APPENDIX A
SCOPING REPORT

SCOPING REPORT

EBMUD Water Supply Management Program 2040

Notice of Preparation *for the* Program Environmental Impact Report

SCH #2008052006

August 2008

Prepared by EBMUD staff in conjunction with EDAW, Inc.

Table of Contents

EBMUD Water Supply Management Program 2040
Program Environmental Impact Report Scoping Report

1.0 Introduction and Background

1.1 Introduction

East Bay Municipal Utility District (EBMUD) is updating its current Water Supply Management Program, which identified projects that could be implemented to meet projected water demands through 2020. The updated Water Supply Management Program, entitled WSMP 2040, will present water demand projections through 2040, as well as alternative portfolios comprised of various water supply components to meet dry-year water needs through the year 2040.

EBMUD is the lead agency, under the California Environmental Quality Act (CEQA), for preparation of a Draft Program Environmental Impact Report (PEIR) on WSMP 2040. The Draft PEIR will assess the potential impacts of WSMP 2040 on the physical environment of the program area.

As part of the Draft PEIR process, EBMUD conducted three public scoping meetings in May and July 2008, inviting comments from agencies and the public to help determine the content of the Draft PEIR. This report describes the scoping process and summarizes the comments received during the scoping meetings, and at other venues during the Notice of Preparation period described in the next section.

1.2 EBMUD Service Area and Water Supply

EBMUD is a publicly owned utility whose major function is to provide water to its 1.3 million residential, industrial, commercial, and institutional customers in the East Bay region of the San Francisco Bay Area. In 2005, EBMUD met an average annual demand of 208 million gallons per day (MGD), normalized for weather conditions. About 90 percent of the water delivered to EBMUD's customers originates from the Mokelumne River watershed. The remaining 10 percent originates as runoff from protected watershed lands in the East Bay.

The EBMUD water supply system collects, transmits, treats, and distributes high-quality water from its primary water source in the Sierra Nevada to its customers in Alameda and Contra Costa counties. The water supply system consists of a network of reservoirs, aqueducts, water treatment plants, pumping plants, and distribution facilities. Raw (untreated) water from Pardee Reservoir is transported approximately 90 miles through the Pardee Tunnel, the Mokelumne Aqueducts, and the Lafayette Aqueducts to EBMUD's five terminal reservoirs. Major EBMUD water storage and conveyance facilities are described below.

The Freeport Regional Water Project (FRWP) is a regional water supply project that EBMUD has undertaken in partnership with the Sacramento County Water Agency (SCWA). The FRWP, when completed in 2010, will enable EBMUD to take delivery of Central Valley Project (CVP) water under contract with the United States Bureau of Reclamation to meet a portion of EBMUD's drought year water supply needs.

2.0 Draft EIR Scoping Process

2.1 Notice of Preparation

As required under CEQA Guidelines section 15082, EBMUD released a Notice of Preparation (NOP) on May 1, 2008 announcing the anticipated preparation of the Draft PEIR on WSMP 2040.

The NOP summarized the purpose and objectives of WSMP 2040, and presented EBMUD's determination that the proposed WSIP may have a significant effect on the environment. EBMUD also determined, in accordance with Guidelines Section 15082(c)(1) that a scooping meeting was mandatory for WSMP 2040, a project of regional significance. EBMUD decided to hold three such meetings, two in its service area, and one near its principal source of supply in the Sierra Foothills, as follows:

- OAKLAND – Thursday, May 22, 2008, 6:30 p.m. at the EBMUD Administrative Offices, Training Room, 375 11th Street, Oakland;
- STOCKTON – Thursday, May 29, 2008, 6:30 p.m. at the Stockton Grand Hotel, 2323 Grand Canal Boulevard, Stockton; and
- OAKLAND – Wednesday, July 9, 2008, 6:30 p.m. at the EBMUD Administrative Offices, Training Room, 375 11th Street, Oakland.

The NOP circulation period began on May 1, 2008. Comments were invited by email, telephone or in letter form, through the close of business on June 2, 2008. At the request of certain agencies, EBMUD opened a second NOP circulation period, from June 3 to July 31, 2008. Agencies and the public were notified about the availability of the NOP, and the scoping meeting dates and locations, through the following methods:

- NOP and NOP Mailing Lists. A mailing list was compiled, including approximately 160 contacts for potentially-interested federal, state, regional, and local agencies; federal, state, regional, and local elected officials; regional and local interest groups; other potentially affected water and irrigation districts, and WSMP 2040 Community Liaison Committee (CLC) members.

  On May 1, 2008, copies of the NOP were distributed via certified mail to 113 public agencies, and 15 copies were provided to the State Clearinghouse. Copies of the NOP Notice of Availability were sent via first-class mail to 48 additional organizations and individuals.

  A flyer announcing the second comment period was sent on July 3, 2008 to all agencies and entities on the aforementioned mailing list.

- County clerks. The NOP was posted with the county clerks of Alameda, Alpine, Amador, Calaveras, Contra Costa, Colusa, Glenn, Plumas, Sacramento, San Francisco, San Joaquin, Santa Clara, and Yuba counties.

- Website. EBMUD had previously established a WSMP 2040 project webpage. The full NOP text, including notification of the two scheduled scooping meetings, provided on May 1, 2008, along with instructions for submitting comments.

- Public Forums. During the initial circulation period for the NOP, EBMUD staff offered presentations on the WSMP 2040 project, and the scooping process, to the Northeast San Joaquin County Groundwater Basin Authority (May 14, 2008), and to the WSMP 2040 CLC (May 19, 2008). Comments received at these 'unofficial' scoping venues have been recorded in this report.

2.2 Comment Inventory by CEQA Topic

CEQA Topic Area[1]	email	letter	verbal
5.2 CEQA/EIR process		4	
5.2.1 Hydrology, Groundwater, and Water Quality	5	26	10
5.2.2 Geology, Soils, and Seismicity			
5.2.3 Energy			
5.2.4 Biological Resources	2	3	
5.2.5 Land Use		1	
5.2.6 Transportation			
5.2.7 Air Quality		2	
5.2.8 Noise			
5.2.9 Cultural Resources		2	
5.2.10 Recreation		2	
5.2.11 Visual Resources			
5.2.12 Hazards			
5.2.13 Public Services and Utilities			
5.2.14 Environmental Justice		1	
5.2.15 Cumulative effects, including global climate change		4	1

[1] Numbering scheme is from section 5 of the NOP

3.0 Summary of Comments

Topic 5.2 CEQA/EIR Process

- Description of environmental setting should include areas of potential impact beyond immediate points of diversion or project activity (Letter 6 – SL&D-MA/WWD, comment A)
- Demand projections: explain discrepancies between methodology and results as developed for WSMP 2040 and EBMUD's current UWMP (Letter 11 – MRWPA, comment A)
- PEIR should include consideration of additional portfolio screening criteria proposed by MRWPA (Letter 11 – MRWPA, comment F)
- PEIR should describe and justify use of a limited historical hydrologic period (Letter 12 - Oakland, comment A)
- Note preliminary FERC filing on Lower Bear Reservoir (Email Msg. 3 – Foothill Conservancy, comment A)
- Water demand projections should consider impacts of peak oil impacts (Letter 14 – Flashman, comment C)

Topic 5.2.1 Hydrology, Groundwater and Water Quality

- Support development of Lower Bear Reservoir and Pardee Reservoir expansion, and IRCUP (Letter 1 - AWA, comment A)
- Proposed location of a Sacramento-area conjunctive use component in NOP Figure 4B is within Sacramento Central Groundwater Authority jurisdiction, not SGA as stated (Letter 3 – SCGA, comment A)
- PEIR should describe any Sacramento-area groundwater project with yield greater than 4,500 AFY (Letter 3 – SCGA, comment B; Letter 5 – SCWA, comment b)
- PEIR should include groundwater modeling of Sacramento area groundwater basins (Letter 3 – SCGA, comment C; Letter 5 – SCWA, comment A)
- PEIR should evaluate project effects upon year 2000 Water Forum Agreement groundwater basin recharge and recovery policies (Letter 5 – SCWA, comment C)
- PEIR should include modeling of potential impacts to CVP, not averaged over a set of years, but in annual and monthly changes (Letter 6 – SL&D-MA/WWD, comment B)
- Disclose impacts on Delta water quality and reliability from Freeport diversions in aid of water transfers (Letter 7 – SWC, comment A; Letter 9 – CCWD, comment A; Verbal 1 – GBA, comment D)
- Discuss potential degradation of groundwater from ASR project components (Letter 8 – RWQCB, comment A)
- Discuss permitting requirements for various project portfolios to be described in the Draft PEIR (Letter 8 – RWQCB, comment B)
- PEIR should evaluate effects of portfolios with Delta components upon EBMUD's prior commitment to CCWD to wheel water via the FRWP (Letter 9 – CCWD, comment A; Verbal 3 – Scoping Mtg #1, comment B)
- Conclusions in the PEIR about the feasibility or water yield from any portfolio that includes a phase 2 Bayside Groundwater Project component would be premature (Letter 10 – ACWD, comment B)
- Environmental setting description for portofolio(s) including the phase 2 Bayside Groundwater Project component should reiterate previous commitments by EBMUD in the November 2005 certified EIR, including development of significance criteria and mitigation measures (Letter 10 – ACWD, comment A)
- Does EBMUD expect the 90 percent of average demand to continue to come from the Mokelumne watershed through 2040? (Email Msg 1 – SEWD, comment A)
- Describe anticipated additional pumping capacity, lining or other methods to increase the Mokelumne aqueducts' capacity (Email Msg 1 – SEWD, comment B)

- Cite other agency use of EBMUD's method of extrapolating a historic severe two-year drought into a three-year severe drought – approach seems too conservative (Email Msg 1 – SEWD, comment C)
- Provide a projection of EBMUD's ultimate average annual demand (Email Msg 1 – SEWD, comment D)
- Determine if Piedmont Reservoir is to be modified under the portfolios described in the PEIR (Email Msg 2 – Piedmont, comment A)
- Describe expected yield (total and EBMUD allocation) of Raise Lower Bear component (Verbal 1 – GBA, comment A)
- Consider wastewater effluent as a potential water source (Verbal 1 – GBA, comment B)
- Will the PEIR identify particular trading partners for northern California water transfers? (Verbal 1 – GBA, comment C)
- Consider discussion of rainwater catchment in the PEIR conservation component (Verbal 2 – GBA, comment A)
- Clarify that EBMUD's Freeport entitlements would not change as a result of implementing other surface reservoir components (Letter 11 – MRWPA, comment E; Verbal 3 – Scoping Mtg 1, comment D)
- PEIR should state if EBMUD might pursue the Enlarge Pardee component with regional partners (Letter 11 – MRWPA, comment C; Verbal 4 - Scoping Mtg 2, comment C)
- Include ESJ Integrated Conjunctive Use Program options among WSMP 2040 components (Letter 11 – MRWPA, comment B)
- PEIR preferred portfolio should emphasize components that reduce demand on Mokelumne watershed (Verbal 4 - Scoping Mtg 2, comment A)
- Consider including Regional Desal component in Portfolio C (Verbal 4 - Scoping Mtg 2, comment B)
- Explain apparent inconsistency between including groundwater banking among the portfolios but disfavoring it in the GBA IRWM plan (Letter 11 – MRWPA, comment E)
- Explain how land use patterns are accounted in WSMP conservation programs (Letter 12 - Oakland, comment C)
- "Floor" value for water reuse and conservation should be higher than currently forecast (Letter 14 - Flashman, comment A)
- Price declines for water saving appliances should be reflected in feasibility of conservation program options (Letter 14 - Flashman, comment B)
- Burying one or more cross-delta aqueducts should be considered for seismic security (Letter 14 - Flashman, comment D)
- Consider how conservation pricing would impact need for water analysis (Letter 14 - Flashman, comment E)

Topic 5.2.4 Biological Issues

- Disclose impacts on endangered species from Freeport diversions in aid of water transfers (Letter 7 – SWC, comment A; Letter 9 – CCWD, comment A)

- Discuss effects on landscape and terrestrial species from chemical content of desalinated and recycled water usage (Letter 12 – Oakland, comment D)
- Discuss potential loss of forest habitat resulting from Lower Bear Reservoir expansion (Letter 13 – Foothill Conservancy, comment E)
- Describe changes to Mokelumne River flow regimes and impacts to aquatic resources from reservoir expansion components (Letter 13 – Foothill Conservancy, comment F)
- Note FERC license restrictions on Mokelumne River flows regarding Lower Bear Reservoir (Email Msg. 3 – Foothill Conservancy, comment B)

Topic 5.2.5 Land Use Issues

- Describe how Oakland redevelopment initiatives were accounted in WSMP 2040 water demand projections (Letter 12 - Oakland, comment B)

Topic 5.2.6 Transportation Issues

- Disruption of local and emergency access and evacuation routes for Mokelumne River communities from elimination of Middle Bar Bridge (Letter 13 – Foothill Conservancy, comment D)

Topic 5.2.7 Air Quality Issues

- Suggested content for regional air quality evaluation (Letter 14 – SJVAPCD, comment A)
- Consider the suggested quantitative thresholds for air quality impact significance (Letter 14 – SJVAPCD, comment C)

Topic 5.2.9 Cultural Resources

- Advice on procedures and resources for preparation of cultural resource investigation and mitigation (Letter 4 – NAHC, comment A)
- Loss of Mokelumne River historic and cultural resources from inundation (Letter 13 – Foothill Conservancy, comment C)

Topic 5.2.10 Recreation

- Development of new facilities could affect trails and recreation areas in the East Bay watershed and adjacent public lands (Letter 2 - EBRPD, comment A)
- Loss of river recreation and associated economic impacts (Letter 13 – Foothill Conservancy, comment B)

Topic 5.2.14 Environmental Justice

- Implementation of the Enlargee Pardee Reservoir component could have a disproportionate impact on San Joaquin County, per EPA criteria (Letter 11 – MRWPA, comment G)

Topic 5.2.16 Cumulative Impacts

- Progress toward Los Vaqueros expansion project by CCWD is more advanced than indicated in the NOP – EIR due for release summer 2008 (Letter 9 – CCWD, comment C; Verbal 3 –Scoping Mtg #1, comment A)
- GHG analysis for reservoir components of the portfolios must be life-cycle-based (Letter 13 – Foothill Conservancy, comment A)
- Discuss reservoir expansion components in context of full IRCUP policies (Letter 13 – Foothill Conservancy, comment G)
- Describe GHG and cumulative effects on climate change (Letter 14 – SJVAPCD, comment B)

Letter No. 1 Amador Water Agency

A Public Agency

AMADOR Water Agency FOUNDED 1959

12800 RIDGE ROAD, SUTTER CREEK, CA 95685-9630 • (209) 223-3018
FAX: (209) 257-5281

May 27, 2008

Mr. Tom Francis
EBMUD
375 11th Street
Oakland, CA 94607

Re: Water Supply Management Program 2040

Dear Mr. Francis:

The Amador Water Agency Board of Directors reviewed the Notice of Preparation of a Draft Environmental Impact Report regarding EBMUD's Water Supply Management Program 2040 at their May 22, 2008 Board Meeting. The Board has supported the concept of raising Lower Bear Reservoir, raising Pardee Reservoir and pursuing the Integrated Regional Conjunctive Use Project (IRCUP) over the past few years. These projects were also included in the Mokelumne Amador Calaveras IRWMP. A

Although there are many details that need to be addressed and resolved, the Amador Water Agency Board supports pursuing these projects which could benefit Amador Water Agency and regional partners such as EBMUD, by adding additional water supplies to meet further growth consistent with our general plans.

Sincerely,

Jim Abercrombie
General Manager

c.c. AWA Board of Directors

Letter 2 East Bay Regional Park District

East Bay Regional Park District

2950 PERALTA OAKS COURT P.O. BOX 5381 OAKLAND CALIFORNIA 94605-0381 T. 510 635 0135 F. 510 569 4319 TDD. 510 633 0460 WWW.EBPARKS.ORG

May 29, 2008

Mr. Tom Francis
East Bay Municipal Utilities District
375 11th Street
Oakland, CA 94607

Subject: Scoping Comments for EBMUD's Water Supply Management Program 2040

Dear Mr. Francis,

Thank you for providing the East Bay Regional Park District ("District") with the Notice of Preparation (NOP) for an Environmental Impact Report (EIR) for the proposed Water Supply Management Program 2040 ("Program"). As stated in the NOP, the primary purpose of the Program is to identify solutions to meet dry-year water needs through 2040. We anticipate that this could include construction of new reservoirs and water conveyance facilities, and changes in operations at existing facilities.

As you may be are aware, the District owns or operates 65 regional parks and more than 1,100 miles of regional trails. Some of the facilities may be affected by construction of new facilities or changes in operations at existing facilities. For example, the District operates Lake Chabot and Anthony Chabot Regional Parks, which include portions of Chabot Reservoir and its surrounding watershed. Another example would be where the District has existing or planned regional trails adjacent to EBMUD pipelines or the proposed Buckhorn Canyon Reservoir. These would include the Iron Horse, Lafayette-Moraga and Redwood-Las Trampas Regional Trails. A

I have enclosed a copy of our most recent Master Plan map which shows the locations of our existing and proposed regional parks and trails. You may wish to review this map and contact us should you require more specific information on park boundaries and trail alignments that may be affected by the Plan. Please call me at (510) 544-2622 should you need further information.

Sincerely,

Brad Olson
Environmental Programs Manager

Letter 3 Sacramento Central Groundwater Authority

SCGA

Sacramento Central Groundwater Authority
Managing Groundwater Resources in Central Sacramento County

827 7th St, Rm 301
Sacramento, CA 95814

Tel: (916) 874-6851
Fax: (916) 874-5698
www.scgah2o.org

June 2, 2008

Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607

RE: Notice Of Preparation Of A Draft Environmental Impact Report For EBMUD Water Supply Management Program 2040

Dear Mr. Francis:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) describing the scope and content of East Bay Municipal Utility District's (EBMUD) proposed Program Environmental Impact Report (PEIR) for its Water Supply Management Program (WSMP) 2040. According to the NOP, the primary purpose of WSMP 2040 is to identify solutions to meet EBMUD's dry-year water needs through 2040. The NOP indicates that meeting these water supply needs will be accomplished through a number of components carried forward from the 1993 WSMP, one of which is Groundwater Storage/Conjunctive Use. Under the Proposed Program this component has been identified, in part, as Groundwater Banking/Exchange. The NOP describes this component as it applies to the Sacramento Basin as follows:

EBMUD would participate in the construction of facilities to provide in-lieu or artificial groundwater recharge and recovery in the Sacramento County area. The primary goal of this program would be to provide additional dry year supplies. Several options are available, and would require coordination with the Sacramento County Water Agency, Sacramento Groundwater Authority, or the Sacramento Regional Sanitation District. In general, EBMUD would provide support in developing the facilities to recharge the groundwater basin. In exchange, the District would receive either groundwater extracted from the basin or surface water. During wet years, the basins would be recharged. During dry years, EBMUD would receive more than 4,500 AF of water. The extracted stored groundwater would be conveyed to the Mokelumne Aqueducts via the FRWP facilities for distribution to the District's existing Water Treatment Plants for treatment, and thus could be operated only when the FRWP is operating. Facilities required for this component include:

- Recharge ponds;
- Extraction wells;
- Pipeline from the FRWP pipeline to the well field/recharge area;
- Intertie at the FRWP pipeline;
- Pump station for the new pipeline; and
- Granular activated carbon treatment system either at the well field or at the intertie with the FRWP pipeline.

