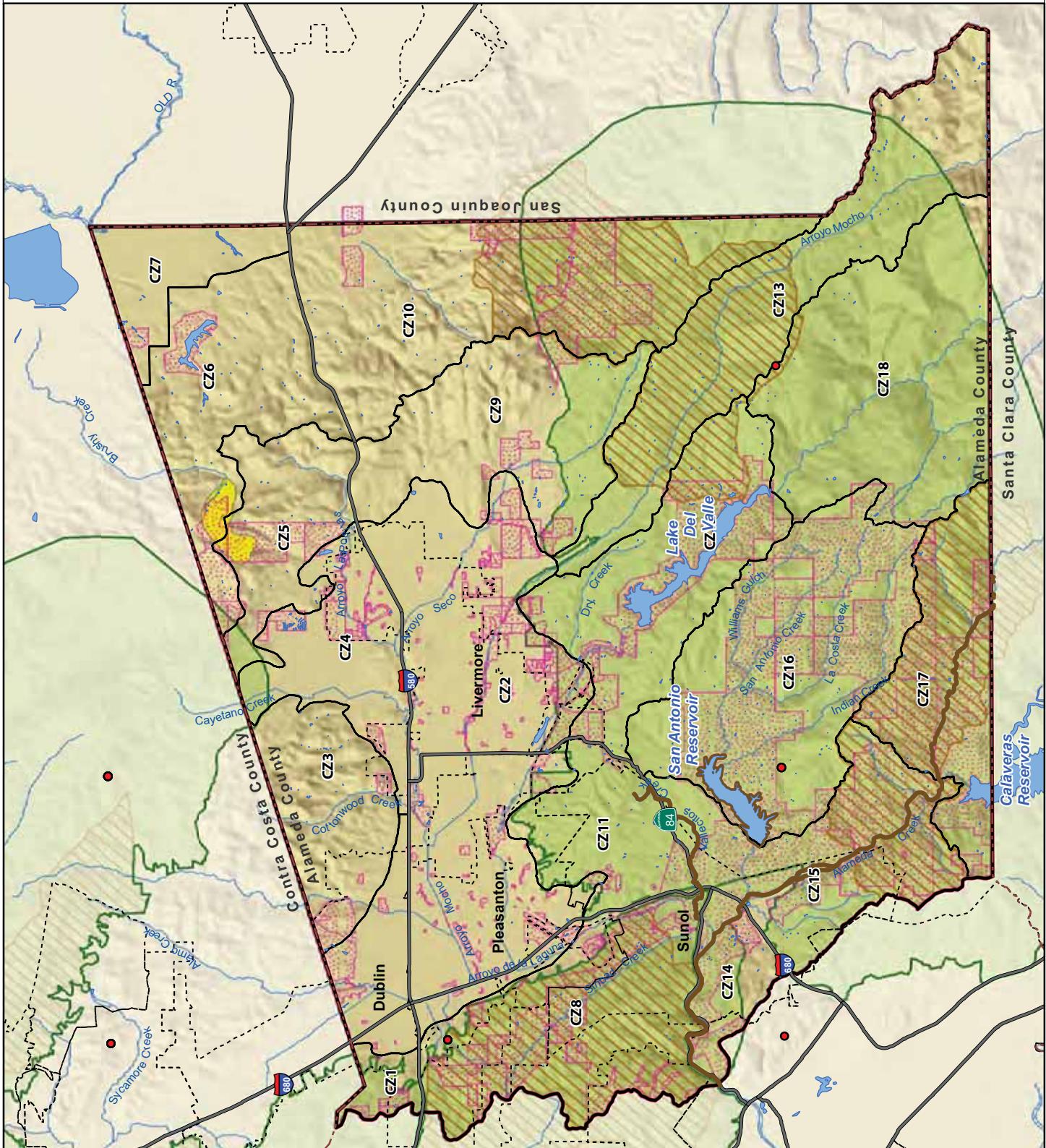


Figure D-12
Potential Central
California Coast
Steelhead
(*Oncorhynchus*
***mykiss*) Habitat**

October 2010

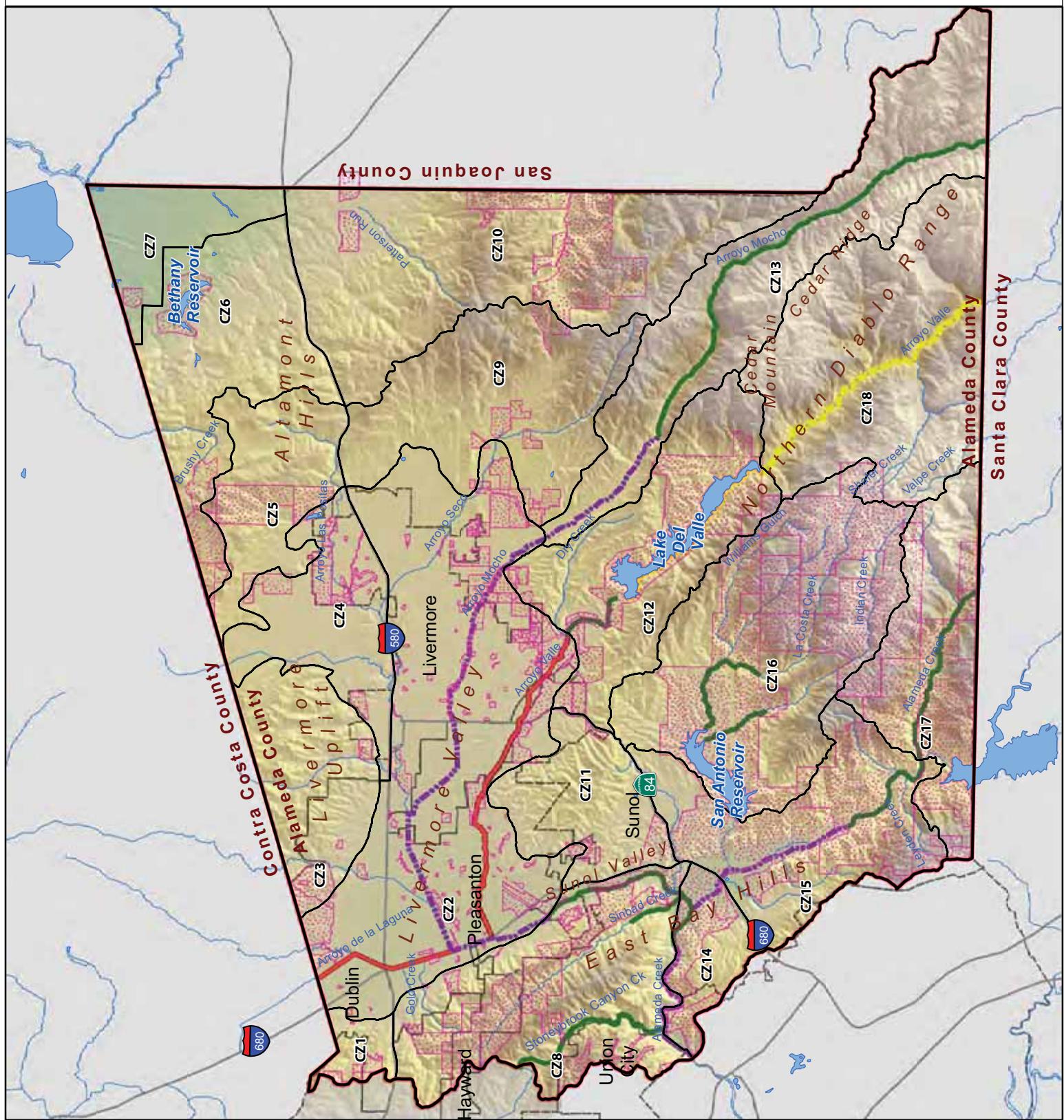
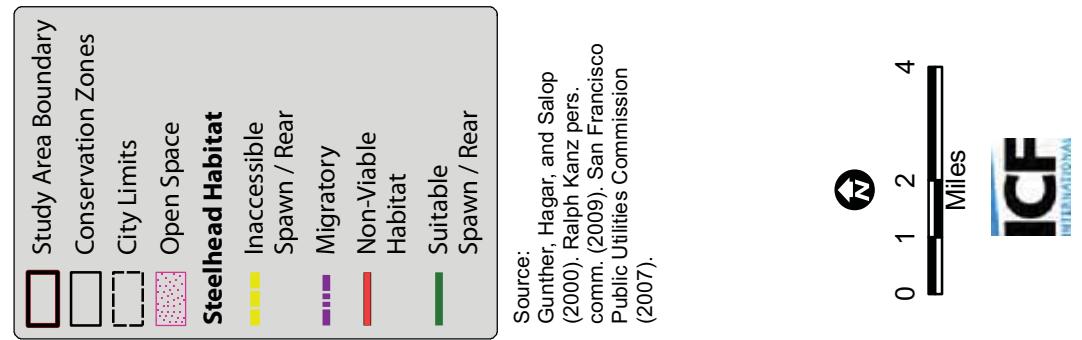
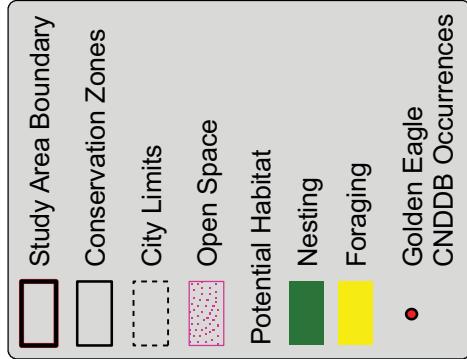


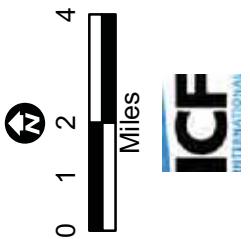
Figure D-13
Potential Golden Eagle
(Aquila chrysaetos)
Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008. Source: California Dept. of Fish & Game, Nov. 2008, California Spatial Information Library, WHR range; BNA species account



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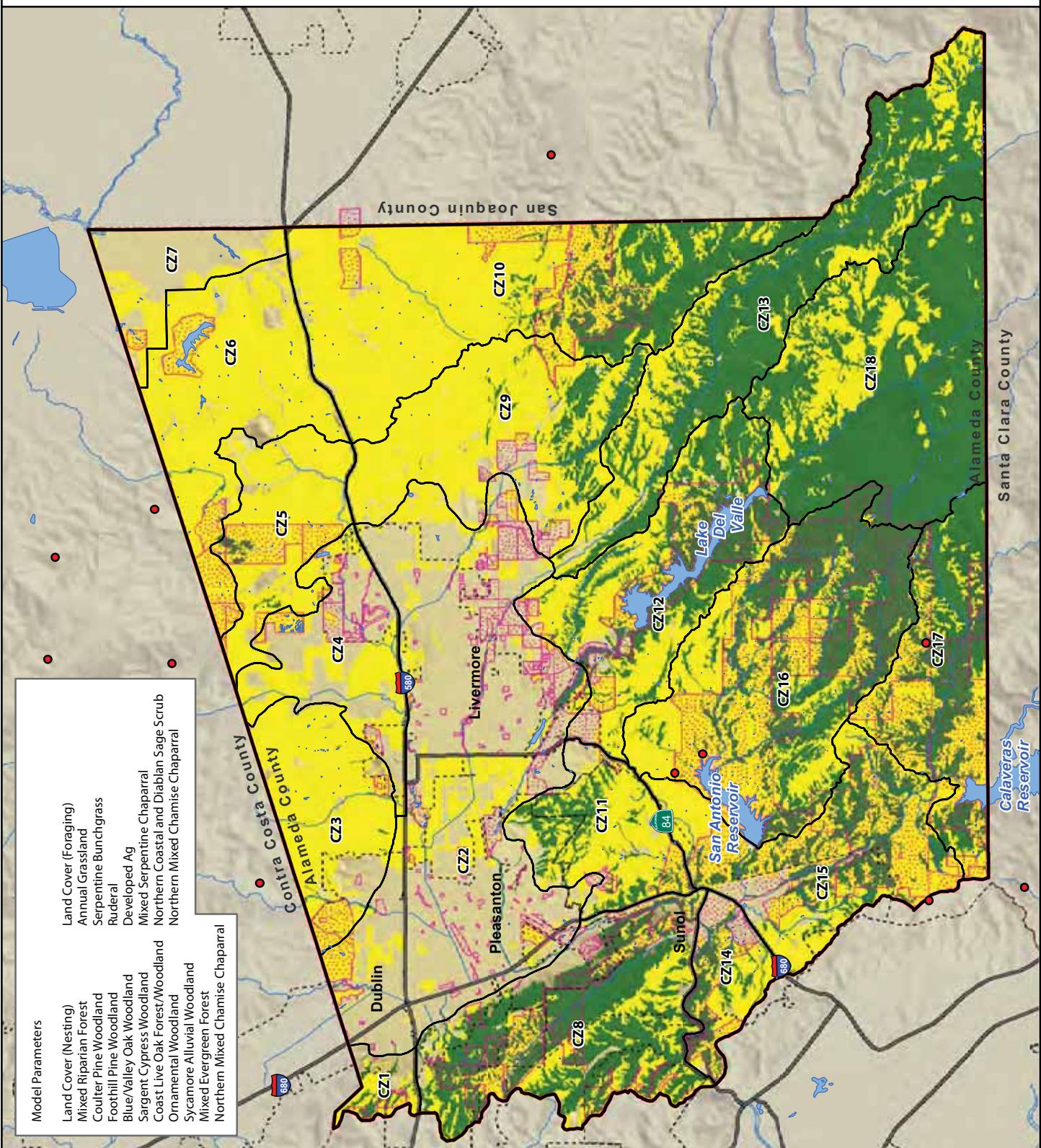
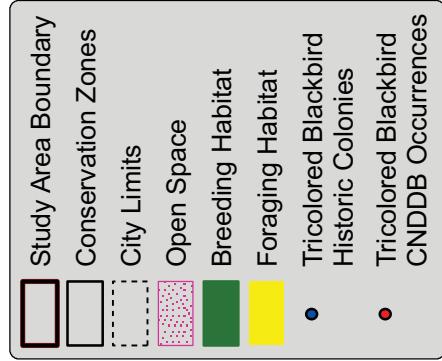


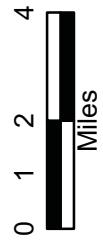
Figure D-14
**Potential Tricolored
 Blackbird (*Agelaius
 tricolor*) Habitat**

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008, California Dept. of Fish & Game, Nov. 2008, California Spatial Information Library; Tricolored Blackbird Portal 2009; Churchwell et al. 2005; BNA species account; Hamilton 2004; 90 finding 2006; TRBL Conservation Plan 2007; Hamilton 1998; Orians and Collier 1963; Payne 1969



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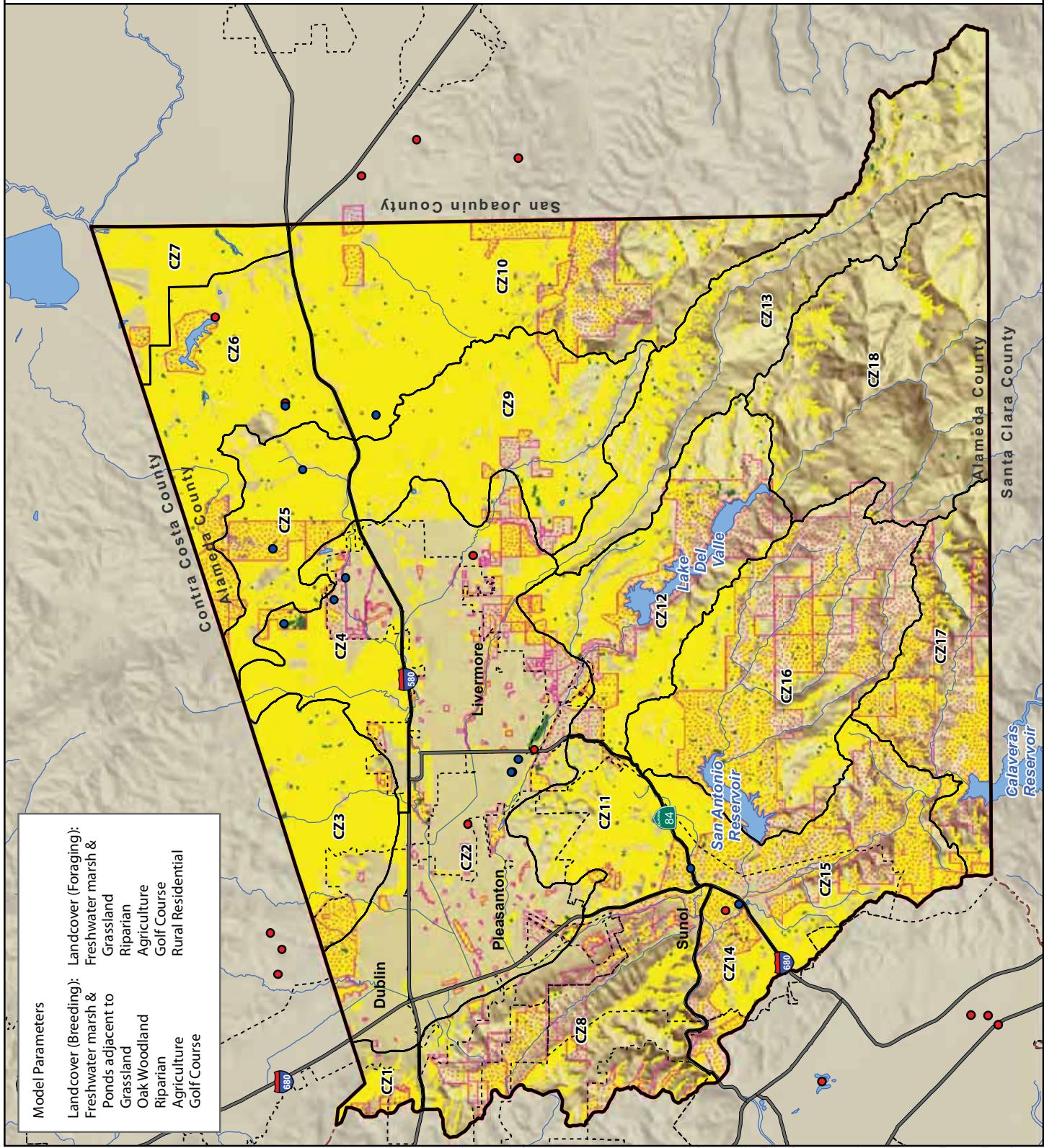
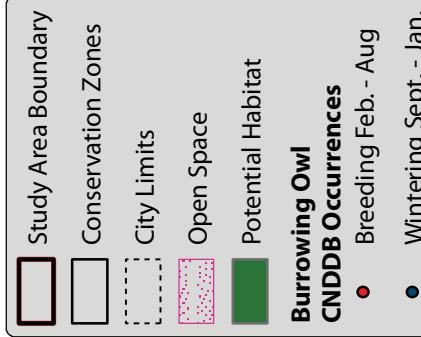


Figure D-15
Potential Western
Burrowing Owl (*Athene*
cunicularia hypugaea)
Habitat

October 2010



Note: Mapping procedure and
habitat are described in the text.