The NOP indicates that in order to implement a groundwater recharge and recovery program in the Sacramento County area coordination with the Sacramento County Water Agency, Sacramento Groundwater Authority, or the Sacramento Regional County Sanitation District would be required. Groundwater management within Sacramento County is addressed by three separate entities; the Sacramento Groundwater Authority for the North Basin; the Sacramento Central Groundwater Authority for the Central Basin; and currently the South Area Water Council for the South Basin. As described in Figure 4b, Central Valley Components, it would appear that the proposed location for EBMUD's Groundwater Banking/Exchange project for the Sacramento Basin is located within the jurisdictional boundaries of the Sacramento Central Groundwater Authority. Thus coordination should be with the Sacramento Central Groundwater Authority not the Sacramento Groundwater Authority. A

The NOP states that "EBMUD would participate in the construction of facilities to provide in-lieu or artificial groundwater recharge and recovery in the Sacramento County area" and "EBMUD would provide support in developing the facilities to recharge the groundwater basin." These statements indicate that EBMUD intends to participate in a partnership that presumably would implement a project that is larger than the 4,500 AF or more of banked groundwater that EBMUD would extract in dry years. In order to properly define potential impacts to the groundwater basin the PEIR should describe the extent of the larger groundwater recharge and recovery program. B

Groundwater management criteria within the Central Basin is described in the Central Sacramento County Groundwater Management Plan (GMP) which was adopted and the EIR certified by the Board of Sacramento Central Groundwater Authority (Groundwater Authority) in November 2006. Significant modeling work was undertaken to assist in the development of the GMP and the establishment of Basin Management Objectives (BMO). These BMO's include: maintain the long-term average groundwater extraction rate at of below 273,000 AF/year; maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum "solution;" protect against any potential inelastic land surface subsidence by limiting subsidence to no more than 0.007 feet per 1 foot of drawdown in the groundwater basin; protect against any adverse impacts to surface water flows in the American, Cosumnes, and Sacramento rivers; and, water quality objectives. The GMP also has a requirement to develop a basin wide Well Protection Program (WPP). The WPP will operate based on the assumption that on-going development within the Central Basin could potentially impact the operation of existing private domestic wells and agricultural wells. The program will collect a fee from new development to finance the cost to lower or re-drill wells that are impacted. It is expected that the WPP will become operational in early 2009. As part of the PEIR, EBMUD should perform groundwater modeling, using a model acceptable to the Groundwater Authority, to identify potential impacts to the implementation of the adopted GMP, its associated BMO's and the WPP. C

If you should have any questions regarding these comments, please feel free to contact me at (916) 874-6851.

Sincerely,

Darrell K. Eck

Darrell K. Eck
Executive Director

Letter 4 Native American Heritage Commission

STATE OF CALIFORNIA — Gray Davis, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

May 28, 2008

Tom Francis
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607

Sent Via Fax: 510-287-1295
# of Pages: 1

RE: SCH # 2008052006, EBMUD Water Supply Management Program 2040

Dear Mr. Francis:

The Native American Heritage Commission has reviewed the above mentioned NOP. To adequately assess the project-related impact on archaeological resources, the Commission reccomends the following action be required:

1. Contact the appropriate Information Center for a records search. The record search will determine:
   - Whether a part or all of the project area has been previously surveyed for cultural resources.
   - Whether any known cultural resources have already been recorded on or adjacent to the project area.
   - Whether the probability is low, moderate, or high that cultural resources are located within the project area.
   - Whether a survey is required to determine whether previously unrecorded cultural resources are present.

2. The final stage of the archaeological inventory survey is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
   - Required the report containing site significance and mitigation be submitted immediately to the planning department.
   - Required site forms and final written report be submitted within 3 months after work has been completed to the Information Center.

3. Contact the Native American Heritage Commission for:
   - A Sacred Lands File Check.
   - A list of appropriate Native American Contacts for consultation concerning the project site and assist in the mitigation measures.

A

Lack of surface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should include provisions for accidentally discovered archeological resources during construction per California Environmental Quality Act (CEQA) §15064.5 (f). Health and Safety Code §7050.5 and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery and should be included in all environmental documents. If you have any questions, please contact me at (916) 653-4038.

Sincerely,

Debbie Pilas-Treadway
Associate Governmental Program Analyst

CC: State Clearinghouse

Letter 5 Sacramento County Water Agency

Department of Water Resources
Keith DeVore, Director

Including service to the cities of
Elk Grove and Rancho Cordova

SACRAMENTO COUNTY
WATER AGENCY

June 2, 2008

Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607

RE: Notice Of Preparation Of A Draft Environmental Impact Report For EBMUD Water Supply Management Program 2040

Dear Mr. Francis:

Thank you for the opportunity to comment on the Notice of Preparation (NOP) describing the scope and content of East Bay Municipal Utility District's (EBMUD) proposed Program Environmental Impact Report (PEIR) for its Water Supply Management Program (WSMP) 2040. According to the NOP, the primary purpose of WSMP 2040 is to identify solutions to meet EBMUD's dry-year water needs through 2040. The NOP indicates that meeting these water supply needs will be accomplished through a number of components carried forward from the 1993 WSMP, one of which is Groundwater Storage/Conjunctive Use. Under the Proposed Program this component has been identified, in part, as Groundwater Banking/Exchange. The NOP describes this component as it applies to the Sacramento Basin as follows:

> EBMUD would participate in the construction of facilities to provide in-lieu or artificial groundwater recharge and recovery in the Sacramento County area. The primary goal of this program would be to provide additional dry year supplies. Several options are available, and would require coordination with the Sacramento County Water Agency, Sacramento Groundwater Authority, or the Sacramento Regional Sanitation District. In general, EBMUD would provide support in developing the facilities to recharge the groundwater basin. In exchange, the District would receive either groundwater extracted from the basin or surface water. During wet years, the basins would be recharged. During dry years, EBMUD would receive more than 4,500 AF of water. The extracted stored groundwater would be conveyed to the Mokelumne Aqueducts via the FRWP facilities for distribution to the District's existing Water Treatment Plants for treatment, and thus could be operated only when the FRWP is operating. Facilities required for this component include:
>
> - Recharge ponds;
> - Extraction wells;
> - Pipeline from the FRWP pipeline to the well field/recharge area;
> - Intertie at the FRWP pipeline;

"Managing Tomorrow's Water Today"

Main: 827 7th St., Rm. 301, Sacramento, CA 95814 • (916) 874-6851 • fax (916) 874-8693 • www.scwa.net
Facilities Operations & Admin.: 3847 Branch Center Rd. #1, Sacramento, CA 95827 • (916) 875-RAIN • fax (916) 875-6884
Elk Grove Office: 9280 W. Stockton Blvd., Suite 220, Elk Grove, CA 95758 • (916) 875-RAIN • fax (916) 875-4046

- Pump station for the new pipeline; and
- Granular activated carbon treatment system either at the well field or at the intertie with the FRWP pipeline.

According to Figure 4b, Central Valley Components, of the NOP the proposed Groundwater Banking/Exchange project for the Sacramento Basin is located either within or in close proximity to Zone 40 of the Sacramento County Water Agency (SCWA). Development and operation of the Zone 40 project is described in the Zone 40 Water Supply Master Plan (WSMP) which was adopted and the EIR certified by the SCWA Board in February 2005. Significant modeling work was undertaken to assist in the evaluation and development of the Zone 40 conjunctive use program. As part of the PEIR, EBMUD should perform groundwater modeling, using a model acceptable to SCWA, to identify potential impacts to the implementation of the Zone 40 conjunctive use program as described in the 2005 WSMP and associated EIR. A

The NOP states that "EBMUD would participate in the construction of facilities to provide in-lieu or artificial groundwater recharge and recovery in the Sacramento County area" and "EBMUD would provide support in developing the facilities to recharge the groundwater basin." These statements indicate that EBMUD intends to participate in a partnership that presumably would implement a project that is larger than the 4,500 AF or more of banked groundwater that EBMUD would extract in dry years. In order to properly define potential impacts to the groundwater basin the PEIR should describe the extent of the larger groundwater recharge and recovery program. B

The 2000 Water Forum Agreement (WFA) is the result of a six-year collaborative effort involving business and agricultural leaders, citizens groups, environmentalists, water managers and local governments. The WFA provides a comprehensive package of linked actions that will achieve two coequal objectives: provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River. The WFA contains a Groundwater Management Element that provides recommendations concerning the sustainable yield of the individual sub-basins underlying Sacramento County. For the basin underlying Zone 40 (the Central Basin) the recommended long-term sustainable yield is 273,000 AF/year. Modeling work done as part of the WFA supports the current pattern of groundwater usage through the year 2030. The PEIR should investigate and evaluate changes in the pattern of groundwater demands and the operation of the groundwater basin associated with the implementation of the proposed groundwater recharge and recovery program. C

If you should have any questions regarding these comments, please feel free to contact me at (916) 874-6851.

Sincerely,

Darrell K. Eck

Darrell K. Eck

Senior Civil Engineer

Letter 6 San Luis & Delta-Mendota Authority/Westlands Water District

diepenbrock·harrison
A PROFESSIONAL CORPORATION

JOHN V. "JACK" DIEPENBROCK
KAREN L. DIEPENBROCK
KEITH W. McBRIDE
BRADLEY J. ELKIN
EILEEN M. DIEPENBROCK
MARK D. HARRISON
GENE K. CHEEVER
MICHAEL Y. BRADY
LAWRENCE B. GARCIA
SUSAN E. KIRKGAARD
ANDREA A. MATARAZZO
JOEL PATRICK ERB
JON D. RUBIN

R. JAMES DIEPENBROCK
(1929–2002)

JEFFREY L. ANDERSON
LARA M. O'BRIEN
MICHAEL E. VINDING
JENNIFER L. DAUER
CHAD O'NEAL MUILENBURG
SEAN K. HUNGERFORD
LEONOR Y. DICDICAN
CHRIS A. McCANDLESS
JEFFREY K. DORSO
DAN M. SILVERBOARD
ANDREW P. TAURIAINEN
BLAIR W. WITT
KRISTA J. DUNZWEILER
DAVID R. RICE
JENNIFER D. BECHTOLD
SARAH R. HARTMANN

June 2, 2008

Via Facsimile (510) 287-1295
and e-mail tfrancis@ebmud.com

East Bay Municipal Utility District
Attn: Tom Francis
375 11th Street
Oakland, CA 94607

Re: Comments on the Notice of Preparation by East Bay Municipal Utility District for its Water Supply Management Program 2040 Environmental Impact Report

Dear Mr. Francis:

On behalf of the San Luis & Delta-Mendota Authority ("Authority") and Westlands Water District ("Westlands"), I submit this comment letter. It addresses the scope of the Program Environmental Impact Report ("PEIR") East Bay Municipal Utility District ("East Bay MUD") will be preparing for its Water Supply Management Program 2040 ("WSMP 2040").

The Authority, which was formed in 1992 as a joint powers authority, consists of 32 member public agencies, each of which contracts with the United States Department of the Interior, Bureau of Reclamation ("Reclamation"), for supply of water from the Central Valley Project ("CVP"). The Authority's member agencies hold contracts with Reclamation for the delivery of approximately 3.3 million acre-feet of CVP water. Of that amount, the Authority's member agencies use approximately 2.7 million acre-feet of CVP water on agricultural lands within the western San Joaquin Valley, San Benito County, and Santa Clara County, California; 200,000 to 250,000 acre-feet of CVP water for municipal and industrial uses, including those within the Silicon Valley; and

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approximately 300,000 to 350,000 acre-feet of CVP water for environmental purposes, including for waterfowl and wildlife habitat in the San Joaquin Valley, California.

Westlands, a member of the Authority, is a California water district with a right to receive up to 1,150,000 acre-feet of CVP water annually. Westlands uses this water for irrigation of approximately 500,000 acres on the west side of the San Joaquin Valley in Fresno and Kings Counties, as well as for municipal and industrial purposes within those Counties. Westlands' farmers produce more than 60 high quality commercial food and fiber crops sold for the fresh, dry, canned, and frozen food markets, both domestic and export. More than 50,000 people live and work in the communities that are dependent on Westlands' agricultural economy.

The Authority and Westlands understand and appreciate the task ahead of East Bay MUD to meet the water demands of its customers. The Authority and Westlands present the following comments to assist East Bay MUD with that effort and to help ensure the PEIR provides a comprehensive environmental evaluation of potential impacts of the WSMP 2040.

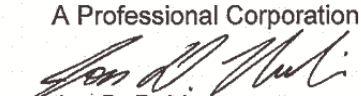
The Notice of Preparation for the PEIR indicates East Bay MUD may rely upon a supplemental supply of water to fulfill its customers' water needs and that the supplemental supply may be obtained through the construction of new reservoirs, expansion of existing reservoirs, groundwater banking, and/or water transfers. Each of those actions has the potential to cause impacts outside of the immediate area of a reservoir, groundwater bank, or locale of the transferor and transferee. As a result, the environmental setting for the PEIR should extend beyond the proposed site for any particular action. It should include areas in the immediate vicinity of the point of diversion, as well as areas downstream of that location. A

When considering potential impacts, East Bay MUD should recognize that any adverse impacts to the federal Central Valley Project or, more specifically, to the quantity of water available to the Authority's members, could be significant. For that reason, East Bay MUD should present detailed modeling results that are demonstrative of the type and extent of impacts that might result from any action proposed by East Bay MUD. The modeling results should not be presented as average changes over any particular set of years. At a minimum, data should be presented identifying modeled, annual changes, with monthly data available for review and comment. B

The Authority and Westlands appreciate your consideration of these comments and ask East Bay MUD to prepare the PEIR consistent with them.

Very truly yours,

DIEPENBROCK HARRISON
A Professional Corporation



Jon D. Rubin
Attorneys for the San Luis & Delta-Mendota Authority
and Westlands Water District

Letter 7 State Water Contractors

June 2, 2008

Mr. Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607

Subject: EBMUD Water Supply Management Program 2040

Dear Mr. Francis:

The State Water Contractors (SWC) submits these comments regarding the Notice of Preparation (NOP) to prepare a Program Environmental Impact Report (PEIR) for East Bay Municipal Utility District's (EBMUD) Water Supply Management Program (WSMP) 2040. As described in the NOP, EBMUD is proposing its WSMP 2040 to identify water management measures and potential alternatives to those measures, and to evaluate the environmental impacts of the identified alternatives.

The SWC is an organization representing 27 of the 29 public water entities[1] that hold contracts with the California Department of Water Resources (DWR) for the delivery of water from the State Water Project (SWP). Collectively, the members of the SWC provide all, or a part, of the water supply delivered to approximately 25 million Californians, roughly two-thirds of the State's population, and to over 750,000 acres of irrigated agriculture. The members of the SWC provide this water to retailers, who, in turn, serve it to consumers throughout the San Francisco Bay Area, the San Joaquin Valley, the Central Coast, and Southern California.

The SWP water supply delivered through the Sacramento-San Joaquin Delta constitutes a significant portion of the water supplies available to SWC members. As a result, the SWC is very interested in matters affecting the quantity and quality of water supplies in the Bay-Delta. Potential WSMP 2040 components listed in the NOP include water transfer agreements with northern California water agencies and Sacramento basin groundwater banking and exchange, with diversion of water at EBMUD's new Freeport Regional Water Project (FRWP). Additional water may also be diverted at the FRWP to recharge groundwater basins as part of other regional groundwater partnerships.

[1] Alameda County Zone 7 Water Agency, Alameda County Water District, Antelope Valley-East Kern Water Agency, Casitas MWD on behalf of the Ventura County Flood Control District, Castaic Lake Water Agency, Central Coast Water Authority on behalf of the Santa Barbara FC&WCD, City of Yuba City, Coachella Valley Water District, County of Kings, Crestline-Lake Arrowhead Water Agency, Desert Water Agency, Dudley Ridge Water District, Empire West-Side Irrigation District, Kern County Water Agency, Littlerock Creek Irrigation District, The Metropolitan Water District of Southern California, Mojave Water Agency, Napa County FC&WCD, Oak Flat Water District, Palmdale Water District, San Bernardino Valley MWD, San Gabriel Valley MWD, San Gorgonio Pass Water Agency, San Luis Obispo County FC&WCD, Santa Clara Valley Water District, Solano County Water Agency, and Tulare Lake Basin Water Storage District.

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These water transfers and groundwater projects could involve diversions at greater rates, at different times, or in greater total amounts than those analyzed in the March 2004 Final Environmental Impact Report/Environmental Impact Statement (FEIR/EIS) for the FRWP. The WSMP 2040 PEIR will need to include analysis and disclosure of environmental effects and impacts on endangered fish species, water quality in the Delta, and water supply reliability caused by diversions beyond those analyzed in the FRWP DEIR/EIS. A

The SWC looks forward to coordinating with EBMUD in the future as development of the PEIR proceeds. We appreciate your consideration of our comments. If you have any questions, please feel free to contact me at (916) 447-7357.

Sincerely,

Terry L. Erlewine
General Manager

Letter 8 Regional Water Quality Control Board

Linda Adams
Secretary for Environmental Protection

California Regional Water Quality Control Board
Central Valley Region
Karl E. Longley, ScD, P.E., Chair

Sacramento Main Office
11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

13 May 2008

Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607

NOTICE OF PREPARATION OF A DRAFT EIR, EBMUD WATER SUPPLY MANAGEMENT PROGRAM 2040

I have reviewed the Notice of Preparation of a Draft Environmental Impact Report, EBMUD Water Supply Management Program 2040. The document describes projects that are located both within and outside the boundary of the Central Valley Regional Water Board. The comments provided are state-wide appropriate and address the entire project, however, I am primarily concerned with those project elements located within the Central Valley Region.

The following activities subject to permitting from the Regional Water Board are described in the document:

- Expansion of existing reservoirs (raising the height of dams)
- Construction of new reservoirs
- Use of recycled water (treated domestic wastewater) for various purposes
- Aquifer storage and recovery (conjunctive use)

The Regional Board supports development of ASR systems but is concerned about the potential for groundwater degradation. Groundwater degradation can result from constituents that originate in the source water that are not removed during the water treatment (for example total dissolved solids or some organic chemicals) or they can be a result of the water treatment process (for example disinfection byproducts such as trihalomethanes, haloacetic acids, or nitrosamines). The concentrations of contaminants in source water can sometimes be minimized through operational controls such as operation during times when source water quality is at its best. This may coincide with times of high river discharge. Staff stresses the importance of consideration of the variability of source water quality when selecting the source water location, the impact of treatment technologies on water to be injected, and consideration of operational limitations when designing an ASR system to protect the aquifer that is the source of drinking water. In some cases, the most convenient source water intake may not provide suitable water quality. In such cases, other water sources that may be available should be considered.

Section 5.2.1 discusses water quality issues, however, the section fails to discuss possible degradation of groundwater by the constituents discussed above. The potential for such degradation should be an important consideration in the analysis. } A

The document does not provide a discussion of the permits that would be required for implementation of the alternatives discussed. Permits that will likely be required include } B

Waste Discharge Requirements (WDRs), industrial stormwater permits, construction stormwater permits, water quality certification for wetlands disturbance, and a Section 404 permit for dredging activities. Each of the types of permits is discussed further below.

Waste Discharge Requirements

Wastewater will be discharged in operation of water treatment facilities. Identified waste constituents include dredging spoils generated while constructing the pump intake structure, water treatment backwash, backwash treatment residuals and backwash sludge drying lagoons, and domestic waste that may be generated by the operation staff of the facilities. Staff anticipates WDRs will be required for those discharges. With respect to an aquifer storage and recovery well, California Water Code Section 13260 requires anyone proposing operation of an injection well to submit a Report of the Discharge (RD). WDRs may be required for operation of an ASR system. In accordance with California Water Code Section 13260, the project proponent shall submit an RD at least 150 days prior to discharging wastewater at the site.