The purpose of the model is to identify areas
within the study area where the species occurs
or could occur based on known habitat
requirements. The data on which this map is
based are regional in scale. This map should not
be used for site planning and should be
verified in the field. Occurrence data are limited
by where field surveys have been conducted,
some occurrence points may be geographically
inaccurate. Occurrence records from
the California Natural Diversity Database, 2008.
Source: California Natural Diversity Database,
California Dept. of Fish & Game, Nov. 2008.
California Spatial Information Library;
Klute et al. 2003; BNA Species account;
DeSante and Ruhlen; USFWS 2003-Status

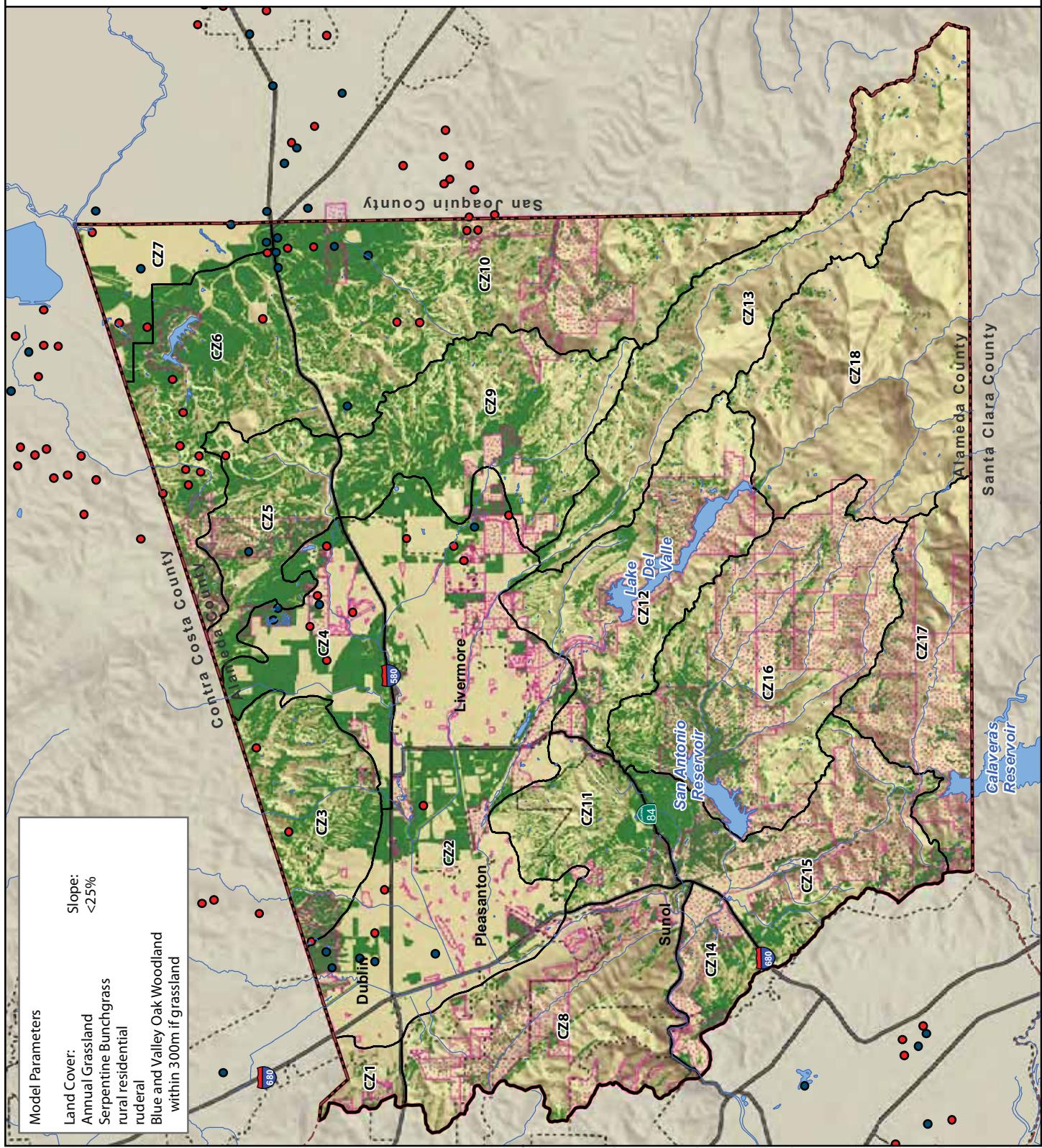
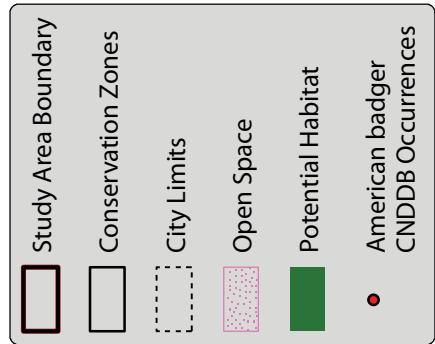


Figure D-16
Potential American
Badger (*Taxidea taxus*)
Habitat

October 2010



Note: Mapping procedure and habitat are described in the text.

The purpose of the model is to identify areas within the study area where the species occurs or could occur based on known habitat requirements. The data on which this map is based are regional in scale. This map should not be used for site planning and should be verified in the field. Occurrence data are limited by where field surveys have been conducted; some occurrence points may be geographically inaccurate. Occurrence records from the California Natural Diversity Database, 2008.

Source: California Natural Diversity Database, California Dept. of Fish & Game, Nov. 2008. California Spatial Information Library; NatureServe

A scale bar representing distance in miles. It features a horizontal line with tick marks at intervals of one mile, ranging from 0 to 4. A compass rose icon is positioned to the left of the scale bar.

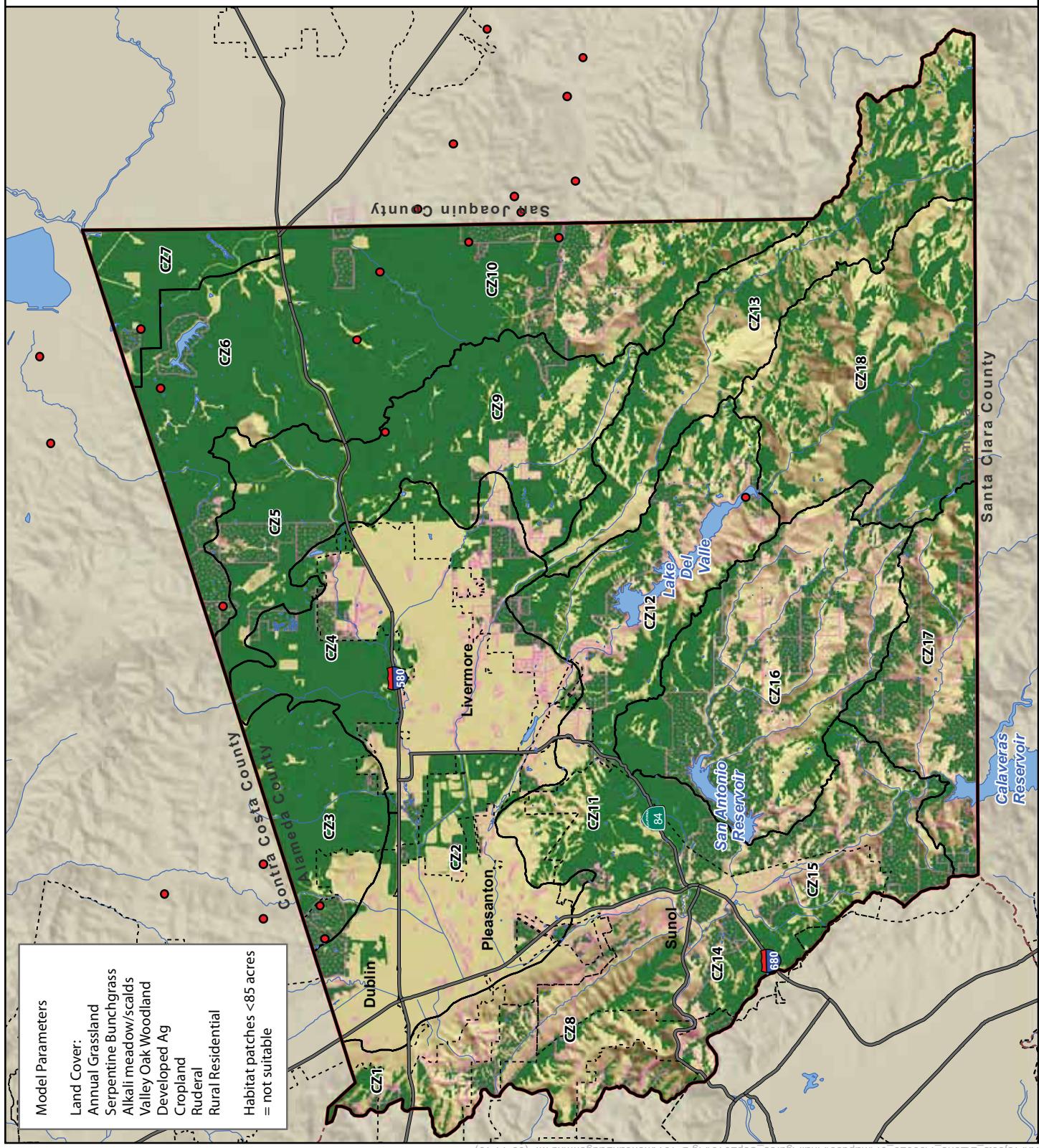
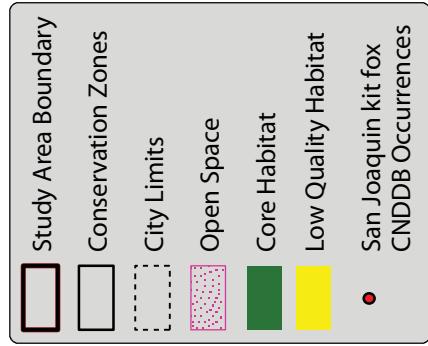


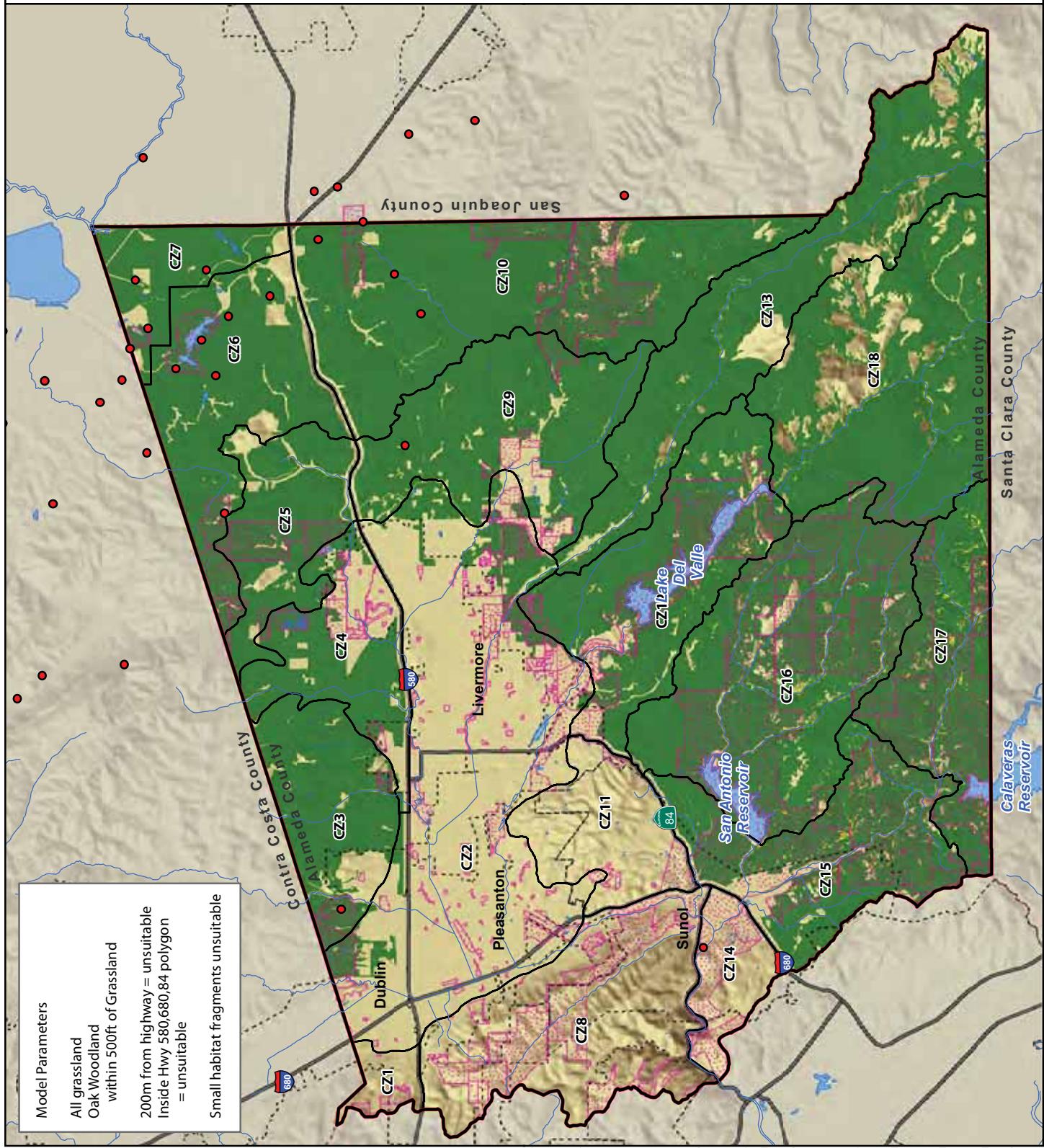
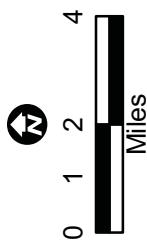
Figure D-17
**Potential San Joaquin
 Kit Fox (*Vulpes macrotis
 mutica*) Habitat**

October 2010



Note: Mapping procedure and
 habitat are described in the text.

The purpose of the model is to identify areas
 within the study area where the species occurs
 or could occur based on known habitat
 requirements. The data on which this map is
 based are regional in scale. This map should not
 be used for site planning and should be
 verified in the field. Occurrence data are limited
 by where field surveys have been conducted;
 some occurrence points may be geographically
 inaccurate. Occurrence records from
 the California Natural Diversity Database, 2008.
 Source: California Dept. of Fish & Game, Nov 2008.
 California Spatial Information Library;
 USFWS 1996; ESRP range and species
 account; Patrick Kelley-personal communication;
 SFWSO 2007



Appendix E

Focal Species Impact/Mitigation Scoring Sheets

Appendix E. Focal Species Impact/Mitigation Scoring Sheets

Table E-1. Impact/Mitigation Scoring for vernal pool fairy shrimp in the EACCS study area.