Construction Stormwater Permit

A National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activities, Order No. 99-28-DWQ is required when a project involves clearing, grading, or disturbances to the ground, such as stockpiling, or excavation. Currently, construction activity that involves soil disturbances on construction sites one acre or greater or which are part of a larger common plan of development or sale require a construction storm water permit.

Because construction associated with the projects will disturb more than one acre, the project proponent will need to obtain permit coverage under the NPDES General Permit No. CAS000002 for Discharges of Storm Water Associated With Construction Activity. Before construction begins, the proponent must submit an NOI to comply with the permit to the State Water Resources Control Board and a Stormwater Pollution Prevention Plan (SWPPP) must be prepared.

Industrial Stormwater Permit

Depending on the Standard Industrial Classification (SIC) code of the final project, compliance with the NPDES General Permit No. CAS000001 for Discharges of Storm Water Associated With Industrial Activities may be required. The SIC codes of activities requiring coverage are listed in the General Permit. In order to obtain coverage under the General Permit, the proponent must submit a Notice of Intent to comply with the permit (NOI) to the State Water Resources Control Board and an SWPPP must be prepared.

Water Quality Certification - Wetlands

If a U.S. Army Corp of Engineers (ACOE) permit is required due to the disturbance of wetlands, then Water Quality Certification must be obtained from the Regional Board prior to initiation of project activities. Section 401 of the federal Clean Water Act requires that the project proponent for any project that impacts surface waters of the United States (such as streams and wetlands) must request a 401 Water Quality Certification from the Regional Board. Water Quality Certification must be obtained prior to initiation of project activities. The proponent must follow the ACOE 404(b)(1) Guidance to assure approval of their 401 Water Quality Certification application. The guidelines are as follows:

1. Avoidance (Is the project the least environmentally damaging *practicable* alternative?)
2. Minimization (Does the project minimize any adverse effects to the impacted wetlands?)
3. Mitigation (Does the project mitigate to assure a no net loss of functional values?)

Section 404 Permit

If the project will involve the discharge of dredged or fill material into navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the US Army Corps of Engineers. If a Section 404 permit is required by the Corps, the Board will review the permit application to ensure that the discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If a Section 404 permit is required, the proponent must apply to the Regional Board for a Water Quality Certification under Section 401.

Dewatering Permit

The proponent may be required to file a Dewatering Permit for coverage under WDRs General Order for Dewatering and Other Low Threat Discharges to Surface Waters Permit, Order No. 5-00-175 (NPDES CAG995001). The following discharges may be covered by this permit provided they do not contain significant quantities of pollutants and are either (1) four months or less in duration, or (2) the average dry weather discharge does not exceed 0.25 million gallons per day (mgd):

a. Well development water
b. Construction dewatering
c. Pump/well testing
d. Pipeline/tank pressure testing
e. Pipeline/tank flushing or dewatering
f. Condensate discharges
g. Water Supply system discharges
h. Miscellaneous dewatering/low threat discharges

If you have any questions about the storm water program, please call Dani Berchtold at (916) 464-4683. Additional information is available via the Internet at the Regional Board's Storm Water website *http://www.swrcb.ca.gov/stormwtr/index.html*. For more information on Section 404 Permits contact the Sacramento District of the Corps of Engineers at (916) 557-5250 or Patrick Gillum with the Regional Board at (916) 464-4709. If you have any questions about the RD process, please telephone me at (916) 464-4616.

TIMOTHY R. O'BRIEN
Waste Discharge to Land Unit

Letter 9 Contra Costa Water District

CONTRA COSTA
WATER DISTRICT

1331 Concord Avenue
P.O. Box H20
Concord, CA 94524
(925) 688-8000 FAX (925) 688-8122

June 2, 2008

Tom Francis
Water Supply Improvements Division
East Bay Municipal Utility District
375 Eleventh Street, MS 407
Oakland, California 94607

Re: EBMUD Water Supply Management Program 2040 PEIR

Dear Mr. Francis:

Contra Costa Water District (CCWD) appreciates this opportunity to provide scoping comments on East Bay Municipal Utility District's (EBMUD's) May 1, 2008 Notice of Preparation (NOP) for a Program Environmental Impact Report (PEIR) for EBMUD's Water Supply Management Program (WSMP) 2040. The primary purpose of WSMP 2040 is to identify solutions to meet EBMUD's dry-year water needs through 2040.

CCWD supports EBMUD's program to improve its ability to meet future demands and continue to provide a safe and reliable water supply to its customers through a diverse portfolio of water conservation measures, recycled water projects, supplemental water supplies, and drought period rationing. CCWD has the following comments on preparation of the PEIR:

Freeport Regional Water Project

Potential WSMP 2040 components listed in the Notice of Preparation include water transfer agreements with northern California water agencies and Sacramento basin groundwater banking and exchange, with diversion of water at EBMUD's new Freeport Regional Water Project (FRWP). Additional water may also be diverted at the FRWP to recharge groundwater basins as part of other regional groundwater partnerships.

These water transfers and groundwater projects could involve diversions at greater rates, at different times, or in greater total amounts than those analyzed in the March 2004 Final Environmental Impact Report / Environmental Impact Statement (EIR/EIS) for the FRWP. The WSMP 2040 PEIR will need to include analysis and disclosure of environmental effects and impacts on endangered fish species, water quality in the Delta, and water supply reliability caused by diversions beyond those analyzed in the FRWP DEIR/EIS. A

As discussed on page 2-15 of the Final EIR/EIS for the FRWP, the Freeport Regional Water Authority (FRWA) and EBMUD have also agreed to wheel 3,200 acre-feet/year of CCWD's CVP contract supply for CCWD as mitigation for water quality impacts on CCWD's Delta diversions. Under this agreement, water that would otherwise be diverted in the Delta will be diverted instead at the FRWP intake and conveyed to CCWD through FRWP facilities, Reclamation's Folsom South Canal, and EBMUD's Mokelumne Aqueduct. CCWD water will be wheeled every year, upon request by CCWD, unless there are unavoidable conditions that reduce the capacity of the system to the extent that FRWA and EBMUD are unable to wheel the water. The PEIR should include analysis and disclosure of whether the proposed water transfers and groundwater banking/exchanges would affect EBMUD's ability to wheel water to CCWD as agreed. B

CCWD's Los Vaqueros Expansion Project

On page 11, the NOP states that CCWD's Los Vaqueros Reservoir Expansion Project will not be considered for inclusion as a component in the WSMP 2040 because development of the Expansion Project is not sufficiently advanced. However, a Notice of Preparation for the Expansion Project was issued in January of 2006 and the Draft EIS/EIR is scheduled for public release later this summer, making the development of the Expansion Project sufficiently advanced for consideration, and more advanced than other projects (such as the regional desalination project) which are included as potential components of the WSMP 2040. CCWD would welcome a discussion with EBMUD on the potential of the Expansion Project to help meet EBMUD's dry-year supply goals, on a schedule consistent with the WSMP 2040. Please call Marguerite Naillon, Special Projects Manager, at (925) 688-8018 to initiate the discussion. C

Regional Desalination Project

As discussed on page 22 of the NOP, CCWD and EBMUD, together with the San Francisco Public Utilities Commission and the Santa Clara Valley Water District, are developing regional desalination facilities that could provide up to 71 million gallons per day of water. The partnership agreement extends through the pilot testing phase, which is now underway with a final report due in the summer of 2009. However CCWD is committed to cooperating with EBMUD and the other partner agencies on this project, and will help to ensure that EBMUD is provided with an accurate and thorough evaluation of the project. As a project partner, CCWD would like to be kept informed of EBMUD's analysis of the regional desalination project as the WSMP 2040 PEIR is developed.

CCWD would like to be kept informed throughout the PEIR process. Please send all materials regarding the WSMP 2040 to:

Dr. Leah Orloff
Water Resources Manager
Contra Costa Water District
P.O. Box H2O
Concord, CA 94524

If you would like any additional information, or would like to discuss these comments, please call me at (925) 688-8083.

Sincerely,

Leah Orloff
Water Resources Manager

Letter 10 Alameda County Water District

ALAMEDA COUNTY WATER DISTRICT

DIRECTORS
JOHN H. WEED
President
JAMES G. GUNTHER
Vice President
JUDY C. HUANG
MARTIN L. KOLLER
ARTHUR LAMPERT

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MANAGEMENT
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General Manager
WILBERT LIGH
Finance Manager/Treasurer
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Engineering Manager
WALTER L. WADLOW
Operations Manager

May 29, 2008

Mr. Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland CA 94607

Dear Mr. Francis:

Subject: ACWD comments on the Notice of Preparation for the EBMUD Water Supply Management Program 2040

Thank you for providing the Notice of Preparation (NOP) for the EBMUD Water Supply Management Program 2040 Draft Environmental Program EIR (PEIR). ACWD has reviewed the NOP, and is concerned with one component of the Water Supply Management Program, specifically the Phase 2 Bayside Groundwater Project. ACWD has had a longstanding concern that the Bayside Project may have significant adverse impacts on ACWD's water supplies in the Niles Cone Groundwater Basin.

Background

The Bayside Project facility is located within an alluvial unit known as the Southeast Bay Plain Groundwater Basin (SEBP), which includes units previously referred to in past Department of Water Resource Bulletins as the San Lorenzo Cone and San Leandro Cone. The SEBP is hydraulically interconnected with the Niles Cone Groundwater Basin (NCGB) which has been, and will continue to be, a critical source of water supply and water storage for ACWD.

EBMUD first proposed a large scale, 10 to 15 mgd Aquifer Storage and Recovery (ASR) operation at the Bayside facility through an EIR prepared in 2001 At that time, ACWD expressed significant concerns over this project, citing the interconnection between the SEBP and NCGB, and the expected consequential impacts on the NCGB and ACWD's water supply. ACWD and EBMUD attempted to resolve their differences through joint development and application of a common SEBP-NCGB numeric groundwater model. The model demonstrated that a 5 to 10 mgd Bayside Project would have significant impacts on ACWD's groundwater supplies, even considering the injection component, thus necessitating mitigation. Uncertainties in the model calibration were a source of disagreement between the two agencies over the course of this effort. ACWD was especially concerned that the model may have under-predicted the impacts that would actually result.

In 2005, EBMUD withdrew the 2001 EIR in favor of the smaller Phase 1 Bayside Groundwater Project involving 1 mgd of ASR operations, with a potential Phase 2 expansion planned for a later date. ACWD had significant concerns regarding both the Phase 1 project and potential Phase 2 expansion and submitted extensive comments on the Project's EIR (attached). As a result, EBMUD made commitments not to proceed with a Phase 2 expansion until the Phase 1 project had been fully tested and the resulting groundwater impacts fully evaluated through a re-calibrated regional groundwater model. EBMUD also committed to developing a separate, project-specific EIR for any Phase 2 expansion of the Bayside Project.

Comments

1. The PEIR should recognize all previous commitments regarding the analysis of impacts and development of mitigation measures for the Phase 2 Bayside Project.

   The EIR for the Phase I Project, which was certified in 2005, pledges that if EBMUD were to ever proceed with a future Phase 2 Bayside Project, a separate Phase 2 project-specific EIR would be developed following a detailed re-assessment of feasibility of such a Phase 2 Project. Such an assessment would include consideration of well levels in the SEBP and NCGB in response to actual Bayside Phase 1 operations. The well levels (among other information) would serve as a basis for recalibrating the groundwater model. The re-calibrated groundwater model, or perhaps a newly developed model, would be used to re-estimate impacts on the NCGB under hypothetical Phase 2 operations. As required under EBMUD's Board of Directors Findings Regarding the Bayside Groundwater Project (November 2005), the recalibration of the groundwater model for Phase 2 Bayside modeling analyses must be made in coordination with ACWD. Similarly, the determination of the significance criteria for Phase 2 Bayside impacts on the NCGB and ACWD water supplies must be developed in consultation with ACWD.

   The 2005 Bayside EIR also identified that the Phase 2 Bayside Project would have potentially significant impacts on the groundwater levels that would adversely affect ACWD operations in the NCGB. The 2005 EIR indicated that potential mitigation measures could include providing potable water to the ACWD distribution system or raw water to ACWD's recharge facilities. The PEIR should include all of these factors when describing and evaluating the Phase 2 Bayside Project.

   A

2. Identification or conclusion, within the upcoming WSMPP PEIR, of any net water supply benefits from a Phase 2 Bayside Groundwater Project would be premature.

   Phase 1 operations at the Bayside facility are not expected to commence until 2009, and a detailed study on the actual effects of Phase 1 operations on groundwater conditions (monitoring and modeling) in the SEBP and NCGB must precede any attempts to predict additional net yield (considering possible water supplies that would have to be provided by EBMUD as mitigation to ACWD in dry to normal years) from a Phase 2 expansion. Moreover, a separate project specific EIR is required for such a Phase 2 Bayside Project, focusing on a study of the potential impacts on the NCGB and required mitigations. . Given that the Phase 1 project has not yet begun, it would be premature for EBMUD to put forth in

   the WSMPP DEIR any early 'evaluation' that concludes that a Phase 2 Bayside Project would be feasible or could reliably be expected to produce a certain minimum amount of water over Phase 1 levels. Instead, it would be more appropriate to frame this alternative in more hypothetical terms, perhaps in context of its limitations, the future detailed studies that would have to be done to determine feasibility and level of mitigation required, and development of a separate EIR.

   B

3. Concerns regarding construction of monitoring wells in the SEBP should be addressed to ensure confidence that actual Phase 1 Bayside Groundwater Project effects on the aquifer system will be properly assessed. Otherwise, future evaluation of the feasibility of a Phase 2 expansion may be significantly more difficult.

ACWD would likely contest a Bayside Phase 2 Project EIR if we believe that: (1) it underestimates impacts on the NCGB and/or the level of mitigation required; (2) is based on a model whose input parameters are not adequately conservative given a reasonable range of possible hydrogeologic and climactic conditions; (3) or if the model has been calibrated to potentially faulty water level data.

The best way to reduce any potential future conflict or disagreement would be for EBMUD and ACWD to work cooperatively, as previously pledged, in the acquisition and compilation of monitoring data, and in future modeling efforts, over the course of Phase I Bayside operations leading up to development of a possible Phase 2 Bayside Project EIR. Monitoring of the measured stresses of injection and extraction of Phase 1 operations will facilitate confidence in a future model calibration when it is used to predict potential Bayside Phase 2 impacts on the NCGB. It should be noted, however, that Phase 1 operations will impose a considerably smaller stress on the aquifer system than would a Phase II operation. Accordingly, efforts to calibrate a model to predict Phase 2 impacts will need to consider other information in addition to responses to Phase 1 operations.

In furtherance of the goal of agency collaboration, ACWD appreciates EBMUD's commitment to installation of monitoring wells in the SEBP. We do, however, have concerns over the validity of water level data that will be generated from EBMUD's nested wells. A nested well is constructed with installation of multiple casings inside a single, deep borehole to measure water levels at multiple intervals of depth (multiple aquifer layers). ACWD's concerns are supported by similar concerns asserted by the Department of Water Resources (DWR) on page 37 of Bulletin 74-90. Bulletin 74-90 states that; "A nested monitoring well can be difficult to construct because of multiple casings within the same borehole. Care is required during construction to ensure water-bearing zones for each casing string are hydraulically isolated from one another and the annular seals are effective."

To address isolation concerns, DWR Bulletin 74-90 further requires that "casing spacers shall be used within the intervals to be sealed to separate individual well casing strings from one another in a borehole of a nested monitoring well. The spacers shall be placed at intervals along the casing to ensure a minimum separation of 2 inches between individual casing strings (page 44)."

For the reasons mentioned above, ACWD has advocated the more conventional approach of drilling separate single-cased wells. This method reduces the possibility of artificial leakage between water bearing zones, which plague nested wells. At this time, we understand that one (nested) well of the EBMUD monitoring well network has been constructed, and that additional nested wells are planned in 2008.

Since the nested wells penetrate more than one aquifer, it is imperative that the construction of any additional nested wells follow the DWR Bulletin 74-90 minimum requirements for sealing off strata and placement of annular seal material. Any deviation from the minimum requirements may allow leakage which may furnish unreliable measurements of piezometric head and/or result in deterioration of the quality of water in the aquifers. ACWD requests that the DEIR address these concerns.

EBMUD has indicated in verbal communication with ACWD that nested wells are necessary because areas of land (EBMUD parcels or easements) in which well sites are to be constructed are not large enough to accommodate multiple conventional single-cased wells. ACWD has successfully obtained encroachment permits from the cities of Fremont, Newark, and Union City to install clusters of conventional single cased wells within the street right of way (typically sidewalks or landscaped areas). Within the cluster, individual wells (each well screened in a specific targeted aquifer zone) are spaced approximately 10 to 20 feet apart. Acquisition of city encroachment permits has precluded the need to actually acquire parcels of land or easements. Further, considering the extra time required to construct a nested well (the extra steps and care required to achieve the necessary 2-inch separation distance between adjacent casings, and to achieve the installation of a cement seal as a continuum without bridging) any cost savings between a cluster of single-cased wells and a nested well may not be significant.

Accordingly, we request that EBMUD reconsider the benefits and costs of nested wells versus clusters of single-cased wells. We also a request an as-built diagram/documentation of the nested well recently installed at 589 Lewelling Boulevard in San Leandro.

Thank you again for the opportunity to comment on the Notice of Preparation for the Program EIR for EBMUD's Water Supply Management Program 2040. If you have any questions regarding this letter, please contact Steven Inn, ACWD's Groundwater Resources Manager at (510) 668-4441 or Eric Cartwright, ACWD's Water Resources Planning Manager, at (510) 668-4206.

Sincerely,

Paul Piraino
General Manager

Letter 11 – Mokelumne River Water and Power Authority

MOKELUMNE RIVER WATER AND POWER AUTHORITY

P. O. Box 1810 - 1810 E. Hazelton Ave.
Stockton, California 95201
Phone: (209) 468-0827
Fax: (209) 468-2999

June 2, 2008

Mr. Tom Francis, P.E.
East Municipal Utility District
375 11th Street
Oakland, CA 94607

SUBJECT: SCOPING COMMENTS REGARDING THE EAST BAY MUNICIPAL UTILITY DISTRICT WATER SUPPLY MANAGEMENT PROGRAM 2040 ENVIRONMENTAL IMPACT REPORT

Tom

Dear Mr. Francis:

The Mokelumne River Water and Power Authority (MRWPA) respectfully submits the following scoping comments regarding the East Bay Municipal Utility District Water Supply Management Program 2040 Draft Environmental Impact Report (EBMUD WSMP 2040). The following comments also reflect the suggestions and position of the San Joaquin County Board of Supervisors.

Integration of Land Use and Water Supply Planning

Based on the EBMUD WSMP 2040 Notice of Preparation (NOP), the projected 2040 water demand within the EBMUD service area has been estimated to be 274 million gallons per day (MGD). The projected need for supplemental water is estimated to be between 67 and 87 MGD depending on the maximum rationing level EBMUD would impose on its customers. The NOP briefly describes the methodology used to estimate the 2040 water demand level. The methodology utilized is described in the NOP as a land-use based projection of growth augmented by conversations with planning staffs of the land use agencies within the EBMUD service area. EBMUD staff has attributed much of the increase in water demand as "upward" (densification) as opposed to "outward" (annexation) urban growth. The projected growth in demand is closely proportional to the State Department of Finance growth projections for Alameda and Contra Costa counties as a whole. This is inconsistent with the notion of that "upward" growth (densification) would decrease, rather than maintain, per capita demand rates. The EBMUD Urban Water Management Plan 2005 Update (UWMP 2005 Update)

estimates that the water demand in 2030 will be 232 MGD, a much lower projected water demand than the WSMP 2040 projection. A similar methodology, as described in the WSMP 2040, was presented in the UWMP 2005 Update.

With greater emphasis placed on integrating sound land use and water supply planning decisions, the WSMP 2040 future water demand analysis must be based on planned growth as outlined in adopted general plans of land use agencies within the EBMUD service area. The apparent discrepancy cannot be explained from the information presented in the NOP. Speculative assumptions of water demands outside of currently adopted growth plans within the EBMUD service area are not accurate and should not be used as the basis for WSMP 2040 and the associated Program EIR. The demand projections should be re-examined and differences in the methodologies between the current and UWMP projections explained. Due to the activity of EBMUD to extent their Camanche water rights, the accuracy of this projection is highly significant especially for those agencies that may rely on diversions from the Mokelumne River for future water supply. A

Potential Water Supply Impacts to San Joaquin County

Serving demand growth in the EBMUD service area by expanding Pardee Reservoir and increasing diversions from the Mokelumne River could impact the availability of water to Eastern San Joaquin County, which the Mokelumne River flows through and which has been determined by the State Department of Water Resources (DWR) in Bulletin 118-80 to be in "critical groundwater overdraft." To meet future beneficial use requirements in that area of the County, the MRWPA filed Water Right Application 29835[1] seeking wet year water from the Mokelumne River. Based on Water Right Application 29835, the MRWPA has developed the MORE WATER Project[2], a regional conjunctive use project, which would divert Mokelumne River water in wet years to be utilized for agricultural and urban use. A primary element of this project will be the use of available groundwater storage in the Eastern San Joaquin Basin.

An appropriative right that maximizes available supply from the Mokelumne River, based on Application 29835, is an essential element of the MORE WATER project and was considered by the Northeastern San Joaquin County Groundwater Banking Authority[3] in the Eastern San Joaquin Integrated Regional Water Management Plan[4] (GBA IRWMP). This alternative is one of

[1] Water Right Application 29835 was filed by the MRWPA with the State Water Resources Control Board in 1990.

[2] The MORE WATER Project proposes to divert up to 1000 cubic feet per second from Pardee Reservoir to the proposed Duck Creek Reservoir, a 150,000 acre-foot off-stream reservoir in San Joaquin County. Additional diversions up to 620 cubic feet per second are proposed on the Lower Mokelumne River for direct recharge and use in-lieu of groundwater. These diversions are limited to December through June and are junior to all senior appropriations.

[3] The Northeastern San Joaquin Groundwater Banking Authority is comprised of the City of Stockton, City of Lodi, California Water Service Company, Stockton East Water District, Central San Joaquin Water Conservation District, North San Joaquin Water Conservation District, Central Delta Water Agency, South Delta Water Agency, Woodbridge Irrigation District, and San Joaquin County Flood Control and Water Conservation District. The San Joaquin Farm Bureau Federation is an Associate Member.

[4] The GBA adopted the IRWMP on July 25, 2007.

the central water supply elements in the Eastern San Joaquin Integrated Conjunctive Use Program (ICU Program). Of the Programs outlined under the ICU Program, three include the MORE WATER Project and also consider regional groundwater banking options with outside interests. EBMUD should consider those options including the use of the proposed regulating reservoir on Duck Creek and groundwater basin storage that may provide mutual regional benefits including dry-year supply. B

Regional Water Supply Solutions

EBMUD's Alternative Portfolio D: Lower Carbon Footprint includes the Enlarged Pardee Project concept as a stand-alone alternative, which is described as providing 51 MGD of additional supply to EBMUD in dry-years. In order to yield an additional 51 MGD (57,000 acre-feet per year) in three consecutive dry years, it is estimated that EBMUD would need to retain the priority of use on essentially all of the 172,000 acre-feet of additional storage from the enlargement of Pardee Reservoir.

The MRWPA highly recommends that EBMUD study, evaluate and implement those project alternatives that will provide EBMUD with a high level of reliability and self-sufficiency without additional diversions from the Mokelumne River. However, if the Expanded Pardee concept is to be considered, it is recommended that it not be considered as a stand-alone project but combined with other regional elements wherein joint project benefits can be developed to meet significant regional needs in San Joaquin County. Taking advantage of this regional approach could alleviate potential conflicts in the watershed concerning MRWRA water right activities as well as issues surrounding the 1958 Agreement between EBMUD and Amador/Calaveras Counties. These factors should be recognized and addressed as part of the Plan and PEIR. C

San Joaquin County has been in discussions with EBMUD for several years regarding the use of excess capacity in the Freeport Regional Water Project (Freeport Project). San Joaquin County understands that EBMUD's water supply agreement with the Bureau of Reclamation specifically conditions EBMUD's diversion from Freeport to be allowed when EBMUD's Total System Storage is forecasted to be less than 500,000 acre-feet. It is unclear in the NOP if the Expanded Pardee option would reduce the amount available to EBMUD at Freeport due to carry-over of stored water to meet dry year demands. Preliminary modeling illustrates that water from Freeport reduces EBMUD's reliance on the Mokelumne. This issue should also be addressed. D

In addition, The Mokelumne River Forum, comprised of water agencies including EBMUD and water interests from Calaveras, Amador and San Joaquin Counties, is currently developing an Inter-regional Conjunctive Use Project (IRCUP) for the more efficient utilization of Mokelumne River supplies for the benefit all participating parties.

While a regional project utilizing the Eastern San Joaquin County groundwater basin is included in two of EBMUD's WSMP Portfolios, EBMUD's November 2007 comments on the

GBA's NOP for the Integrated Water Management Plan PEIR identified and supported the only alterative that excluded groundwater banking to be EBMUD's preferred alternative. The inconsistencies of including consideration of groundwater banking in EBMUD's planning but disfavoring it in the GBA IRWM planning should be explained. E

Additional Alternatives Analysis Criteria

It is recommended that the following additional criteria should be used to evaluate the Alternative Water Supply Portfolios and the projects contained in each.

1. **Level of Self-sufficiency.** The Alternative Water Supply Portfolios should be analyzed and given preference based on the quantity of water obtainable from local sources, as opposed to water imported from outside the EBMUD service area. In discussing sources of supplemental supply sources, the NOP acknowledges that the District is currently exploring Regional Desalination alternatives. The NOP also discusses the use of recycled water as a means of reducing the use of potable water. These and other "local" sources of water should be included and given a weighted preference in the assessment of the Alternative Portfolios. Reliance on these sources would reduce the demand on the Mokelumne River.

2. **Efficiency of Operation.** WSMP 2040 should evaluate the water supply from a systems viewpoint. The incremental volume of water delivered to EBMUD customers from each of the projects under consideration should be explicitly analyzed and reported. Since the primary purpose of the WSMP 2040 is to meet dry-year water needs, the incremental delivery of water to customers in dry-years should be given the greatest weight in the evaluation. The WSMP 2040 should favor projects that deliver water primarily in dry years, and disfavor projects that operate in all years to develop carry-over water to meet dry-year needs.

4. **Economic Ranking.** The unit cost of each water supply component should be based on the incremental water supplied to customers, not on total water produced. The economic ranking criteria should prioritize those project components with the lowest marginal cost of incremental delivery to customers. Economic ranking criteria should favor those projects with the lowest marginal cost for incremental water supplies delivered.

5. **Sensitivity to Energy Costs.** WSMP 2040 should examine the sensitivity to increased energy costs. Total project life-cycle costs should be evaluated for expected cost levels and tested increased energy for costs to determine whether a project would become infeasible or whether priorities reordered should this scenario occur.

6. **Rationing Level.** EBMUD's current Drought Management Program calls for up to 25% rationing system-wide. Among water agencies within the state, EBMUD has long led the field in improved water use efficiency, water supply reliability, real demand reduction, and creating a well informed customer base. Any reduction in a 25% water rationing level would be contrary to the efforts of EBMUD to better manage its water resources. The implications are also far reaching, as relaxed drought management policies leave less water available for fisheries, habit, recreation, and water supplies on the Lower Mokelumne River and within San Joaquin County. The WSMP 2040 must include Alternative Portfolios that maintain the current 25% rationing level and also cumulatively analyze the impacts of relaxed rationing on the Lower Mokelumne and the Mokelumne River water users in San Joaquin County.

F

Environmental Justice Considerations

While not a CEQA priority, the NOP lists Environmental Justice as an environmental issue that will be addressed in the WSMP 2040 Program EIR. As considered, the "Alternative Portfolio D: Lower Carbon Footprint" includes the Enlarged Pardee Project which is described as providing 51 MGD of additional supply to EBMUD with a substantially lower output of carbon emissions due to significant energy savings and net non-fossil fueled energy generation. Redirected impacts of Enlarged Pardee Project are evident as the principles of Environmental Justice are applied.

In 1997, the Council on Environmental Quality[5] released guidelines for the consideration of Environmental Justice principles in the development of projects and actions. These Principles should be used to determine whether actions or projects have disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or Indian tribes. These Principles are bulleted below.

- Consideration of the demographic composition of the affected area;
- Consideration of relevant public health data;
- Recognition of interrelated cultural, social, occupational, historical, or economic factors as it applies to the physical sensitivity of a community to particular impacts;
- Development of effective public participation;
- Inclusion of community representatives from affected areas; and
- Inclusion of Tribal representation.

The EBMUD Mokelumne River diversion, storage and conveyance system continues to be a burden the San Joaquin County community. Most notably, the seismic integrity of the nearly century-old Pardee Dam and the Mokelumne Aqueduct with an easement through the heart of the City of Stockton attracts crime, is a frequent site of loitering and illegal dumping, and generally detracts from adjacent property values. Conditions placed on local projects in the vicinity of the Mokelumne Aqueducts add considerably to construction and mitigation costs. In

[5] Environmental Justice: Guidance Under the National Environmental Quality Act published December 10, 1997 by the Council for Environmental Quality as established by Executive Order 12898 and Presidential Memorandum.

addition, the Freeport Regional Water Project will also traverse the County to connect American River supplies to the Mokelumne Aqueducts. Expanding Pardee, as presented in the WSMP 2040 NOP, is perceived to disproportionately affect San Joaquin County in the following ways:

1. Potentially less water available for diversion and continued declines in groundwater levels due to unavailable Mokelumne river supplies.
2. Economic impacts due to potential dam failure and flooding, increased pumping costs, degraded groundwater quality due to saline intrusion, and unreliable water supplies for area communities.
3. Health impacts due to higher carbon, particulate, and other harmful emissions based on increased energy usage to pump groundwater. The San Joaquin Valley suffers from some of the worst air quality in the state and nationally.
4. Disproportionate burden on San Joaquin County taxpayers to mitigate these redirected impacts. San Joaquin County ranks among the most afflicted California Counties in terms of unemployment, poverty, and crime.

G

The Mokelumne River Water and Power Authority appreciates this opportunity to provide comments on this significant effort. Should you have any questions, please contact me at (209) 468-3089.

Sincerely,

C. MEL LYTLE, Ph.D.
Water Resources Coordinator

Letter 12 – City of Oakland

CITY OF OAKLAND

250 FRANK H. OGAWA PLAZA, SUITE 3315 • OAKLAND, CALIFORNIA 94612-2032

Community and Economic Development Agency
Economic Development Division

FAX (510) 238-2226
TDD (510) 839-6451

July 24, 2008

Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607

RE: Notice of Preparation of a Program Environmental Impact Report for the EBMUD Water Supply Management Program 2040

Dear Mr. Francis:

Thank you for the opportunity to comment on the East Bay Municipal Utility District's (EBMUD) Notice of Preparation (NOP) to prepare a Program Environmental Impact Report (PEIR) for the Water Supply Management Program 2040.

In general, City of Oakland staff is concerned that the methodology, assumptions, and the possible portfolios for the water supply program do not reflect the individual situations for each area under your jurisdiction. The City of Oakland is unique within the EBMUD's service area because the development pattern is very dense with a limited amount of previously undeveloped land. Although there are several large land areas proposed for redevelopment, it is anticipated that most development will be infill type which would require a different approach to future water supply demands than other areas that have large tracks of undeveloped acreage. Based on our review of the NOP, City staff has the following comments:

1. The Overview document attached to the NOP details the assumptions in determining drought planning. The document states that "out of the three driest periods on record (1929 to 1934, 1976 to 1977 and 1987 to 1992), the 1976 to 1977 drought, although shortest, was the most severe event and resulted in a worst case for water supply for the EBMUD system." Staff assumes that this means that data as far back as 1929 was used to determine the worst case for water supply. Staff is concerned about the limitations of this data in that it only represents a brief time period when discussing the issue of droughts and water supply. Staff recommends that the PEIR either 1) include as much historical data in the water supply assumptions as possible, or 2) describe in detail what type of data is available and how that accurately represents a worst case scenario. A
2. The Overview document states that EBMUD projected water demands through 2040 using a land-use based approach. Staff is concerned with the methodology to determine water demands in the City of Oakland and would like this specifically explained in the EIR. Also, staff is concerned about how the anticipated changes in land use within the City would affect the need for water and the

City's overall demand. Several examples of these land use changes would include the Oakland City Council's recent decision to allow some industrial land to convert to residential, proposed uses on the Oakland Army Base and the new development proposed at the Oak Knoll Naval Medical Center. However, most of the anticipated future development will occur on infill lots. The PEIR should discuss how this type of possible development will affect water demands and how that is different than other development patterns. B

3. The Overview document discusses rationing as a component of the portfolios. The City is very concerned about the idea of further rationing on Oakland residents. Residential neighborhoods occupy the largest percentage of land in the City. The typical development pattern of these neighborhoods is small lots connected by local streets to major arterials. A typical lot is around 5,000 sq. ft. with a large percentage covered in parking and structures. These lots typically do not have a large lawn or planting area. Other cities within EBMUD's jurisdiction have larger lots spread out over a larger land area.

   The Overview suggests that Oakland residents will be asked to ration at the same increased rates as the jurisdictions described above. The City of Oakland's established development pattern must be taken into account when discussing water demand since there is little flexibility to further ration and conserve based on this pattern. Staff recommends that the PEIR discuss how this limitation will affect the different portfolio options. C

4. The Overview document discusses conservation as a component of the portfolios. Currently the City of Oakland's Community and Economic Development Agency Department and the City Planning Commission are discussing potential mandatory green building requirements for private development. If adopted by City Council, these requirements would reduce the anticipated need for water. In addition, City Council adopted the "Bay Friendly Landscaping and Gardening" as an official reference document and planning staff routinely imposes conditions of approval that call for drought tolerant landscaping. City staff is reviewing several other possible ordinances that would affect the need for water. Staff is concerned that none of these measures were included in the water demand assumptions for the City of Oakland.

5. The Overview document does not address the potential impact of recycled water and desalinized water usage on landscapes. The City would like review of the chemical content and potential impacts of both recycled and desalinized water. Recycled water, for example, is understood to have substantially higher salt content than potable water sources. Increased salt levels would have deleterious effects on salt-sensitive native and non-native plant species both in the short and long-term. Increased salt levels may also impact soil health, insect life, and water quality. Specifically include review of impacts to water quality within Section 5.2.1; review of impacts to soils within 5.2.2; review of impacts to plants, insects, wildlife and fisheries within section Section 5.2.4; and review of impacts to visual resources within Section 5.2.11. D

Since the City of Oakland would be directly affected by the proposed project, we request that three (3) copies of the PEIR be sent for review to:

Eric Angstadt
Deputy Director of the Community and Economic Development Agency (CEDA)
City of Oakland
250 Frank H. Ogawa Plaza, Suite 3315
Oakland, CA 94612

Once again, thank you for the opportunity to comment. Should you have any questions regarding this letter please don't hesitate to call me at (510) 238-3659.

Sincerely,

Heather Klein
Planner III
Major Projects Division

cc: Eric Angstadt, Deputy Director of CEDA

Letter 13 – Foothill Conservancy

Foothill Conservancy
P.O. Box 1255 Pine Grove, California 95665

Mr. Tom Francis
East Bay Municipal Utility District

By e-mail transmittal
Re: **Scoping for EBMUD 2040 WSMP**

July 20, 2008

Dear Mr. Francis:

Thank you for this opportunity to provide additional scoping comments on the EBMUD 2040 Water Supply Management Plan. Please contact us if you need clarification.

GHG production from dam and bridge construction

The preferred alternative includes building a new dam at Pardee and a raised dam at Lower Bear Reservoir. The Pardee raise will require construction of a new Highway 49 bridge across the Mokelumne River, per EBMUD staff.

Building large concrete dams and bridges requires massive amounts of energy, from production of the required cement and steel to transporting those materials to the site and placing them in the dams. The EIR for the project must analyze the GHG emissions from the full life cycle of building or raising dams at Pardee and Lower Bear. The evaluation must include everything from the GHGs emitted by mining and manufacturing the construction materials, to their transportation and placement, to the GHG emissions from the movement of workers to and from the construction site. A

In addition, if land clearing is required for the reservoir expansions, the GHG analysis must evaluate the release of carbon from soil disturbance (soil stores large amounts of carbon). If the land is not cleared, the analysis must include the release of carbon from decaying vegetation in the reservoirs and hydropower generation of that carbon-laden water.

Cumulative growth-inducing impacts and related impacts in Amador and Calaveras counties

Making more water readily available in the western portion of Amador and Calaveras counties will fuel rapid growth on lands now used for agriculture and mining, including the 17,000-acre Rancho Arroyo Seco (Howard Ranch). These lands are home to the area's largest number of threatened and endangered species, from Ione rare plants to vernal pool fairy shrimp to tiger salamanders.
The EIR must include full analysis of the growth-inducing potential of expanding Pardee and Lower Bear reservoirs, as well as related impacts to GHG production, air quality (our counties

are nonattainment for ozone now), traffic, biological resources, groundwater (wastewater disposal), and cultural resources.

The analysis should recognize that neither Amador nor Calaveras water agencies have functioning and effective water efficiency and conservation programs.

Loss of recreation resources and related economic activity

The EIR must take into account the following:

- The dam expansions will flood miles of the Mokelumne River and acres of forest lands currently used for recreation by local residents and visitors who spend money in our local economy. Flooding the Middle Bar reach of the Mokelumne River will destroy a river recreation resource used by people from around central California and beyond.
- The combined Electra-Middle Bar whitewater run is unique in the region for its diversity of whitewater experience, wildlife, and scenic beauty. It is used for whitewater recreation year-round. Many locals and visitors fish in the areas of the river that would be flooded by the dam expansion, as well.
- The river is an economic resource to our counties that cannot be replaced with more acre feet of flatwater lake recreation. The Pardee expansion will eliminate the possibility of a commercial rafting activity on the combined Electra-Middle Bar reach, which would benefit our local economy.

B

Destruction of historic and cultural resources

The proposed Pardee expansion will flood the historic Middle Bar area, one of our county's most historic sites, as well as prehistoric and currently used cultural resource sites. Just last year, EBMUD was pleased to allow local native people to harvest a rare willow just upstream of the Middle Bar Bridge. Those willows would be drowned by the reservoir expansion. The EIR must evaluate the loss of these cultural and historic resources and the damage to historic and contemporary cultural sites. The Lower Bear area is also culturally rich. Any expansion of that reservoir will likely destroy cultural resources.

C

Elimination of key route for commerce and emergency response and evacuation

The Pardee expansion calls for eliminating the Middle Bar Bridge, which will create a critical public safety and resource protection problem.

By eliminating the Middle Bar Bridge, the Pardee expansion will turn Gwinn Mine and Middle Bar roads into dead-ends, thereby cutting off key fire evacuation routes for residents of those roads. If a fire were to start up-canyon of the homes along the two roads, the residents would be trapped. In addition, eliminating the crossing at Middle Bar will slow fire and emergency medical response to the area, which could result in loss of life, property and natural resources—as well as damage to EBMUD's watershed from increased risk of catastrophic wildland fire.