Vernal pool fairy shrimp	5	4	3	2	1	0	Score
Closest suitable vernal pool habitat to impact/mitigation area	On-site	Within 250 feet	Greater than 250 feet but hydrologically connected	--	--	Greater than 250-feet and not hydrologically connected	
Aquatic land covers impacted/ mitigated	Vernal pools	Other aquatic features that can support species	--	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland	Oak woodland, Rural residential, ruderual	--	--	--	All others; none	
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Inside Altamont Hills Core Area identified in Vernal Pool Recovery Plan	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-4. Habitat quality of the impact site would be scored using this table and the habitat quality of a mitigation site would need to meet or exceed that value.

Appendix E. Continued

Table E-2. Impact/Mitigation Scoring for longhorn fairy shrimp in the EAACCS study area.

Longhorn fairy shrimp	5	4	3	2	1	0	Score
Closest suitable vernal pool/sandstone pool habitat to impact/ mitigation area	On-site	Within 250 feet	-- Greater than 250 feet but hydrologically connected	--	--	--	Greater than 250-feet and not hydrologically connected
Aquatic land covers impacted/ mitigated	Sandstone pools	Vernal pools	Other aquatic features that can support species	--	--	--	All others; none
Upland land covers impacted/ mitigated	Grassland	Oak woodland, Rural residential, ruderal	--	--	--	--	All others; none
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream identified in Vernal Pool Recovery Plan	Yes					No	
Inside Altamont Hills Core Area	Yes					No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-5. Habitat quality of the impact site would be scored using this table and the habitat quality of a mitigation site would need to meet or exceed that value.

Appendix E. Continued

Table E-3. Impact/Mitigation Scoring for Callippe silverspot butterfly in the EAACCS study area.

Callippe silverspot butterfly	5	4	3	2	1	0	Score
Impact/ Mitigation occurs in:	CZ1/CZ8/CZ11/ CZ12/CZ14/CZ 15/CZ16	--	--	--	--	--	All others
Presence of host/nectar plants	On-site	Within 0.25-mile of site	>0.25-mile but <0.5-mile	--	--	--	> 0.5-mile
Land covers impacted/ mitigated	--	--	Grassland	Oak woodland	--	--	All others
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-6. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-4. Impact/Mitigation Scoring for California tiger salamander in the EACCS study area.

California tiger salamander	5	4	3	2	1	0	Score
Closest suitable breeding habitat to site	On-site	Within 500 feet	Between 501 – 1,600 feet	Between 501 – 2,050 feet	Between 1,601 – 2,050 feet	Between 2051 – 6,900 feet	Greater than 6,900 feet
Is there occupied habitat within 6,900 feet of site?	Yes	--	--	No	--	--	--
Aquatic land covers impacted/ mitigated	Wetland, Ponds	--	Stream/River	--	--	All others; none	
Upland land covers impacted/ mitigated	Grassland, Oak woodland, Rural residential	Chaparral/ Scrub	Riparian	Conifer woodland	ruderal without refugia habitat	All others; none	
Elevation	Below 3,700 feet	--	--	--	--	Above 3,700 feet	
Presence of ground squirrels/pocket gophers	On site	Within 1,350 feet of site	Between >1,351 but <2,650 feet	Between >2,651 bu <5,300 feet	Between >5,301 but <7,900 feet	>7,901 feet from site	
Presence of bullfrogs or non-native fish in aquatic resources on site	No	--	Low number; not all aquatic habitats occupied	--	Yes, occurring in high numbers	--	
Create a new barrier between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Protect linkage between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	No	
Inside designated Critical Habitat	Yes	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-8. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-5. Impact/Mitigation Scoring for California red-legged frog in the EACCS study area.

California red-legged frog	5	4	3	>1-mile but < 2-miles	2	1	0	Score
Closest suitable breeding habitat to site	On-site	< 1-mile	>1-mile but < 2-miles	--	--	--	--	Greater than 2-miles
Is there occupied habitat within 2-miles of site?	Yes	--	--	No	--	--	--	
Aquatic land covers impacted/ mitigated	Wetland, Ponds, Stream/River	--	--	--	--	--	--	All others; none
Upland land covers impacted/ mitigated	Riparian, Grassland, Oak woodland, Rural residential	Chaparral/ Scrub	Conifer woodland	Cultivated ag, ruderalf	--	--	--	All others; none
Elevation	Below 3,500 feet	--	--	--	--	--	--	Above 3,500 feet
Presence of ground squirrels or other burrowing mammals	On site	< 0.25-mile of site	> 0.25 but ≤ 0.5 miles	> 0.5 but ≤ 1.0 miles	> 1.0 but ≤ 1.5 miles	> 1.5 miles	> 1.5 miles	
Presence of bullfrogs or non-native fish in aquatic resources on site	No	--	Low numbers and not all aquatic	--	Yes, occurring in high numbers	--	--	
Create a new barrier between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	--	No	
Protect linkage between breeding and upland habitat	Documented breeding location	--	Potential breeding location	--	--	--	No	
Inside East San Francisco Bay core recovery area	Yes						No	
Inside designated Critical Habitat	Yes	--	--	--	--	--	No	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	No	
Total Score								

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-7. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-6. Impact/Mitigation Scoring for foothill yellow-legged frog in the EACCS study area.

Foothill yellow-legged frog	5	4	3	2	1	0	Score
Last documented occurrence within the Conservation Zone	Within one year	1-3 yrs	4-5 yrs	6-10 yrs	11-25 yrs	Greater than 25 yrs, never	
Land covers impacted/ mitigated	Perennial stream with riparian corridor	Perennial stream with limited riparian corridor	Ephemeral stream	--	--	All others	
Substrate of stream bottom	Rocky, cobble	--	--	Clay, muddy	Sandy	Other	
Presence of reservoir upstream of site	No	--	Yes	--	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-10. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-7. Impact/Mitigation Scoring for Alameda whipsnake in the EACCS study area.

Alameda whipsnake	5	4	3	2	1	0	Score
Inside Core Recovery Unit reported in draft Recovery Plan	Yes	--	--	--	--	--	No
Inside designated Critical Habitat	Yes	--	--	--	--	--	No
High quality shrub habitat (scrub/chaparral especially; on northeast, east, south east, south and southwest Aspects) within one mile of subject site	Yes	--	--	--	No	--	
Land covers impacted/ mitigated	Chaparral/ Scrub	Grassland, Oak Woodland	Riparian	Conifer Woodland	--	All others	
Presence of rock outcrops	On-site	\leq 0.5-mile	\geq 0.5 but < 1-mile	--	--	> 1 mile	
Presence of important movement corridor reported in draft Recovery Plan	On-site	\leq 0.5-mile	\geq 0.5 but < 1-mile	--	--	> 1 mile	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-9. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-8. Impact/Mitigation Scoring for golden eagle in the EACCS study area.

Golden eagle	5	4	3	2	1	0	Score
Presence of golden eagle nest within 1.0-mile of site	Yes	--	--	--	--	No	
Land covers impacted/ Mitigated	Grassland, Oak woodland	Chaparral and scrub, ruderal	Cultivated ag	Rural residential, Conifer woodland	--	All others	
Presence of ground squirrels	On site	Within 0.25-mile of site	> 0.25 but ≤ 1.0 mile	≥ 1 mile	--	--	
Wind turbines within 0.5-mile of site	No	--	--	--	Yes	On-site	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-10. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-9. Impact/Mitigation Scoring for burrowing owl in the EAACCS study area.

Burrowing owl	5	4	3	2	1	0	Score
Nearest known burrowing owl nest location to the impact site (within last 3 years)	On-site	Within 0.5-mile of site	> 0.5 but < 2.0 miles	--	> 2.0 but ≤ 7.5 miles	> 7.5 miles	
Wind turbines within 0.5-mile of site	No	--	--	--	Yes	On-site	
Land covers impacted/ mitigated	Grassland, ruderall	Cultivated ag	Oak woodland	Rural residential	--	All others	
Presence of ground squirrels	On-site	Within 0.25-mile of site	> 0.25 but ≤ 1.0 mile	≥ 1 mile	--	--	
Average height of grass on impacted area	Less than 8-inches	9-24 inches	--	25-36 inches	--	Greater than 36 inches	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-10. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-10. Impact/Mitigation Scoring for tricolored blackbird in the EACCS study area.

Tricolored blackbird	5	4	3	2	1	0	Score
Documented tricolored blackbird nest colony within 0.5-mile of site during previous 3-years.	Yes	--	--	--	--	--	No
Acres of emergent vegetation that could support nesting TRBL	>5	3-5	1-3	0.25 - 1	<0.25	0	
Acres of foraging habitat within 2-miles colony site	>1000	501-1000	251-500	100-250	<100	0	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-10. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-11. Impact/Mitigation Scoring for San Joaquin kit fox and America badger in the EACCS study area.

San Joaquin kit fox/American badger	5	4	3	2	1	0	Score
Impact/ Mitigation occurs in: Land covers impacted/ mitigated	CZ5/CZ6/CZ7/ CZ9/CZ10	--	—CZ4 or CZ13	--	—CZ2, CZ3, CZ11, CZ12	--	
Average Slope	0-5%	> 5 but < 10%	≥ 10 but < 25%	≥25%	--	--	All others
Presence of ground squirrels	On site	Within 0.25- mile of site	Within 0.5- mile of site	--	--	--	Further away
Linkages and movement	Creation or removal of potential linkage across barrier (e.g., culvert under freeway)	Land adjacent to potential linkage on both sides of barrier (e.g., culvert under freeway)	Land adjacent to potential linkage on one side of barrier (e.g., culvert under freeway)	Land not adjacent to key linkage for species.	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-11. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-12. Impact/Mitigation Scoring for San Joaquin spearscale in the EACCS study area.

San Joaquin spearscale Elevation	5 Below 1,050 feet	4	3	2	1	0 Above 1,050 feet	Score
Land covers impacted/ Mitigated	Alkali meadow and scald/alkali wetland	Annual grassland,	Rural residential, ruder	--	--	All others	
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-13. Impact/Mitigation Scoring for recurved larkspur in the EACCS study area.

Recurved larkspur	5	4	3	2	1	0	Score
Conservation Zones	Inside CZ6 or CZ7	--	--	--	--	--	Other CZ
Elevation	100 – 2,000 feet	--	--	--	--	--	Above 2,000 feet
Land covers impacted/ mitigated	Valley sink scrub	Alkali meadow and scald		Annual grassland,	--	--	All others
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-14. Impact/Mitigation Scoring for big tarplant in the EACCS study area.

Big tarplant	5	4	3	2	1	0	Score
Conservation Zones	Inside CZ6 or CZ10	Inside CZ5 or CZ9	--	--	--	--	Other CZ
Elevation	Below 2,000 feet	--	--	--	--	--	Above 2,000 feet
Land covers impacted/ mitigated	Annual grassland, native grassland	--	--	--	--	--	All others
Soils present in impact area	Clay, Clay-loam	--	--	--	--	--	others
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	--
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	--
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-15. Impact/Mitigation Scoring for Congdon's tarplant in the EACCS study area.

Congdon's tarplant		5	4	3	2	1	0	Score
Conservation Zones	Inside CZ2/ CZ3/CZ4/CZ5/ CZ6/CZ7	--	--	--	--	--	--	Other CZ
Elevation	Below 800 feet	--	--	--	--	--	--	Above 800 feet
Land covers impacted/ mitigated	native grassland,	Annual grassland,	--	Rural residential, Ruderal	--	--	--	All others
Soils present in impact area	Clay, Clay- loam, silty clay loam	--	Alkali or Saline soils	--	--	--	--	others
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	--	--
On parcels with an approved management plan for this species.	Yes	--	--	--	--	No	--	--
Total Score								

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-16. Impact/Mitigation Scoring for Palmate-bracted bird's beak in the EACCS study area.

Palmate-bracted bird's beak	5	4	3	2	1	0	Score
Conservation Zones	Inside CZ4	--	--	--	--	--	
Elevation	Below 500 feet	--	--	--	--	--	Above 500 feet
Land covers impacted/ mitigated	chenopod scrub	Annual grassland,	--	Rural residential, ruderal	--	--	All others
Does project effect/protect hydrology in the watershed in a way that would degrade/improve vernal pool habitats downstream	Yes					No	
Soils present in impact area	Alkali soils	--	--	--	--	--	others
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	--
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	--
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix E. Continued

Table E-17. Impact/Mitigation Scoring for Livermore tarplant in the EACCS study area.

Livermore tarplant Conservation Zones	5	4	3	2	1	0	Score
Inside CZ2 or CZ4	--	--	--	--	--	--	Other CZ
Elevation	500-600 feet	--	--	--	--	--	Above 600 feet
Land covers impacted/ mitigated	Alkali meadow and scald	--	--	Annual grassland	--	--	All others
Within EBCNPS Priority Plant Protection Area	Yes	--	No	--	--	--	--
On parcels with an approved management plan for this species.	Yes	--	--	--	No	--	--
Total Score							

Note: The ratio of mitigation to impact depends on the location of the mitigation. The acres of mitigation for a given project would be determined using the ratios shown in Table 3-12. Habitat quality of the impact site and the mitigation site would be scored using this table.

Appendix F

Conservation Easement Toolkit

Example Conservation Easement Template

PLEASE NOTE:

The following Conservation Easement Deed is provided by the multi-agency Project Delivery Team as a standardized template document for Mitigation and Conservation Banks in California. Any modifications to this template shall be identified using tracked changes or other electronic comparison and explained in a memorandum.

(Template Version Date: July 2009)

**RECORDING REQUESTED BY AND
WHEN RECORDED MAIL TO:**

[*Fill in Grantee Name/Address*]

Grantee Name

Grantee Address

City, State ZIP

Attn: _____

Space Above Line for Recorder's Use Only

CONSERVATION EASEMENT DEED
[*Insert Bank Name*]

THIS CONSERVATION EASEMENT DEED ("Conservation Easement") is made as of the _____ day of _____, 20____, by [*insert full legal name(s) of Grantor: _____*] ("Grantor"), in favor of [*insert Grantee's full legal name: _____*] [*if CDFG is Grantee insert: the State of California*] ("Grantee"), with reference to the following facts:

RECITALS

A. Grantor is the sole owner in fee simple of certain real property containing approximately _____ acres, located in the City of [*insert City name*], County of [*insert County name*], State of California, and designated Assessor's Parcel Number(s) [*insert Assessor's Parcel Number(s)*] (the "Bank Property"). The Bank Property is legally described and depicted in **Exhibit A** attached to this Conservation Easement and incorporated in it by this reference.

B. The Bank Property possesses wildlife and habitat values of great importance to Grantee, the people of the State of California and the people of the United States. The Bank Property will provide high quality natural, restored and/or enhanced habitat for [*specify listed and sensitive plant and/or animal species*] and contain [*list habitats; native and/or non-native*], [*include the following phrase only if there are jurisdictional wetlands: and restored, created, enhanced and/or preserved jurisdictional waters of the United States*]. Individually and collectively, these wildlife and habitat values comprise the "Conservation Values" of the Bank Property.

C. The California Department of Fish and Game ("CDFG") has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and the habitat necessary for biologically sustainable populations of these species pursuant to California Fish and Game Code Section 1802. CDFG is authorized to hold easements for these purposes pursuant to California Civil Code Section 815.3, Fish and Game Code Section 1348, and other provisions of California law.

D. The United States Fish and Wildlife Service (the "USFWS"), an agency within the United States Department of the Interior, has jurisdiction over the conservation, protection, restoration and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of these species within the United States pursuant to the federal Endangered Species Act, 16 U.S.C. Section 1531, *et seq.*, the Fish and Wildlife Coordination Act, 16 U.S.C. Sections 661-666c, the Fish and Wildlife Act of 1956, 16 U.S.C. Section 742(f), *et seq.*, and other provisions of federal law.

E. **[Remove/modify this recital as appropriate when USEPA or USACE is not a signatory to the BEI or CBEI]**. The U.S. Environmental Protection Agency ("USEPA") and U.S. Army Corps of Engineers ("USACE") have jurisdiction over waters of the United States pursuant to the federal Clean Water Act, 33 U.S.C. Section 1251, *et seq.*

F. **[Use this version of Recital F when qualified nonprofit organization is Grantee]**. Grantee is authorized to hold this conservation easement pursuant to California Civil Code Section 815.3 and Government Code Section 65965. Specifically, Grantee is (i) a tax-exempt nonprofit organization qualified under section 501(c) (3) of the Internal Revenue Code of 1986, as amended, and qualified to do business in California; (ii) a "qualified organization" as defined in section 170(h) (3) of the Internal Revenue Code; and (iii) an organization which has as its primary and principal purpose and activity the protection and preservation of natural lands or resources in its natural, scenic, agricultural, forested, or open space condition or use.

[Use this version of Recital F when governmental entity is Grantee]. Grantee is authorized to hold this conservation easement pursuant to California Civil Code Section 815.3. Specifically, Grantee is a governmental entity identified in Civil Code Section 815.3 (b) and otherwise authorized to acquire and hold title to real property.