Eliminating the bridge will also eliminate the shortest driving route used by residents of the Paloma area to reach commercial centers in Jackson and Martell where many shop today. This has the potential of reducing sales tax revenue in Amador County and will doubtless lead to more GHG emissions from additional vehicle miles traveled.

The EIR must analyze all of these potential impacts.

D

Habitat loss around Lower Bear Reservoir and downstream of Pardee

The forested lands surrounding Lower Bear Reservoir are home to rare forest species, including California spotted owls and goshawks. The Mokelumne River below Pardee is habitat for trout. The EIR must analyze the biological resource impacts of flooding additional forest habitat. E

Aquatic resource impacts

The Lower Bear River project proposes to change the carefully crafted flow regimes in the North Fork and Main Mokelumne River, which were designed to protect and enhance aquatic resources, including rare foothill yellow-legged frogs. The EIR must analyze the impacts of changes in those flow regimes as well as changes in flow on the Bear River. F

The raise Pardee option may change flow timing, temperatures and volume in the Lower Mokelumne River and inflow of fresh water to the Delta. The EIR must fully analyze these impacts.

Related regional projects

The Pardee and Lower Bear expansions are being discussed as part of the so-called IR-CUP regional water project, which includes additional elements. They are components of various Interregional Water Supply Management Plans (IRWMPs). As long as the EBMUD projects are linked to and include elements of the IR-CUP and IRWMPs, the full, cumulative environmental impacts of those *complete plans* must be analyzed in the WSMP EIR. Those full cumulative impacts must include the impacts on the Lower Mokelumne River and the Delta, including reducing the flow of fresh water into the Delta from the Mokelumne and other Delta tributaries. Analyzing the EBMUD projects in isolation would constitute project piecemealing. G

Thank you for this opportunity to provide additional scoping comments.

Sincerely,

s/R. Winston Bell, Jr.

R. Winston "Pete" Bell, Jr.
Vice-President

Letter 14 – San Joaquin Valley Air Pollution Control District

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

June 23, 2008

Tom Francis
East Bay Municipal Utility District
375 11th Street
Oakland, CA 94607

Subject: Comments on Proposed Project

Project: NOP: EBMUD Water Supply Management Program 2040

District Reference No: 20080303

Dear Mr. Francis:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the NOP for the East Bay Municipal Utility District Water Supply Management Program 2040. The proposed project includes a network of reservoirs, aqueducts, water treatment plants, pumping plants, and distribution facilities. The District offers the following comments:

District Comments

1) The District recommends that any preliminary and final environmental review of the project's potential impact on air quality include the following:

   1a) A description of the regulatory environment and existing air quality conditions impacting the area. Information on the District's attainment status can be found on the District's web page: http://valleyair.org/aqinfo/attainment.htm

   1b) A description of the project, including a discussion of existing and post-project emissions. The discussion should include emissions from short-term activities such as construction, and emissions from long-term activities, such as operational, and area wide emission sources.

A

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061
www.valleyair.org

Southern Region
2700 M Street, Suite 275
Bakersfield, CA 93301-2373
Tel: (661) 326-6900 FAX: (661) 326-6985

1c) A discussion of the potential health impact of Toxic Air Contaminants (TACs), if any, to near-by receptors.

1d) A discussion of whether the project would result in a cumulatively considerable net increase of any criteria pollutant or precursor for which the San Joaquin Valley Air Basin is in non-attainment.

1e) A discussion of whether the project would create nuisance odors.

1f) A discussion of the methodology, model assumptions, inputs and results used in characterizing the project's impact on air quality.

1g) A discussion of all existing District regulations that apply to the project.

1h) A discussion of all feasible measures that will reduce air quality impacts.

A

2) At this time there are no established significance thresholds for greenhouse gas emissions, however, it is suggested that the EIR include a discussion of greenhouse gas emissions generated by the project and the effect they will have, if any, on global climate change.

B

3) Emissions from permitted (stationary sources) and non-permitted (mobile sources) sources should be analyzed separately. The project should be considered to have a significant adverse impact on air quality if emissions from either source exceed the following amounts: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10).

C

4) If the project is located near residential/sensitive receptors, the proposed project should be evaluated to determine the health impact of Toxic Air Contaminants (TACs) to the near-by receptors. If the analysis indicates that TACs are a concern, the District recommends that a Health Risk Assessment (HRA) be performed. If a HRA is to be performed, it is recommended that the project proponent contact the District to review the proposed modeling approach. Please contact Mr. Leland Villalvazo, Supervising Air Quality Specialist, at hramodeler@valleyair.org. Additional information on Toxic Air Contaminants (TACs) can be found on the District's Air Quality Modeling page; http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm

5) If an HRA is performed, all input and out put files necessary to validate the analysis should be submitted to the District in electronic format.

6) The proposed project may require District permits. Prior to construction, the project proponent should submit to the District an application for an Authority to Construct

(ATC). For further information or assistance, the project proponent may contact the District's Small Business Assistance Office at (209) 557-6446.

District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call Georgia Stewart at (559) 230-5937 and provide the reference number at the top of this letter.

Sincerely,

David Warner
Director of Permit Services

for Arnaud Marjollet
Permit Services Manager

DW: gs

Letter 15 – Stuart M. Flashman

Law Offices of
Stuart M. Flashman
5626 Ocean View Drive
Oakland, CA 94618-1533
(510) 652-5373 (voice & FAX)
e-mail: stuflash@aol.com

July 31, 2008

Tom Francis
Water Supply Improvements Division
East Bay Municipal Utility District
375 Eleventh Street, M.S. 407
Oakland, Ca 94607

RE: EIR Scoping for WSMP2040 Project.

Dear Mr. Francis,

This letter responds to the Notice of Preparation for the programmatic EIR for the District's WSPM 2040 water supply project. I am writing to comment on the scope of that EIR, as a former EBMUD Director, a member of the Community Liason Committee for the WSMP 2040 Project, and a citizen and East Bay MUD ratepayer.

Certainly, EBMUD needs to look ahead not the future regarding its water supply needs. From that standpoint, EBMUD is to be commended for looking ahead almost thirty years towards the potential water supply planning needs for the year 2040. Among other things that will need to be considered within that time horizon are population growth, potential changes in population characteristics and distribution, both generally and within the EBMUD service area, and the future availability of water supply sources. None of us has a crystal ball, but a certain amount of forecasting is expected and indeed demanded by the CEQA environmental review process.

Among factors that must be considered in forecasting future changes within the District, perhaps the foremost is the effects of global climate change. Over the next thirty years, it is likely that California's climate will become significantly warmer. As EBMUD is already analyzing, this means that in all likelihood more precipitation in the District's Mokelumne watershed and elsewhere in the Sierra Nevada and its foothills will come as rain, rather than snow, and what does come as snow will probably melt sooner in the springtime. This means not only that the District will be less able to rely on snowpack for water storage, but that, because California in general will have the same problem, overall water availability within California, from both the State Water Project and the Federal Central Valley Project will be reduced. Consequently, water transfers will be increasingly hard to obtain, especially long-term transfers, and the environmental situation in the San Joaquin Delta will be come even more perilous than currently, with a likely increase in restrictions on flows through the Delta and requirements that more flows from rivers feeding the Delta, such as the Mokelumne River, be dedicated to protecting the Delta's environment.

All of this points to the need to emphasize conservation and reuse far more than ever before. On the other hand, however, since the need for conservation and reuse will extend throughout California, it seems likely that there will be increased levels of conservation and reuse mandated at a statewide level, such that increasing amounts of conservation and reuse will occur even in the absence of EBMUD action. Thus the "floor" for reuse, and especially for conservation, should probably be raised from what is currently being forecast by the District. A

In addition, the increased demand for water conservation will mean that increased quantities of water conserving appliances will be produced and the price for such appliances (such as, for example, high efficiency toilets and greywater systems) can be expected to drop significantly. These price changes should be taken into account in projecting the potential cost and resultant feasibility of various water conservation and recycling options. B

Coupled to, although separate from, global warming impacts are the expected impacts from "peak oil" which will undoubtedly be felt before the District's planning horizion of 2040. Peak oil refers to the time point at which petroleum production reaches an all-time peak; corresponding roughly to when half of the world's available oil supply has been utilized. From that point onward, petroleum production will inevitably decline and its cost increase correspondingly. At a practical level, this means that many of the basic assumptions of modern American life will have to change quickly and drastically. Perhaps the most obvious is that the internal combustion powered automobile, as well as diesel powered trucks and equipment, are likely to see enormous changes. When gasoline costs ten to fifteen dollars a gallon, thirty and forty mile commutes will become a luxury that the average person will not be able to afford. Patters of population distribution will have to change accordingly. In addition, since most electric power is still generated from either petroleum or natural gas, and both of these commodities are going to become much more expensive, the cost of electricity, and of household heating and cooling, will rise enormously. Again, this will result in major changes in population distribution, both in California in general and within the EBMUD service area in particular. The analysis of water demand in the EIR needs to take thse changes into account. In particular, it seems likely that the movement of population from west to east in the EBMUD service area will reverse itself. This means that per household water use will likely decrease more than EBMUD's current forecasts project. The "need for water" will need to be modified accordingly. C

Beyond these major impacts, another predictable future impact on the EBMUD service area is seismic activity. EBMUD has already embarked on a seismic improvement program to address future earthquakes within the District. However, earthquakes will also occur in the San Joaquin Delta, affecting EBMUD's aqueducts. The prior WSMP 2020 adopted a plan to strengthen EBMUD's aqueducts to reduce the risk from earthquakes and flooding in the Delta. However, in between future quakes and the rise in sea level from global warming, the likelihood of damage to the aqueducts may not have been adequately addressed. The WSMP 2040 proposes to consider one alternative, Buckhorn Reservoir, that is proposed to partly address this continued and increased vulnerability. However, Buckhorn Reservoir is unlikely to contain enough storage to protect against the dual impacts of global warming plus seismic activity in causing aqueduct damage. If there is major damage to the aqueducts due to seismic activity and widespread flooding in the delta, that damage is unlikely to be quickly remedied. Consequently, the EIR should consider alternative approaches to protecting the District's trans-Delta water supply conduits. One prospect that needs to be evaluated in the possibility of burying one or more of the aqueducts through the Delta. This was briefly considered in WSMP 2020 and rejected as too expensive. However, with rising sea levels, the risks have increased and that option needs to be re-evaluated. D

Finally, one aspect of water conservation appears to have been totally overlooked in the range of alternatives being considered in WSMP 2040: that is, conservation-pricing; i.e., institution of a rate structure that sends strong price signals encouraging conservation. There can be little doubt that there is sufficient elasticity in water demand and sufficient sensitivity to price signals to make conservation pricing an effective tool for conservation. Indeed, both EBMUDs drought pricing schedules and its day-to-day price structure include a mild inclined block rate structure. The evidence from other examples of price effects on conservation behavior in everything from electricity to gasoline consumption are impossible to overlook.

When faced with the suggestion of including conservation pricing among the alternatives to be examined in WSMP 2040, the response from staff and the Board was that it was "too controversial" for inclusion as an alternative. As I am sure you are aware, that is a political, not an environmental, issue. Political controversy is not a sufficient reason to reject consideration of an alternative. The analysis in the EIR may in itself suffice to change the political climate sufficiently to make something previously considered "politically infeasible" acceptable to the voting public. Aside from that, an EIR, while it is intended to have a political effect, is not intended to be a political document. Rather, it is supposed to be based on objective nad verifiable scientific evidence. For that reason as well, political popularity is not an appropriate basis for rejecting an alternative for possible analysis. The EIR needs to include an analysis and discussion of how conservation pricing might affect water demand and reduce the "need for water. } E

Most sincerely,

Stuart M. Flashman

Stuart M. Flashman

E-mail Message 1 Stockton East Water District

From: Kevin Kauffman [mailto:kkauffman@sewd.net]
Sent: Monday, June 02, 2008 10:20 AM
To: Francis, Thomas
Cc: Tom Gau; Steven Winkler; Stan Ferraro; Robert Granberg; Mel Lytle; Mark Madison; Kevin M. Kauffman; Kelly Stephens; John Yoshimura; Jim Simunovich; JEANETTE THOMAS; Anthony Barkett; Ross Moilan
Subject: Comments on NOP

Tom,

Thanks for the opportunity to comment,

Kevin M. Kauffman
Stockton East Water District
P.O. Box 5157
Stockton, CA 95205
(209) 948-0333 office
(209) 948-0423 fax
(209) 969-1175 mobile

Re: EBMUD's May 1, 2008 NOP, with a Project Title of "EBMUD Water Supply Management Program 2040.

Thank you for this opportunity to comment on the above referenced NOP.

The district's questions and comments relate to ongoing discussions held at meeting of the San Joaquin County Flood Control & Water Conservation District Advisory Water Commission, the Northeast San Joaquin County Groundwater Banking Authority, the Mokelumne Forum, Eastern Water Alliance, and other similar venues. The focus of our questions is on Section 2.2, 2.23, and 3 of EBMUD's May 1, 2008 NOP, with a Project Title of "EBMUD Water Supply Management Program 2040."

Section 2.2. ~90% of the 2005 average annual demand of 208 MGD, or ~ 187.2 MGD originated in the Mokelumne watershed.

Section 2.23. The Mokelumne Aqueducts have a gravity capacity of 200 MGD to the East Bay service area (and 325 MGD capacity with pumping at the Aqueduct's terminus in Walnut Creek).

Section 3. Future water need = projected water demand less worst-case supply; worst-case = 1976, 1977, 1978 (actually an average of 1976 & 1977) water supply; projected 2040 water demand = 274 MGD.

Questions & Comments:

1. Does EBMUD expect the 90% of average demand to continue to come from the Mokelumne watershed through 2040? } A
2. Any improvement to the Aqueduct's capacity was not seen. Does EBMUD anticipate additional pumping capacity, lining or other methods to increase the Aqueduct's capacity? } B
3. Manipulating a historic severe two-year drought into a three-year severe drought seems too conservative. Is anyone else in the State of California or the USA using such conservative planning approach? } C
4. The 2040 projected average annual demand of 274 MGD equates to 306,880 AF. Based on the methodology used by EBMUD to project its average annual demand in 2040, could a projection of EBMUD's ultimate average annual demand be provided? } D

The district appreciates this opportunity, looks forward to the EBMUD Water Supply Management Program 2040 adoption process, and wishes EBMUD the best of luck with this process.

Kevin Kauffman
(209) 948-0333

E-mail Message 2 City of Piedmont

From: Francis, Thomas
Sent: Wednesday, May 28, 2008 1:03 PM
To: Caughey, Mark; Galvin, Marie; 'Chau, Suet'
Subject: NOP Comment Call

This is a brief email to document a question that I received regarding the NOP / WSMP 2040 (and my response).

On 4/27/08 I received a phone call from Sylvia Toruno of the City of Piedmont to determine if there were plans to modify the District's Piedmont Reservoir as part of WSMP 2040. A

I replied that we were not considering modifications to the Piedmont Reservoir as part of WSMP 2040. Instead, EBMUD was develop a proposed portfolio of projects that would help the District meet its drought contingency needs through the year 2040. WSMP 2040 would not be addressing particular distribution system / pressure zone storage facility improvement planning detail.

Tom

E-mail Message 3 Foothill Conservancy

-----Original Message-----
From: Foothill Conservancy, Katherine Evatt [mailto:kke@foothillconservancy.org]
Sent: Sunday, July 20, 2008 10:56 AM
To: Francis, Thomas
Cc: Doug Linney; Andy Katz
Subject: Scoping comments, 2040 WSMP

Dear Mr. Francis: See attached additional scoping comments on EBMUD 2040 WSMP. We have focused our comments on the environmental issues that must be addressed in the PEIR that we believe are not included in the current EBMUD plan, especially considering the inclusion of the raise Pardee and expand Lower Bear options in the preferred "portfolio."

However, EBMUD should also note the following:

--PG&E recently filed for a preliminary FERC permit that affects Lower Bear Reservoir. This effectively precludes any other entity from conducting any other project that involves Lower Bear for up to nine years. } A

-- Any alternative that includes expanding Pardee Reservoir will meet with a great deal of local opposition from the residents of Amador and Calaveras counties who use or value the Mokelumne River. EBMUD should have held at least one scoping meeting in our counties. Stockton is not close enough for local participation and few local residents know of EBMUD's plans.

-- The expansions of Pardee and likely Lower Bear are also opposed by regional, statewide, and national conservation, fish, and recreation organizations. Pursuing them will put EBMUD on the track to difficult political and legal fights for many years to come. Surely there are less contentious, less costly, less damaging alternatives for the East Bay's future water supply.

-- Raising Pardee will require major amendments to EBMUD's FERC license, if not a completely new license. These license proceedings will be costly and lengthy. Under the Federal Power Act, FERC licenses must balance recreation and natural resources with power production. Under current FERC standards, any discussion of EBMUD's FERC license will include passage for anadramous fish (salmon and steelhead) around Camanche and Pardee dams in order to restore the fish to their historic spawning areas on the upper Mokelumne River.

--Changes proposed to Lower Bear, the Bear River and the portions of the Mokelumne included in PG&E's Project 137 license may well conflict with the terms of that project's license and the related settlement agreement, to which we are a party. For example, the Amador Water Agency says that raising Bear could change flows in the North Fork and main Mokelumne in the summer months. Those flows are specifically governed by the terms of the Project 137 license and settlement and cannot be changed without agreement of the parties to the settlement. } B

Verbal 1 (May 14, 2008 Event - NSJGBA)

Northeastern San Joaquin Groundwater Banking Authority
Coordinating Committee Meeting Summary
Wednesday, May 14, 2008

Discussion on EBMUD PEIR Notice of Preparation for Water Supply Management Program 2040 (See Attached) – Tom Francis:
Mr. Francis said there was no initial study. EBMUD is proceeding with a program level EIR and expect the draft in late 2008. They anticipate certification in March of 2009.

EBMUD's current water supply sources will not meet the 2040 dry year demand. To address this, EBMUD has developed five portfolios of preferred "suites" for consideration within the context of the PEIR. They primarily get water from the Mokelumne and will get additional water from Freeport. 1.3 million people are customers.

Mr. Francis said the final demand projection of 274 MGD can be reduced based on which portfolio is ultimately selected. Increased residential density and industrial growth are the two main drivers of the projected deficit.

The common elements of the portfolios include water conservation at 37 or 39 MGD, increased water recycling by 5 or 11 MGD mainly in refineries and golf courses, and rationing at a reduced rate of 10, 15 or 20% rather than the current 25% maximum.

Supplemental elements include:

- Raise Lower Bear
- Enlarge Pardee
- Build Buckhorn Canyon
- Groundwater Banking/Exchange (IRCUOP/SJC, Stockton East, Sacramento Basin, Bayside Phase 2)
- Water Transfers
- Regional Desalination

The portfolio screening process included evaluating 14 portfolios and resulted in selection of 5 for consideration within the PEIR. The five portfolios all have conservation, recycling and rationing at various levels as elements. The portfolios are:

1. Groundwater Portfolio – includes upcountry efforts and transfers
2. Diversified Portfolio – includes lower transfers, enlarging Lower Bear, and desalinization
3. Reliability Portfolio – includes a catastrophe assumption and adds Buckhorn Canyon

4. Lower Carbon Footprint Portfolio – includes enlarging Pardee and generating energy
5. Recycling and Transfers Portfolio – includes 27 MGD in transfers and 11 MGD in recycling

Mr. Francis added 15 topics will be considered in the PEIR. Currently no groundwater is utilized by EBMUD. He said there will be a public meeting on the PEIR in Stockton on May 29th, one in Oakland on June 16th and in Walnut Creek on June 17th. Mr. Nomellini stated he would like to see the inclusion of additional Delta considerations. Mr. Francis requested comments be sent to him by June 2nd at the following address:

Thomas B. Francis, P. E.
EBMUD
375 11th Street, MS407
Oakland, CA 94607

Summary by EBMUD of comments offered during the May 14 presentation:

- Raise Lower Bear Reservoir component – what is the expected yield (Ed Steffani of North San Joaquin Water Conservation District) — A
- Desalination – why not consider de-salting WW effluent? (Dante Nomellini of Central Delta Water Agency) — B
- Water transfers – has EBMUD identified particular trading partners? (Dante Nomellini) — C
- Delta sources – no specific delta source components appear to be part of WSMP 2040; however, some WSMP options (ie, desal at Mirant), and certain water transfer sources upstream could disadvantage delta users – should be identified/analyzed in the PEIR. (Dante Nomellini) — D

Verbal 2 (May 19, 2008 Event – Community Liaison Committee Meeting)

1. Public Comment May 19, 2008

No public comments were made, but a speaker card was submitted by Ingrid Severson from Bay Localize:

- Within the water conservation theme, rainwater catchment is a simple technology that can offer significant alternatives for supplies. (Proposition 84), the Statewide Bond geared towards strengthening water systems in CA can provide funding for the implementation of this system for commercial, residential and public sectors.
  Rainwater catchment is a robust alternative - especially when utilized as larger volume of storage facilities, like the 1,000 gallon tanks.

A

Verbal 3 (May 22, 2008 Event – Scoping Meeting No. 1)

EBMUD WSMP 2040

Scoping Meeting Summary Notes
May 22, 2008, 6:30 p.m.
EBMUD Administrative Offices, 375 Eleventh Street, Training Center

Attendees

EBMUD: Tom Francis, Cherie Sakurai, Alex Coate
EDAW: David Blau, Marcia Tobin, Marie Galvin, and Sue Chau
Public: Greg Chan (EBMUD); Richard Denton (CCWD)

Summary

Marcia Tobin presented on the project, the portfolios, and the environmental topics that will be covered in the EIR

Richard Denton asked questions during and after the presentation. He indicated that he is not speaking on behalf of CCWD at the meeting. CCWD will provide formal comments in writing. Responses to Richard's questions and / or clarifications of the project are provided below.

- Marcia and Tom clarified that the Board will be present at the June public meetings.
- Tom clarified that EBMUD's share of the water from the regional desalination component would be 20 mgd. The WSMP 2040 process has consistently used existing and ongoing regional desalination studies to determine the allocations to water agencies.
- David reiterated the WSMP 2040's robust screening process used to derive the current portfolios.
- Marcia clarified that the Bixler component was considered but was determined infeasible during the screening process.
- Tom reiterated that the public process for the WSMP 2040 has been extensive, and that EBMUD has had the 7th CLC meeting.
- Tom responded to Richard's questions regarding the costs of Portfolio B, which includes a range of components. Tom specified that the EBMUD Team is in the middle of modeling the cost. The WEAP model not only determines the need for water, it also calculates cost and phasing.
- David mentioned that the Los Vaqueros Reservoir Expansion is not sufficiently defined to be included as a portfolio evaluated in the WSMP 2040. Richard suggested we speak with Marguerite Naillon if EBMUD wants more information about the Los Vaqueros Reservoir Expansion Project. } A
- Alex confirmed that water entitlements to CCWD from the Freeport Regional Water Project (FRWP) would not change. It would stay at 3.2 mgd. } B
- Tom confirmed that the modeling efforts for the WSMP 2040 took into account the FRWP.

- David confirmed the drought planning sequence used in the WSMP 2040 modeling, which includes adjusting 1978 as a dry year. With global climate change, the drought planning sequence is not considered conservative. Tom confirmed that the EIR will evaluate global climate change at a level equal to other environmental topics. Marcia added that a sensitivity analysis will be conducted for the WSMP 2040, to address the reduced snowpack, increase in water demand, etc.
- Richard asked whether the Buckhorn Reservoir component would free up constraints on the Freeport system. Tom specified that this component would provide flexibility as there would be additional storage for high quality water. The Freeport system won't change. The Freeport pipeline would be used for conveyance of water from transfers and groundwater banking components.

C

Verbal 4 (May 29, 2008 Event – Scoping Meeting No. 2)

EBMUD WSMP 2040

Scoping Meeting Summary Notes
May 29, 2008, 6:30 p.m.
Stockton Grand Hotel

Attendees

EBMUD: Tom Francis, Mark Caughey
EDAW: Sue Chau
Public: Dr. Mel Lytle and Mr. Brandon Nakagawa (San Joaquin County Department of Public Works / Mokelumne River Water and Power Authority)

Summary

Tom Francis described the objectives of the WSMP 2040 effort, the portfolios, and the environmental topics that will be covered in the Program EIR (PEIR).
Responses to questions and comments from the public participants follow:

- Level of past rationing: The highest level of rationing occurred during the 1977-1978 drought, when EBMUD attained a system-wide water use reduction of 39 percent.

  EBMUD requested voluntary water rationing in 2007, but has mandated 15% system-wide rationing this year. The level of rationing is based on projected estimates of snowpack and storage.
- Lower Bear Reservoir: Implementation of this component would include other participants; EBMUD would be allocated approximately ¼ of the resulting water yield.
- Regional Desalination: If the facility was to be located at Oceanside in San Francisco, EBMUD and SFPUC would likely utilize the existing Hayward Intertie to distribute in-lieu water supplies.

  Dr. Lytle strongly encouraged EBMUD to pursue the regional desalination study, and support options that reduce demand in the upper Mokelumne watershed. } A
- Portfolio Composition: Mel asked why Alternative Portfolio C, Reliability, does not include Regional Desalination if its emphasis is west of Delta storage, and why EBMUD would consider a portfolio with a stand-alone Enlarge Pardee Reservoir component. } B

  Tom explained that EBMUD and our Board of Directors may decide at the PEIR stage to create a modified portfolio, selecting components that appear in one or more of the five portfolios under current consideration, and may decide to consider Enlarge Pardee Reservoir alone or in conjunction with other components.

Dr. Lytle stated that San Joaquin County would have concerns if EBMUD decides to implement the Enlarge Pardee Reservoir on its own; this approach would be contrary to collaborative spirit of the Mokelumne River Forum. } C

- Background Reports: Reference documents for the PEIR will become available at the time that the WSMP 2040 PEIR is released. Certain reports may be included as technical appendices to the PEIR

APPENDIX A State Clearinghouse Distribution Notice

STATE OF CALIFORNIA

GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

STATE CLEARINGHOUSE AND PLANNING UNIT

ARNOLD SCHWARZENEGGER
GOVERNOR

CYNTHIA BRYANT
DIRECTOR

Notice of Preparation

May 1, 2008

To: Reviewing Agencies

Re: EBMUD Water Supply Management Program 2040
SCH# 2008052006

Attached for your review and comment is the Notice of Preparation (NOP) for the EBMUD Water Supply Management Program 2040 draft Environmental Impact Report (EIR).

Responsible agencies must transmit their comments on the scope and content of the NOP, focusing on specific information related to their own statutory responsibility, within 30 days of receipt of the NOP from the Lead Agency. This is a courtesy notice provided by the State Clearinghouse with a reminder for you to comment in a timely manner. We encourage other agencies to also respond to this notice and express their concerns early in the environmental review process.

Please direct your comments to:

Tom Francis
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607

with a copy to the State Clearinghouse in the Office of Planning and Research. Please refer to the SCH number noted above in all correspondence concerning this project.

If you have any questions about the environmental document review process, please call the State Clearinghouse at (916) 445-0613.

Sincerely,

Scott Morgan
Project Analyst, State Clearinghouse

Attachments
cc: Lead Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# 2008052006
Project Title EBMUD Water Supply Management Program 2040
Lead Agency East Bay Municipal Utility District

Type NOP Notice of Preparation

Description The primary purpose of WSMP 2040 is currently being prepared and will present water demand projections through 2040, as well as alternative solutions to meet those projected demands. The WSMP PEIR will evaluate the environmental impacts of these alternative portfolios, which include water conservation measures, recycled water projects, supplemental water supplies, and various levels of rationing that could be implemented during drought periods.

Lead Agency Contact

Name Tom Francis
Agency East Bay Municipal Utility District
Phone (510) 287-1303 **Fax** (510) 287-1295
email tfrancis@ebmud.com
Address 375 Eleventh Street
City Oakland **State** CA **Zip** 94607

Project Location

County Alameda, San Francisco, Contra Costa, Sacramento, ...
City
Region
Cross Streets Various locations
Parcel No.
Township **Range** **Section** **Base**

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use

Project Issues Water Quality; Water Supply; Soil Erosion/Compaction/Grading; Drainage/Absorption; Flood Plain/Flooding; Geologic/Seismic; Other Issues; Biological Resources; Wildlife; Landuse; Agricultural Land; Traffic/Circulation; Air Quality; Noise; Archaeologic-Historic; Recreation/Parks; Aesthetic/Visual; Toxic/Hazardous; Public Services; Growth Inducing; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Parks and Recreation; Native American Heritage Commission; Department of Health Services; Department of Fish and Game, Region 3; Department of Fish and Game, Region 2; Department of Water Resources; Department of Conservation; San Francisco Bay Conservation and Development Commission; Caltrans, Division of Transportation Planning; State Water Resources Control Board, Division of Water Rights; State Water Resources Control Board, Division of Water Quality; State Water Resources Control Board, Division of Loans and Grants

Date Received 05/01/2008 **Start of Review** 05/01/2008 **End of Review** 05/30/2008

Note: Blanks in data fields result from insufficient information provided by lead agency.

Resources Agency
- Resources Agency — Nadell Gayou
- Dept. of Boating & Waterways — David Johnson
- California Coastal Commission — Elizabeth A. Fuchs
- Colorado River Board — Gerald R. Zimmerman
- Dept. of Conservation — Sharon Howell
- California Energy Commission — Dale Edwards
- Cal Fire — Allen Robertson
- Office of Historic Preservation — Wayne Donaldson
- Dept of Parks & Recreation — Environmental Stewardship Section
- Central Valley Flood Protection Board — Mark Herald
- S.F. Bay Conservation & Dev't. Comm. — Steve McAdam
- Dept. of Water Resources — Resources Agency — Nadell Gayou
- _____ Conservancy

Fish and Game
- Depart. of Fish & Game — Scott Flint — Environmental Services Division
- Fish & Game Region 1 — Donald Koch
- Fish & Game Region 1E — Laurie Harnsberger
- Fish & Game Region 2 — Jeff Drongesen
- Fish & Game Region 3 — Robert Floerke
- Fish & Game Region 4 — Julie Vance
- Fish & Game Region 5 — Don Chadwick — Habitat Conservation Program
- Fish & Game Region 6 — Gebrina Gatchel — Habitat Conservation Program
- Fish & Game Region 6 I/M — Gabrina Getchel — Inyo/Mono, Habitat Conservation Program
- Dept. of Fish & Game M — George Isaac — Marine Region

Other Departments
- Food & Agriculture — Steve Shaffer — Dept. of Food and Agriculture
- Depart. of General Services — Public School Construction
- Dept. of General Services — Robert Sleppy — Environmental Services Section
- Dept. of Health Services — Veronica Malloy — Dept. of Health/Drinking Water

Independent Commissions,Boards
- Delta Protection Commission — Debby Eddy
- Office of Emergency Services — Dennis Castrillo
- Governor's Office of Planning & Research — State Clearinghouse
- Native American Heritage Comm. — Debbie Treadway
- Public Utilities Commission — Ken Lewis
- Santa Monica Bay Restoration — Guangyu Wang
- State Lands Commission — Marina Brand
- Tahoe Regional Planning Agency (TRPA) — Cherry Jacques

Business, Trans & Housing
- Caltrans - Division of Aeronautics — Sandy Hesnard
- Caltrans - Planning — Terri Pencovic
- California Highway Patrol — Shirley Kelly — Office of Special Projects
- Housing & Community Development — Lisa Nichols — Housing Policy Division

Dept. of Transportation
- Caltrans, District 1 — Rex Jackman
- Caltrans, District 2 — Marcelino Gonzalez
- Caltrans, District 3 — Jeff Pulvemen
- Caltrans, District 4 — Tim Sable
- Caltrans, District 5 — David Murray
- Caltrans, District 6 — Moses Stites
- Caltrans, District 7 — Vin Kumar
- Caltrans, District 8 — Dan Kopulsky
- Caltrans, District 9 — Gayle Rosander
- Caltrans, District 10 — Tom Dumas
- Caltrans, District 11 — Jacob Armstrong
- Caltrans, District 12 — Ryan P. Chamberlain

Cal EPA

Air Resources Board
- Airport Projects — Jim Lerner
- Transportation Projects — Ravi Ramalingam
- Industrial Projects — Mike Tollstrup
- California Integrated Waste Management Board — Sue O'Leary
- State Water Resources Control Board — Regional Programs Unit — Division of Financial Assistance
- State Water Resources Control Board — Student Intern, 401 Water Quality Certification Unit — Division of Water Quality
- State Water Resources Control Board — Steven Herrera — Division of Water Rights
- Dept. of Toxic Substances Control — CEQA Tracking Center
- Department of Pesticide Regulation

Regional Water Quality Control Board (RWQCB)
- RWQCB 1 — Cathleen Hudson — North Coast Region (1)
- RWQCB 2 — Environmental Document Coordinator — San Francisco Bay Region (2)
- RWQCB 3 — Central Coast Region (3)
- RWQCB 4 — Teresa Rodgers — Los Angeles Region (4)
- RWQCB 5S — Central Valley Region (5)
- RWQCB 5F — Central Valley Region (5) — Fresno Branch Office
- RWQCB 5R — Central Valley Region (5) — Redding Branch Office
- RWQCB 6 — Lahontan Region (6)
- RWQCB 6V — Lahontan Region (6) — Victorville Branch Office
- RWQCB 7 — Colorado River Basin Region (7)
- RWQCB 8 — Santa Ana Region (8)
- RWQCB 9 — San Diego Region (9)

- Other _____

Last Updated on 03/03/2008

APPENDIX B
LOCAL PLANS, POLICIES AND REGULATIONS

Appendix B: General Plan Information

General Plans

General Plans contain goals, policies and implementation measures that provide planning guidance for the future.

They act as “blueprints” for the long-term physical development of each county / city. Most General Plans cover a spectrum of topics. For example the Land Use Element of each General Plan designates land uses within the respective jurisdiction and presents land use goals and policies for the future and is designed to serve as the basis for development decision-making, which is of importance to the PEIR. For this Appendix, the General Plans of the counties in which preferred portfolio elements are proposed were reviewed for any policies and planning guidance with relevance to the PEIR. Applicable policies and guidance are summarized by topic below. The General Plans summarized included documents prepared for Alameda County, Alpine County, Amador County, Calaveras County, Colusa County, Contra Costa County, Glenn County, Plumas County, Sacramento County, San Joaquin County, Yolo County, and Yuba County.

Table B-1 provides an overview of the counties General Plans and the preferred portfolio components proposed in each county.

Table B-1 General Plans and Preferred Portfolio Components

County	General Plan	Published	Preferred Portfolio Components
Alameda	Eden Area Final Draft General Plan	March 26, 2007	• Bayside Phase 2 • Recycled Water Projects
Contra Costa	Contra Costa General Plan 2005-2020	January 2005	• Regional Desalination • Recycled Water Projects
Sacramento	County of Sacramento General Plan	December 15, 1993 (includes revisions as of 5/2/1997)	• Sac Basin GW Banking/Exchange
Plumas	Plumas County General Plan, 2nd Edition	1985	• Northern California Water Transfers
Glenn	Glenn County General Plan, Policy Plan	June 15, 1993 (with updates as recent as 2003)	• Northern California Water Transfers
Colusa	Colusa County General Plan	March 1989	• Northern California Water Transfers
Yuba	Yuba County General Plan	May 19, 1994	• Northern California Water Transfers
San Joaquin	San Joaquin General Plan 2010	July 29, 1992; Amended July 2002	• IRCUP/San Joaquin Basin GW Banking/Exchange
Calaveras	Calaveras County General Plan	December 9, 1996	• IRCUP/San Joaquin Basin GW Banking/Exchange • Enlarge Pardee
Amador	Draft Amador County General Plan Update, Preliminary Goals and Policies	September 2008	• IRCUP/San Joaquin Basin GW Banking/Exchange • Enlarge Lower Bear • Enlarge Pardee
Alpine	Alpine County General Plan	April 2005	• IRCUP/San Joaquin Basin GW Banking/Exchange

A summary of relevant goals and policies from applicable General Plans are presented below.

A. Hydrology, Groundwater and Water Quality

a) Water Quality standards and Waste discharge requirements

Amador County's General Plan is in the process of being updated. Preliminary Goals and Objectives encourage development patterns which support water quality objectives, educate the public on reducing water use and address reclaimed water application and wastewater treatment. They also state the policy to extend available water supplies.

The Contra Costa County General Plan states six goals and seven policies regarding water resources. These include goals to assure potable water availability to serve existing and future residents (GOAL 7-F); to encourage the development to locally controlled supplies to meet the growth needs of the County (Goal 7-G); to encourage the conservation of water resources (Goal 7-H); to develop wastewater reclamation as a supplement to imported surface water supplies (Goal 7-M); to conserve, enhance and manage water resources, protect their quality and assure an adequate long-term supply of water for domestic, fishing, industrial and agricultural use (Goal 8-T); and to maintain the ecology and hydrology of creeks and streams and provide an amenity to the public (Goal 8-U). The policies address finding opportunities in cooperation with water service agencies for use of non-potable water, including ground water, reclaimed water and untreated surface water, for other than domestic use (Policy 7-24); reducing the need for water system improvements by incorporating water conservation measures in new developments (Policy 7-26); encouraging reclamation of water (Policy 7-27); finding opportunities to use reclaimed wastewater in cooperation with sewer service and water service agencies (Policy 7-35); and encouraging beneficial uses of treated wastewater including marsh enhancement and agricultural irrigation (Policy 7-36).

The Eden Area Final Draft General Plan is applicable to the area of interest in Alameda County. Relevant goals and policies from that plan include: Goal PF-9 Ensure sufficient water supplies and facilities to serve the residents of the Eden Area in an efficient and financially-sound manner. Policies: The County shall support the efficient use of water through such means as conservation and recycling, and shall encourage the development of water recycling facilities to help meet the needs in the Eden Area. The County shall encourage the efficient use of water for non-residential landscape irrigation by supporting the use of recycled water. The County shall work with EBMUD to ensure effective management and long-term allocation of water resources, to develop a contingency plan for potential short-term water shortages and to develop uniform water conservation programs. Goal-PF-10 Ensure that wastewater is collected, treated and disposed of in a manner that is safe, sanitary and environmentally acceptable. Goal PF-11 Collect, store and dispose of stormwater in ways that are safe, sanitary and environmentally acceptable. Policies: New development projects should be designed to preserve permeable surfaces, minimize the amount of impervious surface and reduce stormwater impacts. Specific strategies that should be considered include permeable paving materials, green roofs and swales. Design of storm drainage facilities shall be

consistent with the SWQMP and NPDES requirements. The County shall protect surface and groundwater resources by implementing the water quality policies in the County wide Resource and Conservation, Open Space and Agriculture Element (ROSA).

The San Joaquin Countywide General Plan includes the following relevant policies: 1) Water quality shall meet the standards necessary for the uses to which the water resources are put. 8) The County shall encourage water conservation. 9) The County shall encourage wastewater reclamation efforts. 11) Water projects shall: (a) incorporate safeguard for fish and wildlife; and (b) mitigate erosion and seepage to adjacent lands. 12) No water shall be exported to other areas of the State unless the current and future needs of San Joaquin County can be met.

b) Groundwater

The Alpine County General Plan lists four water resources specific goals. They all address maintaining adequate supplies of water (surface and subsurface) in Alpine County and protecting the water quality for all current and foreseeable needs. (Element I - Section C, Goals 4 through 7). The County opposes groundwater withdrawals that could exceed or significantly drawdown groundwater supplies (Policy 5a and 5b).