G. **[Modify this recital as appropriate when CDFG, USFWS, USEPA or USACE is not a signatory to the BEI or CBEI.]** This Conservation Easement is granted pursuant to the **[insert the appropriate term: Mitigation Bank Enabling Instrument (the "BEI") or Conservation Bank Enabling Instrument (the "CBEI")]**, by and between **[insert Bank Sponsor name(s)]**, **[insert Bank Property Owner name(s)]**, and **[insert Region name]** CDFG, CDFG Tracking No. **[insert number]**, the **[insert Field Office name]** of the USFWS, USFWS File No. **[insert number]**, the **[insert District name]** District of USACE, USACE File No. **[insert number]**, and Region IX of the USEPA, entered into concurrently with this Conservation Easement, and the Bank Development Plan (the "Development Plan"), and the Interim Management Plan and Long-Term Management Plan (as applicable, the "Management Plan") created under the **[insert: BEI or CBEI]**. **[Remove reference to any agency that is not a party to the BEI or CBEI]** CDFG, USFWS, USACE, and USEPA are together referred to in this Conservation Easement as the "Signatory Agencies".

A final, approved copy of the [*insert: BEI or CBEI*], the Development Plan and the Management Plan, and any amendments thereto approved by the Signatory Agencies, shall be kept on file at the respective offices of the Signatory Agencies. If Grantor, or any successor or assign, requires an official copy of the [*insert: BEI or CBEI*], the Development Plan or the Management Plan, it should request a copy from one of the Signatory Agencies at its address for notices listed in Section 12 of this Conservation Easement.

The [*insert: BEI or CBEI*], the Development Plan and the Management Plan are incorporated by this reference into this Conservation Easement as if fully set forth herein.

H. All section numbers referred to in this Conservation Easement are references to sections within this Conservation Easement, unless otherwise indicated.

COVENANTS, TERMS, CONDITIONS AND RESTRICTIONS

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, and pursuant to the laws of the United States and the State of California, including California Civil Code Section 815, *et seq.*, Grantor hereby voluntarily grants and conveys to Grantee a conservation easement in perpetuity over the Bank Property.

1. Purposes.

The purposes of this Conservation Easement are to ensure that the Bank Property will be retained forever in its natural, restored, or enhanced condition as contemplated by the [*insert: BEI or CBEI*], the Development Plan, and the Management Plan, and to prevent any use of the Bank Property that will impair or interfere with the Conservation Values of the Bank Property. Grantor intends that this Conservation Easement will confine the use of the Bank Property to activities that are consistent with such purposes, including, without limitation, those involving the preservation, restoration and enhancement of native species and their habitats implemented in accordance with the [*insert: BEI or CBEI*], the Development Plan and the Management Plan.

2. Grantee's Rights.

To accomplish the purposes of this Conservation Easement, Grantor hereby grants and conveys the following rights to Grantee:

(a) To preserve and protect the Conservation Values of the Bank Property.

(b) To enter the Bank Property at reasonable times, in order to monitor compliance with and otherwise enforce the terms of this Conservation Easement, the [*insert: BEI or CBEI*], the Development Plan and the Management Plan and to implement at Grantee's sole discretion Development Plan and Management Plan activities that have not been implemented, provided that Grantee shall not unreasonably interfere with Grantor's authorized use and quiet enjoyment of the Bank Property.

(c) To prevent any activity on or use of the Bank Property that is inconsistent with the purposes of this Conservation Easement and to require the restoration of such areas or features of the Bank Property that may be damaged by any act, failure to act, or any use or activity that is inconsistent with the purposes of this Conservation Easement.

(d) To require that all mineral, air and water rights as Grantee deems necessary to preserve and protect the biological resources and Conservation Values of the Bank Property shall remain a part of and be put to beneficial use upon the Bank Property, consistent with the purposes of this Conservation Easement.

(e) All present and future development rights appurtenant to, allocated, implied, reserved or inherent in the Bank Property; such rights are hereby terminated and extinguished, and may not be used on or transferred to any portion of the Bank Property, nor any other property adjacent or otherwise.

3. Prohibited Uses.

Any activity on or use of the Bank Property that is inconsistent with the purposes of this Conservation Easement is prohibited. Without limiting the generality of the foregoing, the following uses and activities by Grantor, Grantor's agents, and third parties are expressly prohibited:

(a) Unseasonable watering; use of fertilizers, pesticides, biocides, herbicides or other agricultural chemicals; weed abatement activities; incompatible fire protection activities; and any and all other activities and uses which may impair or interfere with the purposes of this Conservation Easement [*include the following language only if the Development Plan or Management Plan, including any adaptive management measures, specifies such an exception:*], except for [*insert specific exception(s)*] as specifically provided in the [*specify: Development Plan or Management Plan*].

(b) Use of off-road vehicles and use of any other motorized vehicles except on existing roadways [*include the following language only if the Development Plan or Management Plan, including any adaptive management measures, specifies such an exception:*], except for [*insert specific exception(s)*] as specifically provided in the [*specify: Development Plan or Management Plan*].

(c) Agricultural activity of any kind [*include the following language only if the Development Plan or Management Plan, including any adaptive management measures, specifies such an exception:*] except grazing for vegetation management as specifically provided in the [*specify: Development Plan or Management Plan*].

(d) Recreational activities, including, but not limited to, horseback riding, biking, hunting or fishing except for personal, non-commercial, recreational activities of the Grantor, so long as such activities are consistent with the purposes of this Conservation Easement and specifically provided for in the Management Plan.

(e) Commercial, industrial, residential, or institutional uses.

(f) Any legal or de facto division, subdivision or partitioning of the Bank Property.

(g) Construction, reconstruction, erecting or placement of any building, billboard or sign, or any other structure or improvement of any kind [*include the following language only if the Development Plan or Management Plan specifies such an exception:*],

except for [*insert specific exception(s)*] as specifically provided in the [*specify:* Development Plan **or** Management Plan].

(h) Depositing or accumulation of soil, trash, ashes, refuse, waste, bio-solids or any other materials.

(i) Planting, introduction or dispersal of non-native or exotic plant or animal species.

(j) Filling, dumping, excavating, draining, dredging, mining, drilling, removing or exploring for or extracting minerals, loam, soil, sand, gravel, rock or other material on or below the surface of the Bank Property, or granting or authorizing surface entry for any of these purposes.

(k) Altering the surface or general topography of the Bank Property, including but not limited to any alterations to habitat, building roads or trails, paving or otherwise covering the Bank Property with concrete, asphalt or any other impervious material except for those habitat management activities specified in the Development Plan or Management Plan.

(l) Removing, destroying, or cutting of trees, shrubs or other vegetation, except as required by law for (i) fire breaks, (ii) maintenance of existing foot trails or roads, or (iii) prevention or treatment of disease [***include the following language only if the Development Plan or Management Plan specifies such an exception:***]; and except for [*insert specific exception(s)*] as specifically provided in the [*specify:* Development Plan **or** Management Plan].

(m) Manipulating, impounding or altering any natural water course, body of water or water circulation on the Bank Property, and any activities or uses detrimental to water quality, including but not limited to degradation or pollution of any surface or sub-surface waters [***include the following language only if the Development Plan or Management Plan specifies such an exception:***], except for [*insert specific exception(s)*] as specifically provided in the [*specify:* Development Plan **or** Management Plan].

(n) Without the prior written consent of Grantee, which Grantee may withhold, transferring, encumbering, selling, leasing, or otherwise separating the mineral, air or water rights for the Bank Property; changing the place or purpose of use of the water rights; abandoning or allowing the abandonment of, by action or inaction, any water or water rights, ditch or ditch rights, spring rights, reservoir or storage rights, wells, ground water rights, or other rights in and to the use of water historically used on or otherwise appurtenant to the Bank Property, including but not limited to: (i) riparian water rights; (ii) appropriative water rights; (iii) rights to waters which are secured under contract with any irrigation or water district, to the extent such waters are customarily applied to the Bank Property; and (iv) any water from wells that are in existence or may be constructed in the future on the Bank Property.

(o) Engaging in any use or activity that may violate, or may fail to comply with, relevant federal, state, or local laws, regulations, or policies applicable to Grantor, the Bank Property, or the use or activity in question.

4. Grantee's Duties.

(a) To ensure that the purposes of this Conservation Easement as described in Section 1 are being accomplished, Grantee and its successors and assigns shall:

(1) Perform, at a minimum on an annual basis, compliance monitoring inspections of the Bank Property; and

(2) Prepare reports on the results of the compliance monitoring inspections, and provide these reports to the Signatory Agencies on an annual basis.

(b) In the event that the Grantee's interest in this easement is held by, reverts to, or is transferred to the State of California, Section 4(a) shall not apply.

5. Grantor's Duties.

Grantor shall undertake all reasonable actions to prevent the unlawful entry and trespass by persons whose activities may degrade or harm the Conservation Values of the Bank Property or that are otherwise inconsistent with this Conservation Easement. In addition, Grantor shall undertake all necessary actions to perfect and defend Grantee's rights under Section 2 of this Conservation Easement, and to observe and carry out the obligations of Grantor under the [insert: BEI or CBEI], the Development Plan and the Management Plan.

6. Reserved Rights.

Grantor reserves to itself, and to its personal representatives, heirs, successors, and assigns, all rights accruing from Grantor's ownership of the Bank Property, including the right to engage in or permit or invite others to engage in all uses of the Bank Property that are not prohibited or limited by, and are consistent with the purposes of, this Conservation Easement.

7. Grantee's Remedies.

If Grantee determines that a violation of this Conservation Easement has occurred or is threatened, Grantee shall give written notice to Grantor of such violation and demand in writing the cure of such violation ("Notice of Violation"). If Grantor fails to cure the violation within thirty (30) days after receipt of a Notice of Violation, or if the cure reasonably requires more than thirty (30) days to complete and Grantor fails to begin the cure within the thirty (30)-day period or fails to continue diligently to complete the cure, Grantee may bring an action at law or in equity in a court of competent jurisdiction for any or all of the following: to recover any damages to which Grantee may be entitled for violation of the terms of this Conservation Easement or for any injury to the Conservation Values of the Bank Property; to enjoin the violation, *ex parte* as necessary, by temporary or permanent injunction without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies; to pursue any other legal or equitable relief, including but not limited to, the restoration of the Bank Property to the condition in which it existed prior to any violation or injury; or to otherwise enforce this Conservation Easement. Without limiting the liability of Grantor, Grantee may apply any damages recovered to the cost of undertaking any corrective action on the Bank Property.

If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate injury to the Conservation Values of the Bank Property, Grantee may pursue its remedies under this Conservation Easement without prior notice to Grantor or

without waiting for the period provided for cure to expire. Grantee's rights under this section apply equally to actual or threatened violations of this Conservation Easement.

Grantor agrees that Grantee's remedies at law for any violation of this Conservation Easement are inadequate and that Grantee shall be entitled to the injunctive relief described in this section, both prohibitive and mandatory, in addition to such other relief to which Grantee may be entitled, including specific performance of this Conservation Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies. Grantee's remedies described in this section shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity, including but not limited to the remedies set forth in California Civil Code Section 815, *et seq.* The failure of Grantee to discover a violation or to take immediate legal action shall not bar Grantee from taking such action at a later time.

(a) Costs of Enforcement.

All costs incurred by Grantee, where Grantee is the prevailing party, in enforcing the terms of this Conservation Easement against Grantor, including, but not limited to, costs of suit and attorneys' and experts' fees, and any costs of restoration necessitated by negligence or breach of this Conservation Easement, shall be borne by Grantor.

(b) Grantee's Discretion.

Enforcement of the terms of this Conservation Easement by Grantee shall be at the discretion of Grantee, and any forbearance by Grantee to exercise its rights under this Conservation Easement in the event of any breach of any term of this Conservation Easement shall not be deemed or construed to be a waiver of such term or of any subsequent breach of the same or any other term of this Conservation Easement or of any rights of Grantee under this Conservation Easement. No delay or omission by Grantee in the exercise of any right or remedy shall impair such right or remedy or be construed as a waiver.

(c) Acts Beyond Grantor's Control.

Nothing contained in this Conservation Easement shall be construed to entitle Grantee to bring any action against Grantor for any injury to or change in the Bank Property resulting from (i) any natural cause beyond Grantor's control, including, without limitation, fire not caused by Grantor, flood, storm, and earth movement, or any prudent action taken by Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Bank Property resulting from such causes; or (ii) acts by Grantee or its employees.

(d) Enforcement; Standing.

All rights and remedies conveyed to Grantee under this Conservation Easement shall extend to and are enforceable by [*insert if State of California is Grantee:* CDFG and] the Third-Party Beneficiaries (as defined in Section 14(m)). These enforcement rights are in addition to, and do not limit, the rights of enforcement under the [*insert: BEI or CBEI*], the Development Plan or the Management Plan. If at any time in the future Grantor uses, allows the use, or threatens to use or allow use of, the Bank Property for any purpose that is inconsistent with or in violation of this Conservation Easement then, despite the provisions of California Civil Code Section 815.7, the California Attorney General and the Third-Party Beneficiaries each has standing as an interested party in any proceeding affecting this Conservation Easement.

(e) Notice of Conflict.

If Grantor receives a Notice of Violation from Grantee or a Third-Party Beneficiary with which it is impossible for Grantor to comply consistent with any prior uncured Notice(s) of Violation, Grantor shall give written notice of the conflict (hereinafter "Notice of Conflict") to the Grantee and Third-Party Beneficiaries. In order to be a valid, a Notice of Conflict shall be given within fifteen (15) days of the date Grantor receives a conflicting Notice of Violation, shall include copies of the conflicting Notices of Violation, and shall describe the conflict with specificity, including how the conflict makes compliance with the uncured Notice(s) of Violation impossible. Upon issuing a valid Notice of Conflict, Grantor shall not be required to comply with the conflicting Notices of Violation until such time as the entity or entities issuing said conflicting Notices of Violation issue(s) revised Notice(s) of Violation that resolve the conflict. Upon receipt of a revised Notice of Violation, Grantor shall comply with such notice within the time period(s) described in the first grammatical paragraph of this Section. The failure of Grantor to issue a valid Notice of Conflict within fifteen (15) days of receipt of a conflicting Notice of Violation shall constitute a waiver of Grantor's ability to claim a conflict.

(f) [Add if nonprofit organization is Grantee] Reversion.

If the Signatory Agencies determine that Grantee is not holding, monitoring or managing this Conservation Easement for conservation purposes in the manner specified in this Conservation Easement or in the [*insert: BEI or CBEI*], the Development Plan or the Management Plan then, pursuant to California Government Code Section 65965(c), this Conservation Easement shall revert to the State of California, or to another public agency or nonprofit organization qualified pursuant to Civil Code Section 815.3 and Government Code Section 65965 (and any successor or other provision(s) then applicable) and approved by the Signatory Agencies.

8. Access.

This Conservation Easement does not convey a general right of access to the public.

9. Costs and Liabilities.

Grantor retains all responsibilities and shall bear all costs and liabilities of any kind related to the ownership, operation, upkeep, and maintenance of the Bank Property. Grantor agrees that neither Grantee nor Third-Party Beneficiaries shall have any duty or responsibility for the operation, upkeep or maintenance of the Bank Property, the monitoring of hazardous conditions on it, or the protection of Grantor, the public or any third parties from risks relating to conditions on the Bank Property. Grantor remains solely responsible for obtaining any applicable governmental permits and approvals required for any activity or use permitted by this Conservation Easement [*insert if CDFG or another government entity is Grantee:* , including permits and approvals required from Grantee acting in its regulatory capacity], and any activity or use shall be undertaken in accordance with all applicable federal, state, local and administrative agency laws, statutes, ordinances, rules, regulations, orders and requirements.

(a) Taxes; No Liens.

Grantor shall pay before delinquency all taxes, assessments (general and special), fees, and charges of whatever description levied on or assessed against the Bank Property by competent authority (collectively "Taxes"), including any Taxes imposed upon, or

incurred as a result of, this Conservation Easement, and shall furnish Grantee with satisfactory evidence of payment upon request. Grantor shall keep the Bank Property free from any liens (other than a security interest that is expressly subordinated to this Conservation Easement, as provided in Section 14(k)), including those arising out of any obligations incurred by Grantor for any labor or materials furnished or alleged to have been furnished to or for Grantor at or for use on the Bank Property.

(b) Hold Harmless.

(1) Grantor shall hold harmless, protect and indemnify Grantee and its directors, officers, employees, agents, contractors, and representatives and the heirs, personal representatives, successors and assigns of each of them (each a "Grantee Indemnified Party" and collectively, "Grantee's Indemnified Parties") from and against any and all liabilities, penalties, costs, losses, damages, expenses (including, without limitation reasonable attorneys' fees and experts' fees), causes of action, claims, demands, orders, liens or judgments (each a "Claim" and, collectively, "Claims"), arising from or in any way connected with: (i) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Bank Property, regardless of cause, except that this indemnification shall be inapplicable to any Claim due solely to the negligence of Grantee or any of its employees; (ii) the obligations specified in Sections 5, 9 and 9(a); and (iii) the existence or administration of this Conservation Easement. If any action or proceeding is brought against any of the Grantee's Indemnified Parties by reason of any such Claim, Grantor shall, at the election of and upon written notice from Grantee, defend such action or proceeding by counsel reasonably acceptable to the Grantee's Indemnified Party [*insert if CDFG is grantee:* or reimburse Grantee for all charges incurred for services of the California Attorney General in defending the action or proceeding].

(2) Grantor shall hold harmless, protect and indemnify Third-Party Beneficiaries and their respective directors, officers, employees, agents, contractors, and representatives and the heirs, personal representatives, successors and assigns of each of them (each a "Third-Party Beneficiary Indemnified Party" and collectively, "Third-Party Beneficiary Indemnified Parties") from and against any and all Claims arising from or in any way connected with: (i) injury to or the death of any person, or physical damage to any property, resulting from any act, omission, condition, or other matter related to or occurring on or about the Bank Property, regardless of cause and (ii) the existence or administration of this Conservation Easement. *Provided, however,* that the indemnification in this Section 9 (b) (2) shall be inapplicable to a Third-Party Beneficiary Indemnified Party with respect to any Claim due solely to the negligence of that Third-Party Beneficiary Indemnified Party or any of its employees. If any action or proceeding is brought against any of the Third-Party Beneficiary Indemnified Parties by reason of any Claim to which the indemnification in this Section 9 (b) (2) applies, then at the election of and upon written notice from the Third-Party Beneficiary Indemnified Party, Grantor shall defend such action or proceeding by counsel reasonably acceptable to the applicable Third-Party Beneficiary Indemnified Party or reimburse the Third-Party Beneficiary Indemnified Party for all charges incurred for services of the California Attorney General or the U.S. Department of Justice in defending the action or proceeding.

(c) Extinguishment.

If circumstances arise in the future that render the preservation of

Conservation Values, [*include this phrase only if there are jurisdictional wetlands*: including wetland functions and values,] or other purposes of this Conservation Easement impossible to accomplish, this Conservation Easement can only be terminated or extinguished, in whole or in part, by judicial proceedings in a court of competent jurisdiction.

(d) Condemnation.

[*Use the appropriate paragraph:*]

[*If CDFG or other state agency is Grantee:*] Condemnation. This

Conservation Easement is a "wildlife conservation easement" acquired by a State agency, the condemnation of which is prohibited except as provided in California Fish and Game Code Section 1348.3.

[*All other Grantees:*] Condemnation. The purposes of this Conservation Easement are presumed to be the best and most necessary public use as defined at California Code of Civil Procedure Section 1240.680 notwithstanding Code of Civil Procedure Sections 1240.690 and 1240.700.

10. Transfer of Conservation Easement or Bank Property.

(a) Conservation Easement.

This Conservation Easement may be assigned or transferred by Grantee upon written approval of the Signatory Agencies, which approval shall not be unreasonably withheld or delayed, but Grantee shall give Grantor and the Signatory Agencies at least sixty (60) days prior written notice of the proposed assignment or transfer. Grantee may assign or transfer its rights under this Conservation Easement only to an entity or organization: (i) authorized to acquire and hold conservation easements pursuant to California Civil Code Section 815.3 and Government Code Section 65965 (and any successor or other provision(s) then applicable), or the laws of the United States; and (ii) otherwise reasonably acceptable to the Signatory Agencies. Grantee shall require the assignee to record the assignment in the county where the Bank Property is located. The failure of Grantee to perform any act provided in this section shall not impair the validity of this Conservation Easement or limit its enforcement in any way. Any transfer under this section is subject to the requirements of Section 11.

(b) Bank Property.

Grantor agrees to incorporate the terms of this Conservation Easement by reference in any deed or other legal instrument by which Grantor divests itself of any interest in all or any portion of the Bank Property, including, without limitation, a leasehold interest. Grantor agrees that the deed or other legal instrument shall also incorporate by reference the [*insert: BEI or CBEI*], the Development Plan, the Management Plan, and any amendment(s) to those documents. Grantor further agrees to give written notice to Grantee and the Signatory Agencies of the intent to transfer any interest at least sixty (60) days prior to the date of such transfer. Grantee or the Signatory Agencies shall have the right to prevent any transfers in which prospective subsequent claimants or transferees are not given notice of the terms, covenants, conditions and restrictions of this Conservation Easement (including the exhibits and documents incorporated by reference in it). The failure of Grantor to perform any act provided in this section shall not impair the validity of this Conservation Easement or limit its enforceability in any way. Any transfer under this section is subject to the requirements of Section 11.

11. Merger.

The doctrine of merger shall not operate to extinguish this Conservation Easement if the Conservation Easement and the Bank Property become vested in the same party. If, despite this intent, the doctrine of merger applies to extinguish the Conservation Easement then, unless Grantor, Grantee, and the Signatory Agencies otherwise agree in writing, a replacement conservation easement or restrictive covenant containing the same protections embodied in this Conservation Easement shall be recorded against the Bank Property.

12. Notices.

Any notice, demand, request, consent, approval, or other communication that Grantor or Grantee desires or is required to give to the other shall be in writing, with a copy to each of the Signatory Agencies, and served personally or sent by recognized overnight courier that guarantees next-day delivery or by first class United States mail, postage fully prepaid, addressed as follows:

To Grantor: [Grantee name]
[Grantee address]
Attn: _____

To Grantee: [*insert the appropriate Grantee information:*]

[Department of Fish and Game]
[Region name] Region
[REGION ADDRESS]
[Attn: Regional Manager]

OR

[Grantee name]
[Grantee address]

[Remove/modify the following blocks as appropriate when CDFG or the USFWS are not signatories to the BEI or CBEI or third-party beneficiaries to the CE.]

To CDFG: [Department of Fish and Game]
[Region name] Region
[REGION ADDRESS]
[Attn: Regional Manager]

With a copy to: Department of Fish and Game
Office of General Counsel
1416 Ninth Street, 12th Floor
Sacramento, CA 95814-2090
Attn: General Counsel

To USFWS: United States Fish and Wildlife Service
[Field Office name] Field Office
[FIELD OFFICE ADDRESS]

Attn: Field Supervisor

[Remove/modify these blocks as appropriate when USEPA or USACE are not signatories to the BEI or CBEI or third-party beneficiaries to the CE.]

To USACE: U.S. Army Corps of Engineers
 [District name] District
 [DISTRICT ADDRESS]
 Attn: Chief, Regulatory Branch

To USEPA: U.S. Environmental Protection Agency, Region IX
 75 Hawthorne Street
 San Francisco, CA 94105
 Attn: Director, Water Division

or to such other address a party or a Signatory Agency shall designate by written notice to Grantor, Grantee and the Signatory Agencies. Notice shall be deemed effective upon delivery in the case of personal delivery or delivery by overnight courier or, in the case of delivery by first class mail, three (3) days after deposit into the United States mail.

13. Amendment.

This Conservation Easement may be amended only by mutual written agreement of Grantor and Grantee and written approval of the Signatory Agencies, which approval shall not be unreasonably withheld or delayed. Any such amendment shall be consistent with the purposes of this Conservation Easement and California law governing conservation easements, and shall not affect its perpetual duration. Any such amendment shall be recorded in the official records of the county in which the Bank Property is located, and Grantee shall promptly provide a conformed copy of the recorded amendment to the Grantor and the Signatory Agencies.

14. Additional Provisions.

(a) Controlling Law.

The interpretation and performance of this Conservation Easement shall be governed by the laws of the United States and the State of California, disregarding the conflicts of law principles of such state.

(b) Liberal Construction.

Despite any general rule of construction to the contrary, this Conservation Easement shall be liberally construed to effect the purposes of this Conservation Easement and the policy and purpose of California Civil Code Section 815, *et seq.* [**add if Grantee is nonprofit organization:** and Government Code Section 65965]. If any provision in this instrument is found to be ambiguous, an interpretation consistent with the purposes of this Conservation Easement that would render the provision valid shall be favored over any interpretation that would render it invalid.

(c) Severability.

If a court of competent jurisdiction voids or invalidates on its face any provision of this Conservation Easement, such action shall not affect the remainder of this

Conservation Easement. If a court of competent jurisdiction voids or invalidates the application of any provision of this Conservation Easement to a person or circumstance, such action shall not affect the application of the provision to any other persons or circumstances.

(d) Entire Agreement.

This document (including its exhibits and the [*insert: BEI or CBEI*]), the Development Plan, and the Management Plan incorporated by reference in this document) sets forth the entire agreement of the parties and the Signatory Agencies with respect to the Conservation Easement and supersedes all prior discussions, negotiations, understandings, or agreements of the parties relating to the Conservation Easement. No alteration or variation of this Conservation Easement shall be valid or binding unless contained in an amendment in accordance with Section 13.

(e) No Forfeiture.

Nothing contained in this Conservation Easement will result in a forfeiture or reversion of Grantor's title in any respect.

(f) Successors.

The covenants, terms, conditions, and restrictions of this Conservation Easement shall be binding upon, and inure to the benefit of, the parties and their respective personal representatives, heirs, successors, and assigns, and shall constitute a servitude running in perpetuity with the Bank Property.

(g) Termination of Rights and Obligations.

A party's rights and obligations under this Conservation Easement terminate upon transfer of the party's interest in the Conservation Easement or Bank Property, except that liability for acts, omissions or breaches occurring prior to transfer shall survive transfer.

(h) Captions.

The captions in this instrument have been inserted solely for convenience of reference and are not a part of this instrument and shall have no effect upon its construction or interpretation.

(i) No Hazardous Materials Liability.

(1) Grantor represents and warrants that it has no knowledge or notice of any Hazardous Materials (defined below) or underground storage tanks existing, generated, treated, stored, used, released, disposed of, deposited or abandoned in, on, under, or from the Bank Property, or transported to or from or affecting the Bank Property.

(2) Without limiting the obligations of Grantor under Section 9 (b), Grantor hereby releases and agrees to indemnify, protect and hold harmless the Grantee's Indemnified Parties (defined in Section 9 (b) (1)) from and against any and all Claims (defined in Section 9 (b)(1)) arising from or connected with any Hazardous Materials or underground storage tanks present, alleged to be present, released in, from or about, or otherwise associated with the Bank Property at any time, except any Hazardous Materials placed, disposed or released by Grantee or any of its employees. This release and indemnification includes, without

limitation, Claims for (A) injury to or death of any person or physical damage to any property; and (B) the violation or alleged violation of, or other failure to comply with, any Environmental Laws (defined below). If any action or proceeding is brought against any of the Grantee's Indemnified Parties by reason of any such Claim, Grantor shall, at the election of and upon written notice from the applicable Grantee Indemnified Party, defend such action or proceeding by counsel reasonably acceptable to the Grantee Indemnified Party [*add if CDFG is Grantee:* or reimburse Grantee for all charges incurred for services of the California Attorney General in defending the action or proceeding].

(3) Without limiting the obligations of Grantor under Section 9 (b), Grantor hereby releases and agrees to indemnify, protect and hold harmless the Third-Party Beneficiary Indemnified Parties (defined in Section 9 (b)(2)) from and against any and all Claims arising from or connected with any Hazardous Materials or underground storage tanks present, alleged to be present, released in, from or about, or otherwise associated with the Bank Property at any time, except that this release and indemnification shall be inapplicable to a Third-Party Beneficiary Indemnified Party with respect to any Hazardous Materials placed, disposed or released by that Third-Party Beneficiary Indemnified Party or any of its employees. This release and indemnification includes, without limitation, Claims for (A) injury to or death of any person or physical damage to any property; and (B) the violation of alleged violation of, or other failure to comply with, any Environmental Laws. If any action or proceeding is brought against any of the Third-Party Beneficiary Indemnified Parties by reason of any such Claim, Grantor shall, at the election or and upon written notice from the applicable Third-Party Beneficiary Indemnified Party, defend such action or proceeding by counsel reasonably acceptable to the Third-Party Beneficiary Indemnified Party for all charges incurred for services of the California Attorney General or the U.S. Department of Justice in defending the action or proceeding.

(4) Despite any contrary provision of this Conservation Easement, the parties do not intend this Conservation Easement to be, and this Conservation Easement shall not be, construed such that it creates in or gives to Grantee or any Third-Party Beneficiaries any of the following:

(A) The obligations or liability of an "owner" or "operator," as those terms are defined and used in Environmental Laws (defined below), including, without limitation, the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 U.S.C. § 9601, *et seq.*; hereinafter, "CERCLA"); or

(B) The obligations or liabilities of a person described in 42 U.S.C. § 9607(a)(3) or (4); or

(C) The obligations of a responsible person under any applicable Environmental Laws; or

(D) The right to investigate and remediate any Hazardous Materials associated with the Bank Property; or

(E) Any control over Grantor's ability to investigate, remove, remediate or otherwise clean up any Hazardous Materials associated with the Bank Property.

(5) The term "Hazardous Materials" includes, without limitation, (a) material that is flammable, explosive or radioactive; (b) petroleum products, including by-products and fractions thereof; and (c) hazardous materials, hazardous wastes, hazardous or toxic substances, or related materials defined in CERCLA, the Resource Conservation and Recovery Act of 1976 (42 U.S.C. § 6901, *et seq.*; hereinafter, "RCRA"); the Hazardous Materials Transportation Act (49 U.S.C. §5101, *et seq.*; hereinafter, "HTA"); the Hazardous Waste Control Law (California Health & Safety Code § 25100, *et seq.*; hereinafter, "HCL"); the Carpenter-Presley-Tanner Hazardous Substance Account Act (California Health & Safety Code § 25300, *et seq.*; hereinafter "HSA"), and in the regulations adopted and publications promulgated pursuant to them, or any other applicable Environmental Laws now in effect or enacted after the date of this Conservation Easement.

(6) The term "Environmental Laws" includes, without limitation, CERCLA, RCRA, HTA, HCL, HSA, and any other federal, state, local or administrative agency statute, ordinance, rule, regulation, order or requirement relating to pollution, protection of human health or safety, the environment or Hazardous Materials. Grantor represents, warrants and covenants to Grantee and Third-Party Beneficiaries that activities upon and use of the Bank Property by Grantor, its agents, employees, invitees and contractors will comply with all Environmental Laws.

(j) Warranty.

Grantor represents and warrants that Grantor is the sole owner of the Bank Property. Grantor also represents and warrants that, except as specifically disclosed to and approved by the Signatory Agencies pursuant to the Bank Property Assessment and Warranty signed by Grantor and attached as an exhibit to the [*insert: BEI or CBEI*], [*choose applicable statement:* there are no outstanding mortgages, liens, encumbrances or other interests in the Bank Property (including, without limitation, mineral interests) which may conflict or are inconsistent with this Conservation Easement *or* the holder of any outstanding mortgage, lien, encumbrance or other interest in the Bank Property (including, without limitation, mineral interest) which conflicts or is inconsistent with this Conservation Easement has expressly subordinated such interest to this Conservation Easement by a recorded Subordination Agreement approved by Grantee and the Signatory Agencies].

(k) Additional Interests.

Grantor shall not grant any additional easements, rights of way or other interests in the Bank Property (other than a security interest that is expressly subordinated to this Conservation Easement), nor shall Grantor grant, transfer, abandon or relinquish (each a "Transfer") any mineral, air, or water right or any water associated with the Bank Property, without first obtaining the written consent of Grantee and the Signatory Agencies. Such consent may be withheld if Grantee or the Signatory Agencies determine(s) that the proposed interest or Transfer is inconsistent with the purposes of this Conservation Easement or will impair or interfere with the Conservation Values of the Bank Property. This Section 14(k) shall not limit the provisions of Section 2(d) or 3(n), nor prohibit transfer of a fee or leasehold interest in the Bank Property that is subject to this Conservation Easement and complies with Section 10. Grantor shall provide a copy of any recorded or unrecorded grant or Transfer document to the Grantee and Signatory Agencies.

(l) Recording.

Grantee shall record this Conservation Easement in the Official Records of the County in which the Bank Property is located, and may re-record it at any time as Grantee deems necessary to preserve its rights in this Conservation Easement.

(m) Third-Party Beneficiary.

Grantor and Grantee acknowledge that the [*include the agencies that will be third-party beneficiaries:* CDFG, USFWS, USACE, and USEPA] (the “Third-Party Beneficiaries”) are third party beneficiaries of this Conservation Easement with the right of access to the Bank Property and the right to enforce all of the obligations of Grantor including, but not limited to, Grantor’s obligations under Section 14, and all other rights and remedies of the Grantee under this Conservation Easement.

(n) Funding.

Endowment funding for the perpetual management, maintenance and monitoring of the Bank Property is specified in and governed by the [*insert: BEI or CBEI*] and the Management Plan.

IN WITNESS WHEREOF Grantor has executed this Conservation Easement Deed the day and year first above written.

GRANTOR:

Approved as to form:

[*Remove or modify the approval block as appropriate, i.e., Grantee’s legal counsel if CDFG is not Grantee.*]

BY: _____

General Counsel

NAME: _____

State of California

TITLE: _____

Department of Fish and Game

DATE: _____

BY: _____

Ann S. Malcolm
General Counsel

[Delete this page if CDFG will not be Grantee. If the Grantee will be a government agency, that agency must include its own Certificate of Acceptance.]

CERTIFICATE OF ACCEPTANCE

This is to certify that the interest in real property conveyed by the Conservation Easement Deed by _____, dated _____, 20____, to the State of California, Grantee, acting by and through its Department of Fish and Game, a governmental agency (under Government Code § 27281), is hereby accepted by the undersigned officer on behalf of the Grantee pursuant to the Fish and Game Code.