The Glenn County General Plan includes several policies addressing groundwater and recharge area protection, such as “limit structural coverage and impervious surfaces within areas of high groundwater recharge through application of zoning” and “carefully study the potential impact that any future reservoir construction may have on groundwater recharge areas in Glenn County” (NRP-25, -29, -33, -38), and watershed protection (NRP-30). The plan focuses on reserving and retaining water resources locally (NRP-37).

The Sacramento County General Plan states the following relevant goals and policies. Conservation Goal: Conjunctive use of surface and ground water to provide long-term water supply for Sacramento residents while maintaining river flows and reservoir levels which protect environmental resources and provide substantial recreational benefits. Policies: CO-3. SCWA shall continue to work with the area water purveyors to develop a conjunctive use program and assist other purveyors in obtaining surface water necessary to implement conjunctive use. CO-7. Divert surface water only when flows are sufficient to maintain minimum flows consistent with the EBMUD Court ruling of: 2,000 cfs October 16 through February; 3,000 cfs March through June; 1,750 cfs July through October 15 in the Lower American River between Nimbus Dam and its confluence with the Sacramento River. Conservation Goal: Adequate long-term quantity and high quality ground water resources for both human and natural systems.CO-18. Work with area purveyors to investigate and implement a conjunctive use program between groundwater and surface water supplies, consistent with meeting the in-stream flow requirements of the American River. Policies: CO-19. Utilize intermittent water in conjunctive use with ground water in agricultural areas.

The San Joaquin Countywide General Plan includes the following relevant policies: 2) Surface water and groundwater quality shall be protected and improved where necessary. 4) The County shall support coordinated efforts to obtain adequate water supplies, conjunctive use of ground and surface waters, and provisions for water storage facilities to meet the expected water demand. 6) The replenishment of aquifers shall be supported to minimize the overdraft of groundwater. 7) The County shall support a multi-jurisdictional aquifer evaluation that involves all adjacent counties in an analysis of groundwater supplies, demand and use. 14) The County shall encourage the development of artificial recharge projects of all scales within the County and cities to increase recharge to the aquifers.

The Yuba County General Plan lists several policies related to Groundwater resources; they shall be managed at the local level, including oversight of exportation, in an effort to ensure that an adequate groundwater supply is available for Yuba County residents. Expansion of surface water use for land designated Valley Agriculture, Agriculture/Rural Residential and Foothill Agriculture in lieu of continued reliance on groundwater.

c) Other/Water Supply

The Calaveras County General Plan includes three goals and subsequent policies that address preservation of the current and additional water rights to preserve the county's full development potential, preservation of adequate domestic water supplies and preserving portions of the County's rivers and streams as a local recreation resource. (Calaveras County General Plan, Goals IV-9, IV-10 and V-9). The subsequent relevant policies include support for the development of water projects in the County for domestic and irrigation purposes (Policy IV-9A) and encourage cooperation among water supplies in meeting the needs for the County as a whole (Policy IV-10A).

The Colusa County General Plan states water resource policies that address adequate water supply for the county's domestic, agricultural and wildlife needs by working with the state and federal agencies responsible for water projects (CO-15); discourage support for Bureau of Reclamation's Sites Reservoir project (CO-16) and promote water-conserving agricultural practices and reuse of water (CO-17).

The Glenn County General Plan states a general goal to protect and manage local water resources (NRG-2) with the following policy to encourage the development of water conservation programs by water purveyors for both agricultural water and urban uses (NRP-35).Further, water resources specific policies state opposition to the exportation of groundwater resources outside the county (NRP-22); and support of legislation which will provide for a locally controlled Glenn County groundwater management district (NRP-23). Policy NRP-24 states that the local priorities when dealing with questions of ground and surface water use are: Highest: 1) Household/Domestic, 2) Agriculture, 3) Industrial/Commercial, 4) Wildlife/ Conservation, Lowest: 5) Exportation.

The Yuba County General Plan lists several policies related to natural stormwater drainage, improving the quality of stromwater runoff through artificial wetlands and minimizing off-site drainage. It also addresses prioritizing surface water supplies: The County shall encourage the use of surface water supplies for new development as an alternative to groundwater use whenever feasible. Water utilization and distribution planning shall be directed and coordinated by the Yuba County Water Agency and shall include PG&E, California Water Service Company and the various water delivery special districts. Natural waterways shall be protected from unnecessary alteration whenever flood protection structures or other forms of construction are proposed.

B. Geology, Soils and Seismicity

Please refer to the Hazards section below for General Plan references on geology, soils and specifically seismicity.

C. Biology

a) Local policies or ordinances protecting biological resources (incl. tree preservation policy or ordinance)

The Eden Area Final Draft General Plan is applicable to the area of interest in Alameda County. Relevant goals and policies from that plan include: a Tree Ordinance and several resource conservation policies (see below). The Tree Ordinance (0-2004-23) includes "any woody perennial plant characterized by having a single trunk or multi-trunk structure at least ten feet high and having a major trunk that is at least two inches in diameter taken at breast height (DBH) taken at 4.5 feet from the ground. It shall also include those plants generally designated as trees and any trees that have been planted as replacement trees under the County Tree Ordinance or any trees planted by the County."

The Sacramento County General Plan lists as one of its goals to preserve Sacramento trees and especially native oak woodland resources. Policies include: (CO-130) Make every effort to protect and preserve non-oak native, excluding cottonwoods, and landmark trees and protect and preserve native oak trees measuring 6 inches in diameter at 4.5 feet above ground in urban and rural areas, excluding parcels zoned exclusively for agriculture; (CO-131) Native trees other than oaks, which cannot be protected shall be replaced with in-kind species in accordance with established tree planting specifications, the combined diameter of which shall equal the combined diameter of the trees removed; (CO-133) For discretionary projects involving native oaks, ensure no net loss of canopy area.

The San Joaquin County General Plan lists several objectives and policies to protect and improve the County's vegetation resources. Significant oak groves and heritage trees are protected as resources of significant biological and ecological importance. Policy 4 states "development in the vicinity of significant oak groves shall be designed and sited to maximize the long-term preservation of the trees and the integrity of their natural setting".

b) Candidate, sensitive or special status species, riparian habitat or other sensitive Natural communities

The Eden Area Final Draft General Plan is applicable to the area of interest in Alameda County. Relevant goals and policies from that plan include: Policy 4.1.1: The County must seek to locate uses or development that would seriously impact or jeopardize biological resource values away from areas of significant biological resources. Policy 4.2.1: The County must prioritize for the preservation of lands that contain significant biotic resources should be left substantially undeveloped. These lands include riparian habitats, habitat of rare or endangered fish and wildlife, or species of economic value either commercially or as game species, wetlands supporting concentrations of

waterfowl, among others. Policy 4.2.2: The County must encourage the protection and restoration of sensitive and rare habitat types in the County. These habitat types include, but are not limited to: native grasslands, riparian woodlands, oak woodlands, seasonal and permanent wetlands and tidal lands. Policies 4.3.1, addressing the designation of Sensitive Habitat Areas (SHAs) and Resource Management zoning districting and Policy 4.4.4, addressing coordination with the Alameda Watershed Steelhead Restoration Plan, the Alameda County Flood Control and Water Conservation District/Clean Water Division and the Alameda Creek Fisheries Restoration Workgroup may also be of relevance.

The **Alpine County General Plan** highlights the goal to preserve and protect wetland areas (G.P. Goal No. 8). The related Policy No. 8 states: Minimize development in or conversion of wetlands. The plan also lists several implementation measures, detailing requirements regarding wetland delineations, mitigation, US Army Corps review, and protection of stream environment designated areas. However, the County may approve projects that would impact designated stream environment areas where it is found that negative effects upon any of the listed parameters are outweighed by public need or concern. However, variance provisions should not apply to streams presently serving or intended to serve as habitat for threatened trout species. The County may require developers to dedicate land or easements to and along streams that support fisheries for the protection of stream environments or their public use. Additional goals and policies include: G.P. Goal No. 9: Protect and Increase the Populations of Threatened, Rare, or Endangered Plant Species; G.P. Goal No. 13: Protect the Critical Habitat of all Federal or State Listed Sensitive, Threatened, Rare, or Endangered Wildlife; G.P. Goal No. 14: Protect Important Deer Habitats and Migration Routes to the Greatest Extent Feasible; and G.P. Goal No. 15: Protect and Enhance Fisheries Including the Existing and Proposed Habitats for Threatened Paiute and Lahontan Cutthroat Trout.

The **Amador County General Plan** identifies natural resource and species protection, conservation and stewardship of the natural environment, including wildlife habitat, as important to the future of the county. Goals include: Goal OS-4: Protect wildlife habitats, including sensitive environments and aquatic habitats. Specific detail is provided for Oak Woodlands in Policy OS-4.2.a: Encourage preservation of oak woodlands in accordance with Public Resources Code Section 21083.4 Require assessment of impact to oak woodlands for new development, and mitigation per Public Resources Code Section 21083.4, Policy OS-4.2.b: Prepare a countywide Oak Woodlands Management Plan to promote the protection of oak woodlands, ensure consistent land use regulation associated with oak woodlands, and become eligible for state funding for restoration and conservation activities, Policy OS-4.3: Encourage the conservation of corridors for wildlife movement, particularly in oak woodland areas and along rivers and streams. Use development tools, such as clustering, to maintain corridors where possible, and Policy OS-4.4: Support voluntary conservation easements to protect habitat, including oak woodlands. Policies OS-4.5 and 4.6 address the protection of sensitive environments

and aquatic habitats for effects of erosion, siltation, and alteration. Additionally, the plan addresses Protection of special status species (Goal OS-5).

Calaveras County General Plan lists several goals, policies and measures addressing preservation and protection of the County's significant wildlife, botanical and aquatic habitats. The goals include: Goal V-1: Preserve and enhance the County's significant wildlife and botanical habitats. Goal V-2: Protect streams, rivers and lakes from excessive sedimentation due to development and grading, including Policy V-2A: Review proposed development for potential effects on nearby and adjacent streams, rivers and lakes. Goal V-3: Protect and preserve riparian habitat along streams and rivers in County.

The **Colusa County General Plan** lists Conservation Area Policies, Wildlife and Habitat Policies, Implementation Policies, and Open Space Policies for Management and Natural Resource Preservation. These include: (CO-20) Protection of Resource Conservation Areas may at times conflict with agricultural and recreation management practices on adjoining lands. Such conflicts should be resolved on a case by case basis in a manner which recognizes the public interests in both habitat resource protection and the sound management of agricultural and recreational resources; and OS-I (Open Space Element) indicates that areas designated for Resource Conservation, Agriculture-General, and Agriculture-Upland should remain in open space unless development would be consistent with community plans or land use policies (LU-I through LU-56).

The **Contra Costa County General Plan** overall conservation policy states "Watersheds, natural waterways, and areas important for the maintenance of natural vegetation and wildlife populations shall be preserved and enhanced". Vegetation and wildlife goals, policies and implementation measures specifically state to protect ecologically significant lands, wetlands, plants and wildlife habitats; to protect rare, threatened and endangered species of fish, wildlife and plants, significant plant communities, and other resources which stand out as unique because of their scarcity, scientific value, aesthetic quality or cultural significance. Contra Costa County attempts to achieve a significant net increase in wetland values and functions within the County over the life of the General Plan. Further, significant ecological resource areas in the County shall be identified and designated for compatible low-intensity land uses. Setback zones shall be established around the resource areas to assist in their protection. Any development located or proposed within significant ecological resource areas shall ensure that the resource is protected. The County shall utilize performance criteria and standards which seek to regulate uses in and adjacent to significant ecological resource areas. The ecological value of wetland areas, especially the salt marshes and tidelands of the bay and delta, shall be recognized. Existing wetlands in the County shall be identified and regulated. Restoration of degraded wetland areas shall be encouraged and supported whenever possible. The filling and dredging of lagoons, estuaries, and bays which eliminate marshes and mud flats shall be allowed only for water-oriented projects which will

provide substantial public benefits and for which there are not reasonable alternatives, consistent with State and Federal laws. Fish, shellfish, and waterfowl management shall be considered the appropriate land use for marsh and tidelands, with recreation being allowed as a secondary use in limited locations, consistent with the marshland and tideland preservation policies of the General Plan. The County shall protect marshes, wetlands, and riparian corridors from the effects of potential industrial spills.

The **Glenn County General Plan** lists several goals and policies regarding biological resources. The most relevant goal for this section is Goal NRG-3: Preservation and enhancement of the county's biological resources in a manner compatible with a sound local economy. Applicable policies include: (NRP-39) Approach the retention and enhancement of important habitat by preserving areas or systems which will benefit a variety of species or resources rather than focusing on individual species, resources or properties; (NRP-41) Biological resources: Preserve natural riparian habitat, especially along Stony Creek and the Sacramento River and Butte Creek; (NRP-42) Eliminate the E-M (Extractive Industrial) Zone from areas containing natural riparian vegetation/habitat and replace it with a category affording greater protection to streamcourses and riparian habitats; (NRP-44) Recognize that retention of natural areas is important to maintaining adequate populations of wildlife which is, in turn, important to the local economy; (NRP-45) Encourage development of hunting opportunities in the county in an effort to offset the costs of natural habitat preservation while assuring that such activities are consistent with the public health and safety; (NRP-49) Coordinate with State and federal agencies, private landowners, and private preservation/conservation groups in habitat preservation and protection of rare, endangered, threatened and special concern species, to ensure consistency in efforts and to encourage joint planning and development of areas to be preserved; NRP-50 Recognize the Sacramento River corridor, the Sacramento National Wildlife Refuge, migratory deer herd areas, naturally occurring wetlands, and stream courses such as Butte and Stony Creeks as areas of significant biological importance; (NRP-52) Utilize the Sacramento River Marina Carrying Capacity Study findings when reviewing proposals for development along the Sacramento River; (NRP-61) Support efforts to improve water availability and management when the potential exists to benefit fish and wildlife in cooperation with Glenn County agricultural: water users; and (NRP-62) Support the coexistence of agricultural: wildlife and wildlife land uses, and cooperation of persons involved in agriculture and wildlife habitat preservation, in areas of wildlife habitat potential.

The **Plumas County General Plan's** goal to "provide development opportunities while preserving, for continued utilization, the natural resources of Plumas County on a County-wide basis" is supported by the diagram directive to "identify "sensitive water areas" which shall include important fish and wildlife habitat, surface waters and watersheds which are sources of water supplies, and recreation water areas". The Plan also defines "important wildlife habitats" as those areas within the geographic range that provide all three of the essential habitat components (food, water, and shelter) in high quality where a species is found. If the general geographic range where a species is

found is limited, the entire range may be identified as an “important wildlife habitat”. If a certain species is limited in abundance, including but not limited to endangered species, the entire range where this species is found may be classified as an “important wildlife habitat”. Within important wildlife habitats, require in-site analysis and incorporation of all necessary mitigation measures into project design. In all other areas, adopt mitigation measures unless overriding social or economic factors are identified. Require developments to retain or replace streamside vegetation along stream corridors which provide important habitats for fish and wildlife. Prohibit substantial interference with important wildlife migration routes. Prohibit alternation of the natural characteristics of wetlands by any activity.

The **Sacramento County General Plan** lists several goals, objectives, and measures to protect biological resources. In particular, the plan states as a Goals: “Healthy, well-managed marsh and riparian woodlands along Sacramento County's waterways” and “Preserve and enhance high-quality, self-sustaining vernal pool habitats”. Marsh and riparian habitat protection policies include: (CO-60) Marshland and riparian areas of special significance shall be designated as natural preserves on the General Plan; (CO-61) natural preserves shall not include adjacent irrigated pasture or cropland. However, they may include up to 200 feet of adjoining grassland or grazing area, or up to one-fourth mile of grassland between parallel riparian or marsh areas; (CO-62) Ensure no net loss of marsh and riparian woodland acreage, values or functions; (CO-64) Seasonal and permanent marshland within designated natural preserves shall not be drained or filled for the purpose of converting the land to another use; (CO-65) In any cases where complete or selective removal of riparian woodland or scrub habitat is necessary for channel maintenance, public safety, or installation of infrastructure, it will be planned and carried out, or mitigated, so as to minimize unavoidable impacts upon biological resources; and (CO-68) Consistent with overall land use policies, the County shall support and facilitate the creation and biological enhancement of large natural preserves or wildlife refuges by other government entities or by private individuals or organizations. Such areas may, but need not necessarily, function as mitigation banks for other impacts upon biological resources due to development. The **Sacramento County General Plan** also lists a “Ten percent increase in marsh and riparian woodland habitat, respectively, by 2010” as objective. Relevant policies include: (CO-70) Public or private projects involving filling or removal of marsh/riparian habitat shall be mitigated outside of natural preserves where on-site mitigation is not desirable or appropriate shall be mitigated through the purchase of mitigation credits for restored wetlands/riparian areas at no net loss. (CO-72) New or restored marsh/riparian woodlands shall be under ownership of a public agency or subject to a permanent conservation easement. Vernal-pool preservation policies include: (CO-78) Focus vernal pool preservation in permanent open space areas beyond the Urban Area; (CO-80) Select vernal pool preserves based on the following evaluation criteria: representativeness, habitat quality, watershed integrity, defensibility, buffer, preserve size, plant species variety, and presence of special status species. The General Plan also states a policies regarding vernal pool mitigation banking

such as (CO-88) Foster competitive pricing for mitigation bank credits by allowing government agencies, non-profit organizations, and private landowners to establish vernal pool preserves, designate mitigation areas, create and restore vernal pools, and sell credits to developers for off-site mitigation. Other goals and objectives include: increase population of threatened and endangered species found in Sacramento County; preserve and protect fisheries in County waterways and water bodies; and preserve and protect natural and open space values of urban stream corridors by maintaining the natural character of 100-year floodplain by limiting fill; and modifying channels which protect and restore natural stream values.

The San Joaquin County General Plan lists several objectives and policies to protect and improve the County's vegetation, fish and wildlife resources. 1: These include wetlands; riparian areas; rare, threatened and endangered species and their habitats as well as potentially rare or commercially important species; vernal pools; significant oak groves and heritage trees. 6: Development projects which have the potential to destroy wetlands shall not be permitted, unless: no suitable alternative site exists for the land use, and the use is considered necessary to the public; there is no degradation of the habitat or numbers of any rare, threatened, or endangered plant, or animal species as a result of the project; and habitat of superior quantity and superior or comparable quality will be created or restored to compensate for the loss. 7: The County shall support feeding areas and winter habitat for migratory waterfowl. 8: Strips of land along waterways shall be protected for nesting and foraging habitat and for protection of waterway quality. 4: Habitat Protection, Preservation and Restoration Program - In the delta region of the County, the County shall encourage management practices that will preserve and enhance the wildlife habitat value of the area. These include: Experimental planting and flooding to maximize waterfowl use at selected locations in the Delta area.