GRANTEE:

[Remove or modify the approval block as appropriate if CDFG is not Grantee.]

STATE OF CALIFORNIA, by and through its
DEPARTMENT OF FISH AND GAME

By: _____

Title: _____
Authorized Representative

Date: _____

Management Plan Guide & Annotated Outline

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

**A GUIDE AND ANNOTATED OUTLINE
FOR WRITING
LAND MANAGEMENT PLANS**

December 2007
(Supercedes all previous documents)

Lands Program
Wildlife Branch
Resources Management and Policy Division
1812 Ninth Street
Sacramento, CA 95814

USING THIS OUTLINE

This outline has been prepared to help you write a management plan that is useful and easily read by those who want information about Department-administered lands. It provides instructions and examples for writing each chapter. It also serves as an example for the required format. **Each chapter heading (identified by a Roman numeral) should be addressed within the plan.** The amount of information provided within each chapter will be determined by the intensity of management necessary to maintain the property as viable wildlife habitat. **In some cases, it may not be necessary to use certain subheadings; these are listed as optional in the outline.**

Periodically, this outline will be revised to reflect additional information, style improvements, and streamlining efforts. Any questions and comments regarding this outline or the writing of management plans may be directed to the Lands and Facilities Branch, Teresa Le Blanc, (916) 445-3499 or tleblanc@dfg.ca.gov.

SOME TIPS AND NECESSARY FORMAT INFORMATION:

A Table of Contents containing page numbers for chapters and sections must be provided.

Page numbers should appear on every page of your plan, including all maps, tables, and figures. Chapter I, Introduction, is page one and is always unnumbered. All pages preceding page one should be numbered with lower case Roman numerals, starting with -i- on the Table of Contents page.

Tables and figures should be placed immediately following the page where they are first mentioned in the text (for example, if Figure 1 is mentioned on page 3 for the first time, it appears as page 4).

All figures should be prepared on 8-1/2 x 11-inch paper so that reproduction remains a simple task. To prepare professional-looking figures, maintain a minimum ½-inch border. Each figure and table should be numbered and titled. The title should reflect what the figure depicts, such as a location map or habitat types on the property. The numbers and titles of figures and tables may be listed under a separate List of Figures (or Tables); see Table of Contents for example. Compass direction and mileage scale should be included on all figures which illustrate geographical features.

TITLE AND SIGNATURE PAGES

The following two pages are examples of the Title Page and Signature Page which are required for each plan.

E X A M P L E (Title Page)

State of California
The Resources Agency
DEPARTMENT OF FISH AND GAME

DRAFT LAND MANAGEMENT PLAN

for

(NAME OF AREA)

Month, Year

E X A M P L E (Signature Page)

(NAME OF AREA) FINAL DRAFT MANAGEMENT PLAN

Prepared by: Name
Address
Phone

Approved by:

Regional Manager

Date

Deputy Director for Regional Operations

Date

TABLE OF CONTENTS

The Table of Contents of each land management plan should follow the same format as shown on page i of this document. All pages, starting with Chapter I, Introduction, are numbered consecutively, including figures, tables, and maps. Appendices have their own separate page numbers such as A-1, A-2,.., B-1, B-2,....

TABLE OF CONTENTS

	Page No.
TABLE OF CONTENTS	x
ACKNOWLEDGEMENTS (Optional)	x
LIST OF FIGURES (Optional)	x
LIST OF TABLES (Optional)	x
I. INTRODUCTION	x
A. Purpose of Acquisition	x
B. Acquisition History	x
C. Purpose of This Management Plan	x
II. PROPERTY DESCRIPTION	x
A. Geographical Setting	x
B. Property Boundaries and Adjacent Lands	x
C. Geology, Soils, Climate, Hydrology	x
D. Cultural Features	x
1. Archaeology	x
2. Historic Land Use	x
3. Existing Structures	x
III. HABITAT AND SPECIES DESCRIPTION	x
A. Vegetation Communities, Habitats and Plant Species	x
B. Animal Species	x
C. Threatened, Rare or Endangered Species	x
IV. MANAGEMENT GOALS AND ENVIRONMENTAL IMPACTS	x
A. Definition of Terms Used in This Plan	x
B. Biological Elements: Goals & Environmental Impacts	x
1. Operations and Maintenance Tasks (Optional)	x
C. Public Use Elements: Goals & Environmental Impacts	x
1. Operations and Maintenance Tasks (Optional)	x
D. Facility Maintenance Elements: Goals & Environmental Impacts	x
1. Operations and Maintenance Tasks (Optional)	x

- E. Biological Monitoring Element
1. Species and Habitat Monitoring
 2. Consistency with any regional planning effort

V. OPERATIONS AND MAINTENANCE SUMMARY

- A. Operations and Maintenance Tasks to Implement Plan
(if not provided under IV.B.1, C.1, or D.1 above)

x

- B. Existing Staff and Additional Personnel Needs Summary

x

- C. Operations and Maintenance Summary (Optional)

x

VI. REFERENCES (For all citations within plan)

x

APPENDICES: As necessary to list:

- Legal description of property,
- Animal and plant species,
- Soil types/surveys,
- Climatic information
- Environmental Checklist and Discussion of potential impacts (CEQA)
- Additional Consultation Documents
- Public comments and our responses to them
- MOU/MA
- Site interpretive plan
- Fire plan
- Monitoring plan
- Grazing plan

ACKNOWLEDGEMENTS (Optional)

The author(s) may wish to thank groups or individuals who helped prepare the plan or provided necessary information or guidance.

LIST OF FIGURES (Optional)

If appropriate, a list of figures (which includes all maps, drawings, or charts) may be provided here along with their page numbers.

LIST OF TABLES (Optional)

If appropriate, a list of any tables provided in the management plan may be provided here along with their page numbers.

A. Purpose of Acquisition

Describe the primary purpose for which this property was acquired by the Department, using the Land Acquisition Evaluation (LAE) or Conceptual Area Protection Plan (CAPP) and Wildlife Conservation Board minutes for consistency. Additional purposes should also be stated. Be brief, but provide summary information about the management objectives presented later within the plan. Describe the resources protected by this acquisition in very general terms.

B. Acquisition History (This section may be combined with Section A if the description is straightforward)

Describe the circumstances leading to acquisition which might include local or regional development pressure, environmental concerns, inholding consolidation, or other issues, and list any local or regional groups which had influence in promoting this acquisition. If this acquisition is part of a CAPP or an addition to an existing DFG property, it should be mentioned here. If it is an addition, then this plan would be an “addendum to the existing plan.”

Give the acquisition transaction date(s) and the total number of acres acquired. This information is available from the Regional Lands Coordinator who should have a file for each property in the region. The Regional Lands Coordinator also maintains an updated lands inventory containing this information. If special or dedicated funds were used to acquire this property and, therefore, may possibly influence management objectives, name the source of funding here.

C. Purpose of This Management Plan

The following language is required to be stated in the plan to clearly delineate the department's purposes in preparing such plans:

- 1) The plan guides the adaptive management of habitats, species, and programs described herein to achieve the department's mission to protect and enhance wildlife values.
- 2) The plan serves as a guide for appropriate public uses of the property.
- 3) The plan serves as a descriptive inventory of fish, wildlife and native plant habitats which occur on or use this property.

- 4) The plan provides an overview of the property's operation and maintenance, and personnel requirements to implement management goals. It serves as a budget planning aid for annual regional budget preparation.
- 5) The plan provides a description of potential and actual environmental impacts and subsequent mitigation which may occur during management, and contains environmental documentation to comply with state and federal statutes and regulations.

II. PROPERTY DESCRIPTION

This chapter should provide the most current information available to describe the geographical, physical, and cultural site characteristics and features to promote good management of the area. Some of the following subsections may be combined if the subjects below are addressed and information is presented in a logical sequence.

A. Geographical Setting

Describe property location clearly, giving written instructions on how it can be reached by land transportation, and provide a regional map (Map 1) which identifies county and major state or federal highway access to the property. Local towns and crossroads should be shown, as well as compass direction (north), and mileage scale. This is an overview map which gives the unfamiliar reader a regional perspective for locating the property. The map may be a computer-generated schematic or high quality hand-prepared technical illustration; it can also be prepared using a highway map, as long as the reproduction is clear and understandable. The map size should be 8-1/2 x 11 inches.

B. Property Boundaries and Adjacent Land Use

Provide a property map (Map 2) with boundaries distinctly outlined to place it in perspective with adjacent lands. Boundaries should be understandable so that map-users can identify DFG lands. The map should contain sufficient detail to provide information on entrances to and any open roads within the site. Compass direction and mileage scale should be given on the map. Size should be 8-1/2 x 11 inches.

Give a brief description of adjacent land use and prior land use on the property, if known, and provide the names of the USGS topographic map quadrangles in which the property is located. Provide legal property descriptions (Township/Range/Section or metes and bounds) in an appendix (this information is contained in the quarterly lands inventory held by the Regional Lands Coordinator).

[It is strongly suggested that each region maintain a photo file of any existing indicators of boundaries of properties owned by DFG within that region. Old fences, rock walls, monuments, or other physical structures should be photographed as soon as escrow closes. These photographs should be kept on file with the other land inventory documents in each regional office.]

C. Geology, Soils, Climate and Hydrology

These subjects may be combined into one subheading or separated for individual discussion, depending upon how much information is provided. You should give the reader an overall assessment of geological, edaphic, climatic and hydrologic factors which will influence management objectives. You only need to provide information which is pertinent to management of the area.

Geological information which describes how the area evolved or how it relates to the surrounding geological formations can be useful in describing the overall area (eg., alluvial valleys, volcanic outcrops, floodplains).

Soil survey information, obtained from National Resource Conservation Service for most counties, may influence species distributions, water regimes and agricultural activities. Soil types which have significant impacts on management should be discussed here. A soils map may be helpful in making management decisions if soil types are important or complex. A detailed description is not necessary unless it relates to management.

A discussion of local climate should include useful information such as seasonal norms for high and low temperatures, seasonal average precipitation, growing season, and any other climatic factors which influence the area, or should be considered in managing the property.

On some properties, hydrological and water right information will be extremely important. Describe all known surface and subsurface water sources and their seasonal influences on management of the area. If there are wells on the area, the depth to groundwater and pumping rate should be provided, if known. Provide information regarding any surface water rights, (i.e. riparian, pre-1914, adjudicated, appropriative) and current points of diversion. For appropriative rights, include State Water Resources Control Board application permit and license numbers and identify whether use is for direct diversion, storage or both. Also, identify any contracts, MOU's or other agreements related to water use. Please contact the Water Coordinator at (916) 323-7215 if you have further questions about water appropriation, contracts or water rights issues for wildlife areas or ecological reserves.

D. Cultural Features

Describe any known archeological sites without providing their specific locations on the property, and include a summary of the results of any site surveys/inventories, including who conducted them. An assessment of the impacts of management should be given for such sites. Check within the CEQA Guidelines for appropriate action in dealing with suspected or existing archeological sites. All database searches and actual field survey data are confidential. Check with the Lands Program on appropriate archival storage. At the minimum, state that an archeological survey will be initiated where appropriate, prior to any management activity.

Describe all existing structures including roads, levees, fencing, and buildings, and their intended future use on the area. If such structures are likely to be considered "historical resources" of the state pursuant to Executive Order W-26-92 and historic resources preservation laws, all state agencies must preserve and maintain these resources to the extent prudent and feasible within existing budget and personnel resources. Information may also be obtained from the State Historical Preservation Office and the California Native American Heritage Commission.

[The region should maintain a photographic inventory of all structures present on the property at the time of close of escrow.]

III. HABITAT AND SPECIES DESCRIPTION

This chapter provides a descriptive inventory of habitats and species which are located on or use the property. General ecological information necessary for proper management of habitats should be presented in this section. Ensure that the distinction between "potential" and "known to occur" (with reference) is documented for all species. This information will be included in a database developed by the Lands Program to catalog the biological resources occurring on the Department's lands. This database is known as the Biological Resources Inventory (BRI).

A. Vegetation Communities, Habitats and Plant Species

Describe each major native plant community or habitat which occurs on the property. If helpful, a vegetation or habitat map can be included here. Be sure to name any special natural communities which are listed in the Natural Diversity Database (NDDB) which can be accessed through the "Rarefind 3" program, available from the Biogeographic Data Branch at (916) 324-3812 or at their website. General habitat descriptions should follow the "List of California Terrestrial Natural Communities" based on the classification described in A Manual of California Vegetation (Sawyer-Keeler Wolf 1995). You may also use the classification system employed by the Department's Wildlife Area Habitat Committee for more intensively managed wetland units.

Provide an inventory (list), if available, of native plant species which are known or likely to occur on the property. Include non-native vegetation as well. Generally, the list can be placed in an appendix, but major species affected by or targeted for management should be mentioned within the text. An overview of their habitat and management requirements should be presented here. Use proper nomenclature for preparing the list of species which generally includes scientific name (the common name should also be included). The regional plant ecologist can provide assistance in how to prepare these lists. If an inventory has not yet been completed for the property, the Department's Habitat Conservation Branch (HCB) has requested that the plan adopt their recommended language for plant surveys. For example, make a statement to the effect that at the earliest feasible opportunity, and before natural habitats are manipulated, inventories will be conducted to determine that no rare, threatened or endangered plant or special plant species or communities will be negatively impacted by management activities. This language can be acquired by contacting HCB at (916) 653-4875 or by visiting their website.

B. Animal Species

Provide an inventory (list), if available, of animals (including fish, reptiles, amphibians, birds, and mammals) which are known to inhabit or seasonally use this property. Lists can be placed in an appendix, but species affected by or designated for particular management objectives should be mentioned here. An overview of their habitat and management requirements should be presented here. If inventories have not yet been completed, provide a list of species which could potentially inhabit or use the area based on personal field experience and the Department's California Wildlife Habitat Relationships (CWHR) model. Further information may be found by contacting the CWHR Program at (916) 327-8822. Make a statement to the effect that at the earliest feasible opportunity, and before natural habitats are manipulated, inventories will be conducted to determine that no animal T&E species or special species will be negatively impacted by management activities.

C. Endangered, Threatened and Rare Species

List all T&E and rare plants and animals which use the property and briefly describe their ecological requirements. This includes all federal or state listed species as well as those of special concern to the department. Mammals, birds, plants, invertebrates, fish, reptiles, and amphibians require separate headings if combined into one list. State that internal coordination has been accomplished with Department experts to address any management concerns for state-listed species. Document the internal coordination in writing and referenced in an addendum. The documentation may be entitled "Information on the Effects of the Implementation of the Management Plan on Special Status Species." If a species is federally-listed, but not state-listed, at a minimum there should be consultation with the USFWS (pursuant to our Section 6(c) Cooperative Agreement, dated 8/26/91). This consultation will result in a decision on whether a Federal Biological Opinion is necessary. Consultation should also occur with other federal agencies where appropriate.

IV. MANAGEMENT GOALS AND ENVIRONMENTAL IMPACTS

Chapter IV defines the terms used and provides management direction and CEQA documentation for management actions on this property. The goals and tasks stated here should guide all management decisions until such time as the plan is revised and updated. This chapter provides documentation required by federal and state laws pertinent to environmental impacts and endangered species protection.

The following terms and definitions (in boldface) should be presented at the beginning of this chapter to familiarize the reader with terminology used in the plan. *Include definitions for only those terms you use in the plan.*

A. Definitions of Terms Used in This Plan

- 1. Element:** An element refers to any biological unit, public use activity, or facility maintenance program as defined below for which goals have been prepared and presented within this plan.

Since the “elements” are the basis of the plan, be sure to discuss what types of elements are necessary with other regional staff that is familiar with the area and/or resources. We don't want to have so many elements, that goals become redundant, but we do want to discuss all elements to be affected by management on the property.

- 2. Biological Element:** These elements consist of species, habitats, or communities for which specific management goals have been developed within the plan.

With the exception of state- or federally-listed species, biological elements should always be defined in terms of habitat management programs, since the Department's current management objectives are ecosystem or multi-species oriented. When appropriate, state- or federally-listed species management goals should also be contained within the context of a habitat management program. In some cases, this may not be possible and single species management programs should then be considered as separate biological elements.

Within each defined biological element using the NDDB classification based on Sawyer-Keeler Wolf habitats, biological and public use management goals should be specified and described. Criteria used to identify biological elements have been determined by the Department and include but are not limited to the following:

- a) Protection of the element is authorized or mandated by legislation or official policy (e.g., furthering the goals of the North American Waterfowl Plan, Wetlands Policy, or Proposition 70). An example: Coastal and Valley Freshwater Marsh (NDDB type).
- b) Any listed, candidate, or sensitive species, or species of special concern known or suspected to occur on or to use the property must be specified within another element or as a separate biological element.
- c) Essential habitat for one or more listed species must be specified as a biological element. An example is vernal pool habitat upon which numerous state-listed plant species depend.
- d) Manipulated habitats which are intensively managed for fish and wildlife values must be specified as biological elements. An example is Coastal and Valley Freshwater Marsh which is created and/or enhanced on certain DFG lands for migratory waterfowl and other associated wetland species.
- e) Restoration efforts which may restore an extirpated species or habitat, or maintenance efforts which may avoid the threat of extirpation. An example is Great Valley Cottonwood Riparian (NDDB type).

3. Public Use Elements: Public use elements are any recreational, scientific, or other use activity appropriate to and compatible with the purposes for which this property was acquired.

When drafting appropriate public use activities, think about potential impacts to the area's resources. The proposed public use should be related to wildlife or wild lands. In addition, a reasonable and defensible correlation between the proposed public use and how it relates to the primary mission of the Department's land management policies should be articulated. If reasonable public use is justified, it may also be tempered with limits on actual number of public involved, lottery scenarios and other methods to avoid resource impacts. Be sure to coordinate with any existing CCR Title 14, Sections 550-552 or Section 630 regulations.

Additionally, the USFWS may have future draft policies regarding other activities on federally-aided Department properties. Please contact the Federal Aid Coordinator, at (916) 445-3472 for further information.

Criteria used to characterize such public use elements include but are not limited to:

- a) Use is authorized or mandated by legislation or official policy (e.g., uses such as hunting, fishing, and interpretive programs).
- b) Use is compatible with fish and wildlife requirements in the area if properly conducted (e.g., hunting or scientific research programs).
- c) Historical uses which may be restricted seasonally or year-round under this plan due to incompatibility with biological element needs (e.g., fishing or interpretive programs).

4. Facility Maintenance Element: This is a general purpose element describing the maintenance and administrative program which helps maintain orderly and beneficial management of the area.

This might also include canned language regarding the Fish and Game Commission's "Interim Joint Policy on Pre, During and Post Fire Activities and Wildlife Habitat" with the California State Board of Forestry which may be applied to Department lands. In brief, the policy calls for coordination with local regional CDF units on wildfire suppression, staging fire fighting equipment, access points, identifying safety hazard areas to fire fighting personnel, post fire activities (eg. restoration) and preventive fuel or fire breaks, specifically in sensitive habitat areas. A statement may be needed to address local vegetation clearance ordinances and various appropriate clearing methods (eg. mowing, discing, blading, etc.). In some cases, a separate prescription burn plan may be appropriate, described briefly under a "Biological Element" and the plan attached as an addendum.

An example of a facility maintenance element is provided later in this chapter.

5. Biological Goal: A biological goal is the statement of intended long-range results of management based upon the feasibility of maintaining, enhancing or restoring species populations and/or habitat.

Biological goals may be, for example, restoration of riparian habitat to its pre-disturbed state or maintaining a particular habitat for optimal deer herd size.

6. Public Use Goal: A public use goal is the statement of the desired type and level of public use compatible with the biological element goals previously specified within the plan.

Public use goals could be to educate the public about rare species or special habitats on the property, or to promote hunting or fishing programs on the property.

Examples of goals are:

- 1) to provide nesting habitat for a certain species over a given period of time;
- 2) to revegetate a former riparian community;
- 3) to build ponds and/or levees to provide wintering waterfowl areas;
- 4) to maintain roads for public access.

7. Tasks: Tasks are the individual projects or work elements which implement the goal and are useful in planning operation and maintenance budgets.

Examples of tasks are:

- 1) grading and graveling roads;
- 2) specific maintenance on existing levees;
- 3) description of types of revegetation efforts;
- 4) specific maintenance tasks on buildings.

Chapter IV, Part B is the most important section, so read thoroughly:

B. Biological Elements: Goals & Environmental Impacts

Section B should have a subsection for every biological element described. Within each subsection, provide:

- 1) the name and general description of biological element;
- 2) general long-range goals;

- 3) operations and maintenance tasks required to complete each goal (this information is optional).

A description should accompany each *goal* which provides management information and direction on how to meet or exceed the goal. Tasks should be described sufficiently to provide information on how restoration, maintenance, or enhancement of this particular element will be accomplished. If O&M tasks are listed in a summary table, these should provide specific detail on how goals will be met by task performance.

After the goals are characterized, briefly describe any internal or external management constraints which may affect meeting those goals. Some examples are:

- 1) environmental factors such as the influence of local water availability (either surface or subsurface waters); the introduction or spread of non-native species; presence of T&E species; flood; drought; erosion; air pollution; hazardous waste materials;
- 2) legal, political or social factors such as federal, legislative, or Fish and Game Commission policies or regulations which influence or mandate certain types of management; special permitting requirements (eg., COE 404, T&E species, archeological sites); city and/or county ordinances (eg., nuisance abatement); MOUs or other special agreements with private or public entities; water, timber, or mineral rights for the area;
- 3) financial factors such as the source of funding to be used for operation and maintenance, personnel requirements, and overall management of the area (fund source may dictate management direction).

Discuss potential *environmental impacts* from management decisions and mitigation measures which will be employed, if necessary, to avoid or significantly reduce such impacts. If the plan doesn't describe proposed management actions and consider their impacts in **sufficient** detail, CEQA requirements will not be adequately fulfilled by this plan. Any new activities will have to be addressed in future, stand alone CEQA documents on a project-by-project basis. The Department's land management planning process is subject to CEQA based on the interpretation that the planning of certain management tasks with the intent of implementing those tasks falls under the definition of a "project". CEQA defines projects as any activities which may cause a direct physical change or a

reasonably foreseeable physical change in the environment. Depending on the specificity of goals and /or tasks described in the plan, the Region determines whether or not the plan will be considered a “project” under CEQA definition. However, an environmental checklist shall be prepared to show that appropriate consideration was given to potential environmental impacts with the accompanying Negative Declaration. In rare cases, there may be circumstances when a proposed management activity(ies) may result in significant adverse impacts. That determination may trigger an Environmental Impact Report (EIR). Regional personnel should consult with the Lands Program and Habitat Conservation Planning staff in the Region and at headquarters for further direction.

When describing goals for T&E species elements, follow federal and state guidelines which include *consultation with the U.S. Fish & Wildlife Service* (USFWS) or NOAA Fisheries Service for federally-listed species which use the property. It is the intent of the Department and Fish and Game Commission policy not to undertake projects that adversely impact a rare, threatened or endangered species or their habitats (paraphrased from DFG’s operations manual and Fish and Game Code, Section 2053). Internal discussion for state listed species shall be coordinated with the Department’s own experts either in the Region or at Headquarters. Although formal “Biological Opinions” are not prepared, document the coordination in writing that addresses any potential management actions that may impact state listed plants, animals or their habitats. The documentation may be an Addendum to the plan and may be entitled “Information on the Effects of Implementation of the Management Plan on Special Status Species”. If a species is federally-listed, but not state-listed, at a minimum there should be consultation with the USFWS (pursuant to our Section 6(c) Cooperative Agreement, dated 8/26/91) or NOAA depending upon which agency has jurisdiction for the species. This consultation will result in a decision on whether a Federal Biological Opinion is necessary.

Some examples of biological elements (using NDDP habitat types) are:

- 1) Rare, threatened or endangered plant or animal species
- 2) coastal brackish marsh
- 3) California annual grassland
- 4) coastal and valley freshwater marsh
- 5) Great Valley cottonwood riparian
- 6) Non-native, pasture, ag types (DFG internal descriptions)

The following is a biological element example with goals and tasks:

Biological Element: Coastal and Valley Freshwater Marsh

Maintain optimum winter habitat for migratory waterfowl by on-going marsh management techniques to optimize winter food availability for migratory species.

Goal: Continue with established flooding and drawdown timetable; maintain mode of dynamic experimental vernal/summer seasonal wetland management.

Goal: Continue mechanical manipulation of wetland vegetation during summer dry period (when T&E species will not be impacted) to maintain adequate open water during flooded period.

Task: Disc 100 acres of tules annually to maintain marsh in optimal successional stage.

Task: Repair leaking levees to prevent premature drawdowns.

Task: Build 4 additional nesting islands in specified units.

Task: Clean specified water supply ditches.

You may have several goals for each biological element. Listing individual tasks is optional, but increasing the amount of specific information within the plan will greatly increase the value of CEQA documentation. Also, if tasks are not itemized here, there must be a workplan/task summary in the final chapter, Operations and Maintenance Summary.

If you wish to discuss the goals for each element in a narrative format, in order to provide more detail or to clarify certain management issues, be as succinct as possible while providing sufficient information to meet CEQA requirements. Don't forget to discuss management constraints, environmental impacts, and mitigation measures (if applicable).

C. Public Use Elements: Goals & Environmental Impacts

This Section is prepared in the same manner as Section B. It includes a narrative describing the program for each public use element, its goals and tasks (optional), management constraints, and environmental impacts and potential mitigation measures. In describing public use, you are asked to not use the terms, "consumptive" or "nonconsumptive," because of the inaccurate perception they

promote. You may want to use terms like hunting, angling, birdwatching, nature observation, etc.

If hunting programs will be managed on the property, describe each program and the goals and potential impacts associated with them. If an interpretive services program is to be conducted on the property (such as providing hiking trails, or bird tours, describe in sufficient detail the type of program(s) to be implemented along with any associated goals and potential impacts associated with them.

As in previous sections, environmental impacts must be discussed for each public use program, and, if appropriate, mitigation measures to offset such impacts should be described in detail. *If T&E species may be impacted by any public use program*, those impacts should be discussed briefly within the public use element and reference made to the DFG documentation or federal consultation prepared for that species.

Ask regional interpretive and other staff for their input, depending upon what type of public use is being considered for the area. In 1989, the Department adopted guidelines for interpretive plans or prospectuses and if drafted could be referenced as an appendix item. Conservation Planning staff should be consulted on listed species and potential public use conflicts.

Some examples of public use elements are:

- 1) Pheasant hunting program
- 2) General public recreation (including bird watching, plant identification, other self-guided activities)
- 3) Watchable Wildlife program (on certain wildlife areas and ecological reserves)
- 4) Fishing program
- 5) Scientific research, surveys or monitoring (by outside groups)
- 6) Trails, blinds, boardwalks or viewing platforms
- 7) Interpretive centers, educational kiosks

D. Facility Maintenance Element: Goals & Environmental Impacts

This Section describes the physical facility and grounds maintenance program which includes the administration necessary to maintain orderly and beneficial management of the area. (Not all properties will require this section. If access and boundary identification features such as roads and fences are present, this section is required.)

The following examples of goals and tasks are paraphrased and excerpted from the Mendota plan; you may quote them if you like:

Properly administer overall management of the property by:

Goal: Maintain accurate business records on expenditures, staff, maintenance, and other administrative duties.

Goal: Maintain regular office hours in order to respond to public requests for information in a timely manner and otherwise conduct the state's business in a normal manner.

Goal: Maintain all equipment, vehicles, facilities, residences, office structures, shop and associated buildings, fuel tanks, and any related items in optimum working condition to maximize efficient use of operating expenses allocated to this area.

Task: Regular inspection and servicing of all heavy equipment and vehicles.

Task: Regular inspection and repair of all buildings, residences and structures. This may include items such as plumbing, electrical, painting, fixtures, and any other features necessary to protect health and safety of staff and visitors to the property.

Task: Regular inspection and maintenance of fuel tanks to comply with federal and state laws.

As with the other elements, you may list tasks here or in the next chapter. Don't forget to outline potential environmental impacts and mitigation, if appropriate, associated with facility maintenance goals and objectives. Briefly describe T&E species concerns, if appropriate, and refer reader to the specific internal CESA coordination document or federal consultation for further information.

F. Biological Monitoring Element

This Section is prepared in the same manner as Section B. It includes a narrative describing the program for each monitoring element, its goals and tasks (optional), the optimal monitoring season for special or targeted species/habitats and any known constraints, limitations or methodologies. In this section, you should include any standard

or required protocols and discuss the relevance and consistency of any regional planning efforts (NCCPs, HCPs, watershed plans) with this area management plan. Sections within the regional plans relating to monitoring should be reiterated here. Regional partnerships or any state obligations for monitoring of “preserve design” or plan compliance should also be discussed.

V. OPERATIONS AND MAINTENANCE SUMMARY

This chapter contains information in a summary format which will guide budget preparation and work plans for the property. Section A, Operations and Maintenance Tasks, is not necessary if the information has already been presented in Chapter IV. Section C is also optional.

A. Operations and Maintenance Tasks to Implement Plan

If you have not already listed them in the previous section, use this section to itemize O&M tasks required to fulfill goals for previously described biological, public use, and facilities maintenance elements. You should give brief descriptions of specific operations and maintenance tasks which are necessary to implement the goals of this plan. This will help provide information necessary for annual budget preparation for management of the property.

B. Existing Staff and Additional Personnel Needs Summary

Summarize the number of existing staff employed at or who spend a percentage of their work schedule performing tasks on the property, and any additional requirements for personnel, both full time and temporary. Briefly outline the justifications for personnel requested without going into specific task descriptions. Provide the position classifications required to fully implement the plan as written. This may be in narrative or table format.

C. Operations and Maintenance Summary (Optional)

This section is optional and is provided for those who desire to summarize all estimated operations and maintenance costs associated with management of the property. This summary would provide more specific information required for annual budget preparation.

The following table is provided as the preferred format for such a summary:

TABLE . OPERATIONS AND MAINTENANCE SUMMARY OPTIONS

Option 1:

Summary Table: Costs summarized by goal.

Goals	Prior- ity*	Labor (in PYs)	Personnel Class	On-Going Cost \$	One-Time Cost \$
1. Preserve T&E species	1	0.17	WHS I	\$10,000	\$5,000
A. Conduct Surveys					
B. Avoid Impacts					

Continue until all goals are summarized.

TOTAL:	Total No.	\$ Total	\$ Total
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*Define meaning of priorities.

Option 2:

Summary Table: Costs summarized by goals and tasks:

Goals and tasks	Prior- ity*	Labor (in PYs)	Personnel Class	On-Going Cost \$	One-Time Cost \$
1. Preserve T&E species	1	0.17	WHS I		
A. Conduct Surveys				\$1,000	\$ 5,000
B. Avoid Impacts				9,000	

(Continue until all goals and tasks are summarized.)

TOTAL:	Total No.	\$ Total	\$ Total
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VI. REFERENCES

Use standard scientific reference nomenclature to cite authors and their published research. Be sure to add references when using information from other sources; for example, you should reference the WHR or Sawyer-Keeler-Wolf habitat designations.

Example:

Department of Fish and Game. 1999. List of California Terrestrial Natural Communities Recognized by the California Natural Diversity Database. Sacramento.

Meyers, K.E. and W.F. Laudenslayer, Jr., Eds. 1988. A Guide to Wildlife Habitats of California. California Department of Forestry and Fire Protection. Sacramento.

APPENDICES

All appendices should be preceded by a title page which uniquely identifies it (e.g., Appendix A - Legal Description of Property). All pages within this appendix should be numbered consecutively: A-1, A-2, A-3,

Use Appendices as necessary to list such items as:

- 1) Property descriptions
- 2) Animal and plant species inventories
- 3) Soil surveys
- 4) Climatic information
- 5) Other useful but secondary information.
- 6) Environmental checklist and discussion of potential impacts (CEQA)
- 7) CESA internal coordination
- 8) Additional consultation documents
- 9) Public Comments
- 10) Our response to public comments
- 11) MOU/MA
- 12) Site interpretive plan
- 13) fire plan

Section 7 Consultation Selected Review Criteria

Sacramento Fish and Wildlife Office
Selected Review Criteria for Section 7 Off-Site Compensation
Revised Oct. 2009

Property Assurances and Conservation Easement

- Title Report (preliminary at proposal, and Final Title Insurance at recordation), shall be no older than six months;
- Property Assessment and Warranty;
- Subordination Agreement [if there is any outstanding debt on the property];
- Legal Description and Parcel Map;
- Conservation Easement (should use the current multi-agency standardized CE template document); or
- Non-Template Conservation Easement;

Site Assessment and Development

- Phase I Environmental Site Assessment;
- Restoration or Development Plan;
- Construction Security [*if applicable*];
- Performance Security;

Site Management

- Interim Management Plan;
- Interim Management Security Analysis and Schedule;
- Long-Term Management Plan;
- Endowment Fund Analysis and Schedule;

**Guidelines to assist in understanding what is required are detailed on pages 2–7.

Guidelines

Property Assurances and Conservation Easement (CE)

Title Report

1. Who holds fee title to property? Should be the Project Applicant. If not, there may be liability and contracting issues.
2. Are there any liens or encumbrances (existing debts or easements) on the property?
 - a. Review necessary supporting instruments to evaluate liens and encumbrances. Property owner should submit a "*Property Assessment and Warranty*," which discusses each and every exception listed on the Preliminary and Final Title Insurance Policies, evaluating any potential impacts to the conservation value that could result from the exceptions (see below).
 - b. The *Property Assessment and Warranty* template is available at http://www.fws.gov/sacramento/es/cons_bank.htm, and should include a summary and full explanation of all exceptions remaining on the title, with a statement that the owner/Grantor accepts responsibility for all lands being placed under the CE as available for the primary purposes of the easement, as stated in the easement, and assures that these lands have a free and clear title and are available to be placed under the CE.
3. Could any of these liens or encumbrances potentially interfere with either biological habitat values or ownership? If existing easements can potentially interfere with the conservation values/habitat of the property, those portions of the land should be deducted from the total compensation acreage (or number of credits) available on the site.
4. A *Subordination Agreement* is necessary if there is any outstanding debt on the property. Review *Subordination Agreement* for adequacy—the lending bank or other lien holder must agree to fully subordinate each lien or encumbrance.

Legal Description and Parcel Map

1. Ensure accuracy of map, and location and acreage protected under the CE.
2. Both the map and the legal description should explain the boundaries of the individual project compensation site. The site should *not* have ‘leftover’ areas for later use.

Conservation Easement from Template

1. The current CE template can be found at http://www.fws.gov/sacramento/es/cons_bank.htm.
2. Who will hold the easement?
 - a. Must have third-party oversight by a qualified non-profit or government agency. Qualifications include:
 - i. Organized under IRC 501(c)(3);

- ii. Qualified under CA Civil Code § 815;
- iii. Bylaws, Articles of Incorporation, and biographies of Board of Directors on file at, and approved, by USFWS.
 - 1. Must meet requirements of USFWS, including 51% disinterested parties on the Board of Directors;
- b. Must have satisfactorily completed the CDFG due diligence process for easement/endowment holders and/or be accredited by the Land Trust Accreditation Commission <http://www.landtrustaccreditation.org/home>.
- 3. If not using the multi-agency template, applicant should specify objections they have to the template as provided, and may substantially delay processing as they will require Solicitor review. Alternate CEs must be approved by the USFWS prior to recording.

Non-Template Conservation Easements

- 1. You must either 1) add USFWS as a third-party beneficiary, or 2) add language throughout the document, in all appropriate places, that will assure USFWS the right to enforce, inspect, and approve any and all uses and/or changes under the CE prior to occurrence (including land use, biological management or ownership).
- 2. Include, at a minimum, language to:
 - a. Reserve all mineral, air, and water rights under the CE as necessary to maintain and operate the site in perpetuity;
 - b. Ensure all future development rights are forfeited;
 - c. Ensure all prohibited uses contained in the multi-agency conservation agreement template are addressed; and
 - d. Link the CE, Management Plan, and the Endowment Trust Fund within the document (e.g., note that each exists to support the others, and where each of the documents can be located if a copy is required).
- 3. Insert necessary language, particularly, but not exclusively, per: (can compare to multi-agency CE template)
 - a. Rights of Grantee
 - b. Grantee's Duties
 - c. Reserved Rights
 - d. Enforcement
 - e. Remedies
 - f. Access
 - g. Costs and Liabilities
 - h. Assignment and Transfer
 - i. Merger
 - j. Notices

Site Assessment and Development

Phase I Environmental Site Assessment

1. The Assessment must show that the compensation site is not subject to any recognized environmental conditions as defined by the American Society for Testing and Materials (ASTM) Standard E1527-05 “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, available at <http://www.astm.org/Standards/E1527.htm>, (i.e., the presence or likely presence of any Hazardous Substances or petroleum products).
2. If the Phase I Environmental Site Assessment identifies any recognized environmental conditions, the Project Applicant must represent and warrant to the USFWS that all appropriate assessment, clean-up, remedial, or removal action has been completed.

Development Plan [not required if doing preservation only]

1. The overall plan governing construction and habitat establishment activities required to be conducted on the Property, including, without limitation, creation, restoration, and enhancement of habitat.
 - a. This plan should include the baseline conditions of the Property including biological resources, geographic location and features, topography, hydrology, vegetation, past, present, and adjacent land uses, verified *Waters of the U.S. Jurisdictional Determination*, if applicable, species and habitats occurring on the property, a description of the activities and methodologies for creating, restoring, or enhancing habitat types, a map of the approved modifications, overall habitat establishment goals, objectives and Performance Standards, monitoring methodologies required to evaluate and meet the Performance Standards, an approved schedule for reporting monitoring results, a discussion of possible remedial actions, and any other information deemed necessary by the USFWS.
2. Any permits and other authorizations needed to construct and maintain the site shall be included and in place prior to the start of construction of the habitat.
3. Full construction plans for any habitat construction must be *USFWS-approved prior* to the start of construction of the habitat.

Construction Security

- a. The Project Applicant shall furnish a Construction Security in the amount of 100% of a reasonable third party estimate or contract to create, restore, or enhance habitats on the property in accordance with the Development Plan.
- b. The Construction Security shall be in the form of an irrevocable standby letter of credit, or a cashier's check.
 - i. The letter of credit, if chosen, shall be issued for a period of at least one year, and shall provide that the expiration date will be

automatically extended for at least one year on each successive expiration date unless, until extension is no longer necessary.

Performance Security

- c. The Project Applicant shall furnish a Performance Security in the amount of 20% of the Construction Security.
- d. The Performance Security shall be in the form of an irrevocable standby letter of credit, or a cashier's check.
 - i. The letter of credit, if chosen, shall be issued for a period of at least one year, and shall provide that the expiration date will be automatically extended for at least one year on each successive expiration date unless, until extension is no longer necessary.
- 4. The Construction and Performance Securities must:
 - a. Be held by a qualified, Service-approved, non-profit organization or government agency [see requirements under CE above], and
 - b. Be held according to minimum standards for assuring maximum success in earning potential, and will include assurances for no loss of principle, and
 - c. Disbursements or releases from each of the funds must be for documented expenditures, as they occur.

Site Management

Interim Management Plan

- 1. The Interim Management Plan should identify the short-term management, monitoring, and reporting activities to be conducted from the time construction ends until the Endowment Fund has been fully funded for one year and all the Performance Standards in the Development Plan have been met.

Interim Management Security Analysis and Schedule

- a. The Project Applicant shall furnish an Interim Management Security (in the form of a standby letter of credit) in the amount equal to the estimated cost to implement the Interim Management Plan during the first year of the Interim Management Period, as set forth in the Interim Management Security Analysis and Schedule
- b. The Interim Management Security Analysis and Schedule shall consist of a table and/or spreadsheet that shows all of the tasks (management, monitoring, reporting), task descriptions, labor (hours), cost per unit, cost frequency, timing or scheduling of the tasks, the total annual funding necessary for each task, and any associated assumptions for each task required by the Interim Management Plan. The total annual expenses should include administration and contingency costs.
- c. The Interim Management Security must:

- i. Be held by a qualified, Service-approved, non-profit organization or government agency [see requirements under CE above], and
- ii. Be held according to minimum standards for assuring maximum success in earning potential, and will assurances for no loss of principle.
- iii. Disbursements or releases from the fund must be for documented expenditures, as they occur.

Long-Term Management Plan (LTMP)

1. The LTMP template can be found at http://www.fws.gov/sacramento/es/cons_bank.htm and identifies the long-term management, monitoring and reporting activities to be conducted after the interim Management Period.
2. The LTMP should include at minimum:
 - a. Purpose of the Project and purpose of the LTMP;
 - b. A baseline description of the setting, location, history, and types of land use activities, geology, soils, climate, hydrology, habitats present (once project meets Performance Standards), and species descriptions;
 - c. Overall management, maintenance and monitoring goals; specific tasks and timing of implementation; and discussion of any constraints, which may affect goals;
 - d. The Endowment Fund Analysis and Schedule (see below);
 - e. Discussion of Adaptive Management actions for reasonably foreseeable events and possible thresholds for evaluating and implementing Adaptive Management;
 - f. Rights of access to the Property and prohibited uses of the Property as provided in the CE; and
 - g. Procedures for Property transfer, land manager replacement, amendments, and notices.
3. A copy of the LTMP must be either recorded with the CE, or the CE must state in its body that the current management plan can be obtained upon request from the USFWS, if not using the CE template.

Endowment Fund Analysis and Schedule

- a. Can use a PAR or PAR-like analysis that must be based upon the final, approved LTMP.
- b. The analysis and schedule shall consist of a table and/or spreadsheet that shows all of the tasks (management, monitoring, reporting), task descriptions, labor (hours), cost per unit, cost frequency, timing or scheduling of the tasks, the total annual funding necessary for each task, and any associated assumptions for each task required by the Interim Management Plan. The total annual expenses should include administration and contingency costs.
- c. The Endowment Fund must:

- i. Be held by a qualified, Service-approved, non-profit organization or government agency [see requirements under CE above], and
- ii. Be held according to minimum standards for assuring maximum success in earning potential, and will include assurances for no loss of principle.
- iii. Disbursements or releases from the fund must be for documented expenditures, as they occur.

Appendix G

**Water Quality Objectives for Use in
Designing and Implementing Projects
with Impacts to Creeks or Wetlands**

Water Quality Objectives for Use in Designing and Implementing Projects with Impacts to Creeks or Wetlands

The San Francisco Bay Regional Water Quality Control Board (Water Board) is charged with maintaining the beneficial uses of waters of the state in the San Francisco Bay Region, as presented in the *San Francisco Bay Basin Water Quality Control Plan* (Basin Plan), which is the Board's master water quality control planning document (http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml#2004basinplan).

If a project will impact waters of the State, project proponents are required to apply to the Water Board for Waste Discharge Requirements (WDRs), before implementing the project. If the project will also impact waters of the U.S., project proponents are also required to apply to the Water Board for Clean Water Act Section 401 certification. The Water Board reviews applications for WDRs and/or certifications to ensure that potential impacts to waters of the state have been avoided and minimized to the maximum extent practicable.

To assist project proponents in designing projects in a manner that avoids and/or minimizes impacts to waters of the State, the Water Board has developed a technical reference circular (Circular) that provides guidance for applicants on how to design projects that protect and restore stream and wetland system functions. Project proponents are encouraged to consult this Circular when developing projects with potential impacts to creeks or wetlands.

(http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stream_wetland/streamprotectioncircular.pdf). The Water Board intends to periodically revise and update this Circular to take advantage of emerging science and management practices.

Projects that impact creeks or wetlands should strive to achieve three water quality objectives—Watershed Hydrology, Stream Dynamic Equilibrium, and Stream and Wetland System Habitat Integrity.

Watershed Hydrology: The hydrologic connectivity between headwaters and estuary, surface water and ground water, and landscape, floodplain, and stream channel should be protected to produce the pattern and range of flows necessary to support beneficial uses identified in the Basin Plan and a functional ecosystem.

Stream Dynamic Equilibrium: Stream attributes, including hydrologic and sediment regimes, vegetation communities, channel forms, slopes, and floodplain areas, should be protected in a manner so as not to arrest natural hydrogeomorphic processes nor accelerate an imbalance resulting in excessive erosion or deposition of sediment, cause nuisance, or otherwise adversely affect beneficial uses. Watershed processes contribute to a dynamic balance over time between sediment loads and surface water flows which produce complex, fluctuating, and resilient systems.

Stream and Wetland System Habitat Integrity: Stream and wetland system habitats should be maintained by protecting the type, amount, and complexity of wetland and

riparian vegetation, the extent of riparian areas, and the substrate characteristics necessary to support aquatic life.

Achievement of these water quality objectives protects and restores the physical integrity and associated functionality of stream and wetland systems, which include perennial, intermittent, and ephemeral streams and wetlands and their associated riparian areas. The following four principles should be used in developing projects, in order to achieve the water quality objectives:

- 1) *Water Quality Functions and Land Use*: Functioning stream and wetland systems provide a wide range of water quality benefits that support the beneficial uses identified in the Basin Plan. Many land use activities have the potential to substantially degrade water quality functions of stream and wetland systems. Therefore, project proponents should recognize the intrinsic connections between land use activities and the structures, processes, and functions of stream and wetland systems.
- 2) *No Net Loss*: Stream and wetland system areas, functions, and beneficial uses in the Region have been substantially degraded from historic levels as a result of human activities. Therefore, the remaining resources are especially valuable. Projects and associated mitigation measures should be consistent with the California Wetlands Conservation Policy (No Net Loss Policy, Executive Order W-59-93) to ensure no net loss and achieve a long-term net gain in the quantity, quality, and permanence of stream and wetland system areas, functions, and beneficial uses.
- 3) *Climate Change Adaptation*: Stream and wetland system protection and restoration are a critical element of a strategy for reducing adverse impacts of greenhouse gas emissions and adapting the region's water resource management to account for the adverse effects of climate change and sea level rise. Protecting and restoring stream and wetland system functions, including floodwater storage, groundwater recharge, carbon sequestration (e.g., in riparian vegetation and wetland soils that are rich in organic matter), and maintaining aquatic life and wildlife habitat connectivity are important to mitigate for the adverse effects of climate change.
- 4) *Watershed Approach*: Many water quality and ecosystem problems are best identified, prioritized, addressed, and solved using a watershed approach. A watershed approach helps to address cumulative impacts on water quality, and encourages the development of watershed plans and partnerships that coordinate the planning, use, and protection of stream and wetland system resources. Project proponents should consider their project's affects when multiple individual effects are added or interact with other effects in a watershed to create cumulative adverse impacts to water quality. Project proponents should include all appropriate and practicable measures to avoid and minimize potential direct, secondary, and cumulative temporary and permanent impacts to water quality and beneficial uses

The following tables summarize goals for achieving the Water Quality Objectives.

Watershed Hydrology Goals for Stream and Wetland System Functions

Runoff flow and volume

Maintain site runoff and transport characteristics (i.e., timing, magnitude, duration, time of concentration, and discharge pathways of runoff flow) such that post-project flow rates and durations mimic pre-project levels. Where practicable, incorporate measures to restore natural runoff patterns (e.g., enhance soil infiltration capacity and increase the storage of runoff) in watersheds that have been substantially altered from their pre-development conditions.

Hydrologic connectivity

Maintain lateral, vertical, and longitudinal flow pathways, including connectivity between: stream channels, riparian areas, floodplains, and wetlands; surface water and groundwater; and ocean or estuary-to-headwaters at adequate levels to protect stream and wetland system functions and beneficial uses including the maintenance of, and access to, a diverse range of habitats for aquatic life and wildlife.

Natural flow regime

Maintain the natural variation of flows and hydrograph characteristics (i.e., timing, magnitude, duration, and time of concentration) such that the range of flows including low, channel forming, and flood flows are of a magnitude and duration to: 1) sustain channel morphology and balance sediment transport; 2) support riparian vegetation community maintenance; 3) provide adequate flows and velocities during low flow months to satisfy aquatic life and wildlife habitat requirements; and 4) maintain seasonal flows that permit the migration or free movement of migratory fish and access to floodplain and off-channel habitat (e.g., sloughs and permanently or seasonally flooded wetlands) for aquatic life.

Stream Dynamic Equilibrium Goals for Stream and Wetland System Functions

Channel Form and Processes

Where channels are modified, design projects with proper channel form (e.g., channel shape, width/depth ratio, etc.), sinuosity, slope, and floodplain areas such that the balance between sediment loads and surface flows is attained for a range of low to high discharges. This goal promotes natural bank erosion as a desirable attribute of stream and wetland systems while requiring that projects avoid: causing excessive erosion or deposition of sediment in and around the project area; creating hydraulic constrictions (e.g., undersized culverts); or require ongoing channel maintenance (e.g., dredging to maintain channel capacity, ongoing bed and bank repair, etc.). Where practicable, restore channel dimensions and slopes, riparian vegetation communities, floodplain, meander belt, and geomorphic adjustment zone widths, and adequate side slopes from the top of the banks to the top of the floodplain terraces in areas where geomorphic dynamic equilibrium has been impacted.

Drainage network

Maintain the naturally occurring pattern and density of perennial, intermittent, and ephemeral streams, as well as associated aquatic habitats (e.g., wetlands) which transport water, materials, energy, and organisms through the watershed (i.e., the drainage network). Avoid changing the natural runoff pathways by filling, piping, ditching, or culverting.

Gullies and headcuts

Avoid formation or expansion of headcuts and gullies. Design projects with proper channel slope and avoid reducing the landscape infiltration capacity and increasing runoff which may lead to soil erosion and gully formation/expansion.

Stream and Wetland System Habitat Integrity Goals for Stream and Wetland System Functions

Floodplain and riparian areas

Maintain floodplains and/or riparian areas of adequate width to provide water quality functions such as flood water and sediment storage, water quality enhancement, and maintenance of aquatic life and wildlife habitat. Establishment and protection of functioning riparian areas is one of the most straightforward and effective strategies to protect water quality and is a critical element in adapting to the effects of climate change including changes in rainfall and runoff patterns.

Wetland hydrology

Maintain the natural hydrologic regimes of wetlands, including their hydroperiods and levels of hydrologic connectivity to other aquatic habitats, at levels sufficient to support hydrophytic vegetation (where naturally present), aquatic life and wildlife habitat, and other associated beneficial uses.

Wetland and riparian vegetation

Maintain wetland and riparian vegetation (both woody and herbaceous) such that the type, amount, and complexity are adequate to: maintain water temperatures appropriate to the needs of aquatic life; withstand site-specific erosive forces; and supply large woody debris of sufficient quantities to maintain aquatic habitat.

Habitat connectivity

Avoid creating unnatural barriers between or among stream and wetland system and upland habitats (e.g., in-stream structures that restrict fish migration or encroachment on floodplains that restricts wildlife movement along a riparian corridor) that impact migration corridors and dispersal systems which connect aquatic life and wildlife with resources and refuges. Protecting stream and wetland system corridors can increase the resiliency of biodiversity by providing migration corridors as aquatic life and wildlife adapt to the effects of climate change on habitat conditions and distribution.