The Yuba County General Plan lists several goals, objectives, policies and implementation strategies for the preservation of natural resources. The most relevant goals include: (2-OSCG) Maintain and enhance natural resources, open space lands and the scenic beauty of Yuba County in order to protect the quality of the environment, the county's economy, and the health and well-being of present and future residents; (3-OSCG) Restore and enhance the Yuba River corridor for recreation and wildlife; (5-OSCG) Protect lands of unique value to plants, fisheries, waterfowl and other forms of animal life; and (7-OSCG) Conserve Valley oaks, and encourage the protection and regeneration of oak woodlands in foothill areas. Relevant objectives address (17-OSCO) No net loss of wetland and riparian habitat; (20-OSCO) Retention and protection of "District 10" waterfowl habitat areas; (21-OSCO) Identification and protection of remaining areas containing habitat suitable for threatened, endangered or special status species; and (23-OSCO) Creation of a habitat/wetland mitigation banking program utilizing a credit system consistent with State and federal programs. Policies include: (83-OSCP) The County shall support the continuation of an adequate supply of water to District 10 for agriculture and waterfowl habitat purposes; (86-OSCP) The County shall encourage the preservation of areas of natural vegetation that may also contain

threatened, endangered or special status species, including oak woodlands, riparian areas, marshland, and vernal pools; (92-OSCP) The County shall consider the preparation of habitat conservation plans and habitat management plans in accordance with Section 10 of the Federal Endangered Species Act and State Fish and Game Code Section 2081 when a "take" may occur. Any plan prepared should benefit a variety of species rather than focusing on a single species; (106-OSCP) The County shall encourage the retention of natural vegetation and open space areas along the Yuba, Bear and Feather rivers.

c) Other policies

The Contra Costa County General Plan states that the County shall actively oppose any and all efforts to construct a peripheral canal or any other water diversion system that reduces Delta water flows unless and until it can be conclusively demonstrated that such a system would, in fact, protect, preserve and enhance water quality and fisheries of the San Francisco Bay-Delta estuary system.

The San Joaquin County General Plan lists several objectives and policies to protect and improve the County's fish resources.12: The County shall support restoration plans for anadromous fisheries and shall work with the California Department of Fish and Game and other agencies or organizations in developing such plans. 13: The County shall encourage the restoration and enhancement of once-productive degraded ecosystems, such as historic salmon runs on the Mokelumne and Calavaras Rivers.

D. Land Use and Recreation

a) Land Use Planning

The Eden Area Final Draft General Plan is applicable to the area of interest in Alameda County. Relevant goals and policies from that plan include: (Goal LU-11) Reduce the impact of Industrial development and activity on adjoining land uses; (P2) The County should not permit existing, non-conforming Industrial uses to expand their facilities except to rectify building code violations; (Goal LU-15) Preserve the Industrial uses and expand Research and Development/Office uses (R&D/O) in the Eden Area; (P5) New heavy industrial uses shall not be allowed in the Eden Area. Existing heavy industrial uses may remain in place until such time as the property is redeveloped, at which point new Research and Development/Office uses shall be encouraged and new zoning for Research and Development/ Office uses shall be put in place. The following specific policy guidance within the Land Use Element applies to the "Grant Avenue Industrial Area": (4.a.4) The County shall prohibit new industrial uses that have a negative impact on adjacent Neighborhoods. Such uses include, but are not limited to: equipment storage; dying plants; hazardous waste facilities; waste incinerators; and heavy industrial uses. (4.d.2) The County shall discourage new industrial uses that cause a substantial increase in environmental impacts on surrounding residential areas including substantially increased truck traffic, increased noise or air pollution from manufacturing operations, and visual intrusions. New uses shall be required to prove that no such impact exists prior to project approval. (4.d.3) The County shall work to protect existing natural and sensitive environments in and around the Grant Avenue Industrial Area, including wetlands.

The Amador County General Plan addresses earth movement in its Land Use Element: (C. Regulations- Site Specific; 4): Proposals to cut, fill, or otherwise move more than fifty cubic yards of earth shall require an engineered grading plan to be filed with the Building Department prior to any work taking place. Radical cuts or fills which, in the opinion of the County, are contrary to the Goal and Intent for which the scenic highway corridor was adopted may be denied by the County. It also addresses cooperative action in regard to water development projects: 2. To continue similar cooperative action with State agencies and public utilities with respect to recreation site acquisition and development, water development projects and related land uses, game habitat protection and improvement, watershed erosion and wildfire prevention and protection. 4. To provide all reasonable protection and encouragement to the preservation of agricultural soils and continued agricultural use of suitable soils. Further relevant policies include: 12. The County should proceed to plan and develop multi-purpose water reservoirs to a minimum of 25,000 acre feet or annual yield, so as to increase recreational activity, make productive use of an underdeveloped resource, irrigate at least 10,000 acres of additional farm land, and provide a reserve of domestic supply sufficient for the anticipated growth of the County. This water system should be planned so as to accord with ultimate development of more than 100,000 acre feet of firm supply in keeping with

the California Water Plan, including the Cosumnes River and other projects, and to protect the County's remaining water rights. 15. Special consideration and care should be devoted to the aesthetics, architecture, and visual appearance of proposed development in the following areas: (1) land within sight of Highway 49 between Central House and Sutter Creek, (2) land within sight of Highway 88 between Pine Grove and the National Forest, (3) Areas within a half-mile of Volcano, or the proposed Volcano Reservoir, (4) land within one mile of the shore of Comanche Reservoir, (5) the area within a mile of Daffodil Hill, (6) the scenic areas along Highway 49, (7) private lands within the National Forest, (8) Nashville Reservoir area, (9) Highway 124 near Trish Hill Reservoir, (10) other areas having outstanding scenic or historic interest- upon request of the residents or owners.

The Land Use Element of the **Calaveras County General Plan** addresses the future development of land in the County for residential, commercial, industrial, recreation, conservation and open space uses. The Conservation Element addresses the identification, conservation, development and utilization of the County's natural resources. The Element promotes proper management of both finite and renewable resources in the following categories: soils, agriculture, forests, minerals, and waters resources. The following goals and policies are applicable: (Goal II-1) Provide for flexibility in the construction and funding of public facilities and services for future development. (Policy II-1A) When public facilities and services, such as but not limited to water, waste disposal, roadways, and/or fire protection, are not available at required levels, permit a developer to build those facilities to specified standards, or to contribute proportional funds to build and service those facilities. (Goal II-17) Provide for new industrial development in areas designated by the General Plan which allow industrial designations. (Goal IV-2) Protect legally established agriculture from encroachment by incompatible land uses. (Policy IV-2A) Review development proposals for possible encroachment upon legally established agriculture. (Policy IV-5A) Encourage the development of mining uses on lands containing commercially valuable mineral resources. (Goal IV-6) Protect mineral resources from encroachment by incompatible land uses.

The **Colusa County General Plan** lists the following relevant land use goals and policies: (LU-9) The proposed development pattern should protect the integrity of agriculture and shall not in any way create a hardship for the county's farmers. Lands presently in agricultural uses that do not adjoin existing communities should be protected through the county's land use regulations. In addition, the CEQA Initial Study checklist should consider the potential impact of proposed development on existing and adjoining agricultural operations and on water supply. (LU-20) Lands designated for General or Upland Agriculture should continue to be used for agriculture for at least the duration of the planning period (l987-2010). Such period may be extended by future revisions of the plan. (LU-21) The site planning, design, and construction of on-site and off-site improvements for urban development near agricultural areas should avoid adverse

impacts on facilities used to supply water to agricultural operations. Where agricultural and proposed urban uses are competing for the same water supply, priority should generally be given to agriculture.

The **Contra Costa County General Plan** lists the following relevant land use goals and policies: (3-G) To discourage development on vacant rural lands outside of planned urban areas which is not related to agriculture, mineral extraction, wind energy or other appropriate rural uses; discourage subdivision down to minimum parcel size of rural lands that are within, or accessible only through, geologically unstable areas; and to protect open hillsides and significant ridgelines; (3-68) Many of the specific policy statements of this plan support the concept of allowing for multiple uses, compatible with the predominantly agricultural watershed and public purposes of the area. The policies stress the need to preserve designated agricultural lands for agricultural use, and also to allow certain other uses in the area, such as wind energy farms, mineral extraction, and reservoirs; and (9-3) Areas designated for open space shall not be considered as a reserve for urban land uses. In accordance with Measure C- 1990, at least 65 percent of all land in the County shall be preserved for agriculture, open space, wetlands, parks, and non-urban uses.

The **Glenn County General Plan** addresses preservation of agricultural land in relation to water supply and groundwater recharge: (NRP-2) Support the concept that agriculture is a total, functioning system which will suffer when any part of it is subjected to regulation resulting in the decline of agricultural: economics productivity, unmitigated land use conflicts and/or excessive land fragmentation. (NRP-3) Recognize the value of ricelands for waterfowl habitat, watershed management, and for groundwater recharge in an effort to preserve such lands and to maintain necessary water supplies in Glenn County. (NRP-4) Support efforts underway to explore the potential to utilize ricelands as temporary storage reservoirs in winter months, thus increasing groundwater recharge and supplies of surface water for both agriculture and wildlife, and potentially providing an alternative to rice straw burning. (NRP-8) Assure that future land use decisions protect and enhance the agricultural: economics industry while also protecting existing uses from potential incompatibilities. (CDP-12) Utilize a "Right to Farm" Ordinance as a method to reduce the impacts of potential land use conflicts.

The **Plumas County General Plan** addresses the following relevant goals and policies: Identify known “critical water supplies”. The designation of critical water supply shall be based on an existing or potential overdraft. Critical water supplies include subsurface and surface waters. Identify “sensitive water areas” which shall include important fish and wildlife habitat, surface waters and watersheds which are sources of water supplies, and recreation water areas. Further goals include : To encourage the utilization of water for hydroelectric generation as a resource use to meet the energy and economic needs of the County which shall be permitted in prime mining resource production areas and may be permitted in all other land use areas. Maintain agriculture, resource production, and rural residential areas. Maintain the natural free flowing condition of Indian, Red

Clover, Little Grizzly, Hosselkus, Hinchman, Ward, and Montgomery Creeks, except for the use of adjudicated water rights and streambed restoration projects under public auspices.

The **Sacramento County General Plan** addresses agricultural and land use goals and policies: (GOAL) Protect important farmlands from conversion and encroachment and conserve agricultural resources. (AG-2) The County shall not accept applications for General Plan amendments redesignating prime farmland or lands with intensive agricultural investments to agricultural/residential or urban use (i.e., residential, commercial, industrial) unless proposed development is contiguous to agricultural/residential or urban uses, and unless the applicant demonstrates no feasible alternative sites are available other than prime farmlands or lands with intensive agricultural investment. (AG-5) Mitigate loss of prime farmlands or lands with intensive agricultural investments through CEQA requirements to provide in-kind protection of nearby farmland. (AG-25) The County shall actively encourage water conservation by both agricultural and urban water users and (LU-68) Industries allowed in agricultural areas shall be restricted to activities that involve the storage, primary processing, or primary manufacturing of raw agricultural materials provided that properties are designated Food Processing Combining land use zone and agricultural industrial practices are consistent with the Zoning Code. (LU-40) The County shall support activities which attract industrial development that: do not pose a significant risk of pollution to water, air, or other natural resources; provide for diversification in industrial development; expand opportunities for those entering the labor force, and for Sacramento's unemployed and underemployed; (LU-60) Sewer and water treatment and delivery systems shall not provide for greater capacity than that authorized by the General Plan; (LU-69) County departments shall coordinate implementation of electric service delivery, air quality, water supply, transportation, drainage/flood control, solid waste disposal/recycling, and hazardous waste management plans in conjunction with vested public and quasi-public agencies.

The **San Joaquin County General Plan** (adopted July 29, 1992 and amended July 2002) contains specific objectives and policies that address growth accommodation; residential, commercial, industrial, and mixed use development; economic development; housing; and infrastructure and public services. The Resources chapter of the San Joaquin County General Plan identifies objectives and policies that address agricultural lands. Specific objectives are: (1) to protect agricultural lands needed for the continuation of commercial agricultural enterprises, small-scale farming operations, and the preservation of open space; (2) to recognize agricultural lands that contain concentrations of small-scale agricultural operations and dwellings; and 3) to minimize impacts on agriculture in the transition of agricultural areas to urban development (San Joaquin County 1992, p. VI-10). The San Joaquin County Development Title Section 9-1800, Williamson Act Regulations, prescribes the County's regulations for implementing the Williamson Act. Development Title Section 9-1810.3(b) identifies residential and

nonresidential uses that are allowed on Williamson Act lands, including public services (essential) and utility services (San Joaquin County 1995). The Community Development Section (IV) of the San Joaquin County General Plan addresses protection of open space and natural resources. It identifies policies on utility corridors, including electrical transmission and major water lines. Section IV of the San Joaquin County General Plan, Policies 5.1-6, sets forth county objectives for protecting the public from hazards related to utility corridors and for protecting land uses from poorly sited utilities. Section VI of the San Joaquin County General Plan also addresses the protection of resources, including agricultural lands.

The Yuba County General Plan lists several potentially relevant open space and agricultural conservation goals and policies: (2-OSCO) Avoidance of land use and planning decisions adversely impacting scarce natural resources; (3-OSCP) Prior to final action on any development project, the project shall be carefully reviewed against available information for impact on any identified scarce natural resource, including productive agricultural land, mineral deposits, woodlands and watershed lands; (38-OSCP) Any development projects occurring along the shoreline of navigable waterways (Yuba and Feather Rivers) or publicly accessible lakes shall provide public access to and along the shoreline of the waterways. (2-LUG) Retain the most productive agricultural lands in agricultural use, and clearly define areas suitable for urbanization and other forms of nonagricultural development; (13-LUO) Retention of all land used for intensive agriculture located north of the City of Marysville for agricultural use during the term of the Plan; (16-LUO) Recognition of a farmer's right to continue to farm; (215-LUP) The County shall support initiatives to construct a new reservoir on the South Fork of the Yuba River including active lobbying for its authorization and funding.

b) Recreation

The Eden Area Final Draft General Plan is applicable to the area of interest in Alameda County. Relevant goals and policies from that plan include: Goal PR-2: Develop new parks and recreational facilities in the Eden Area to meeting existing deficiencies. Several potential future park sites have been identified through the General Plan process and are listed below.

- A new park at the former Holland Oil Site on the west side of East 14th Street and north of Kent Avenue.
- The expansion of Mervyn Morris Park to include the Little League fields leased by the San Lorenzo Village Homes Association and two privately-owned parcels along Nielson Avenue.
- The expansion of Hillcrest Knolls park on the vacant land currently owned by the County.
- The expansion of Fairmont Terrace Park into the County-owned Fairmont Campus.
- The expansion of Kennedy Park on land behind the Bohannon School on Bockman Road.

(Goal PR-4) Create a comprehensive network of multi-use trails and linear park facilities within and through the Eden area. (P4) The County should pursue opportunities to increase access from all parts of the Eden Area to the EBRPD trail system, the Hayward Regional Shoreline and Chabot Regional Park. These opportunities include improved trailheads that serve Eden Area residents, improved access from within the Eden Area and enhanced signage. (4.e.1) New development should capitalize on access and proximity to the San Lorenzo Creek and Bay Trail facilities. Development that enhances access and the visual appearance to the recreation resource is encouraged.

The **Alpine County General Plan** highlights G.P. Goal No. 15: Protect and enhance fisheries including the existing and proposed habitats for threatened Paiute and Lahontan cutthroat trout. The subsequent policy may be relevant to the PEIR. (Policy No. 15e) Support acquisition of water rights at Heenan Lake, Red Lake, Twin Lake, and Meadow Lake Hydro System. Oppose the transfer of water rights or diversion of water within Alpine County that would adversely impact fisheries and recreational uses.

The **Calaveras County General Plan** addresses the support for recreation uses and open space management: (Goal V-7) Conserve national, state and regional recreation areas in the County. (Policy V-7A) Support public and private entities in their efforts to maintain and improve recreation facilities in the County. (Goal V-9) Preserve portions of the County's rivers and streams as a local recreation resource.

The **San Joaquin County General Plan** (adopted July 29, 1992 and amended July 2002) contains specific objectives and policies that address recreation. These include: (2) To protect the diverse resources upon which recreation is based, such as waterways, marsh lands, wildlife habitats, unique land and scenic features, and historical and cultural sites; (3) To ensure the preservation of the Delta and the opportunity for the public to learn about and enjoy this unique recreation resource; (14) Water-related resources shall be protected for their importance to recreational uses, (15) The recreational values of the Delta, the Mokelumne River, and the Stanislaus River shall be protected; (3) Development may be permitted in Resources Conservation Areas only if proposed uses will not have significant negative impacts on the continued existence for use of the resource; (4) Areas with serious development constraints, such as the Delta, should be predominantly maintained as open space; and (6) The County shall consider waterways, levees, and utility corridors as major elements of the open space network and shall encourage their use for recreation and trails in appropriate areas.

The **Yuba County General Plan** lists several potentially relevant recreation goals and objectives: (8-CG) Provide for public access to waterways; (21-CO) Creation of an inventory of existing public access locations and programs for acquiring additional access.

Transportation

The **Eden Area Final Draft General Plan** is applicable to the area of interest in Alameda County. Relevant goals and policies from that plan include: (Goal LU-11) Reduce the impact of Industrial development and activity on adjoining land uses; (P6) Truck and employee traffic generated by industrial uses should generally be restricted from using streets in residential and commercial areas, except on designated truck routes as specified in the Circulation Element of this General Plan; (P5) New developments shall mitigate the full impacts of their projects on the transportation system. A variety of mitigation measures should be considered, including impact fees, street improvements and transportation demand management (TDM) measures; (Goal CIR-8) Provide for adequate truck circulation to allow for the efficient transport of goods within the Eden Area while protecting neighborhoods from truck related impacts.

The **Alpine County General Plan** addresses the potential impacts on transportation by requesting the following: (Goal No. 36) Provide for the cost of maintenance on new and existing County roads; and (Policy No. 36b) Impact fees will be required with the approval of any industrial, commercial, residential, or other development permit for the purpose of improving affected local roads.

The Circulation Element of the **Amador County General Plan** addresses the goals relevant to transportation: (Goal 1A(5)) Maintain the safety and operational integrity of the road system resulting from the cumulative traffic increases from both large and small development projects by properly mitigating impacts; (Goal 1B(14)) All new development projects shall pay for the full cost of all site-specific improvements associated with that new development that are necessary to maintain public safety; (Goal 1B(16) and 1B(20)) If a new development project would create an impact that would not otherwise occur, the project should pay for the full cost of the improvement needed to mitigate that impact and achieve the level of service objectives.

The **Calaveras County General Plan** addresses the following goals and policies relevant to transportation: (Goal III-7) Provide for financing of project-specific and general improvements to county roads; (Policy III-7B) Review proposed development projects to determine whether they warrant project-specific improvements to county roads to maintain level of service at the subject property; (Goal III-11) Assure adequate development standards for encroachments on public and private roads; (Goal III-19) Promote the continued and expanded use of pipelines for the transport of suitable products and materials, (Policy III-19A) Permit pipelines in public rights of way under established conditions.

The **Colusa County General Plan** lists the following goals and policies: (CIRC-14) Improvements to existing streets that are needed as a result of private development should be the financial responsibility of that developer; (CIRC-40) Navigational

improvements to the Sacramento River should be encouraged to reduce seepage, encourage commercial fishing and tourism, and reduce the danger of boating accidents.

The **Glenn County General Plan** addresses transportation in its circulation element: (CDP-79) Reserve for commercial/industrial development land with transportation advantages, including access to freeway interchanges and rail services, where consistent with other General Plan policies.

The **Plumas County General Plan** addresses transportation in its circulation element: Improve existing County roads with priority given to industrial areas to accommodate planned development.

The **Sacramento County General Plan** addresses transportation in its circulation element: (CI-9. Policy) Sacramento County shall assess fees on new development sufficient to cover the fair share portion of that development's impacts to the regional transportation system that is not covered by other funding sources; and support the Air Quality Management District and other agencies in the implementation of the Near Term Transportation Control Measures outlined in the Air Quality Attainment Plan.

The **San Joaquin County General Plan** goals and policies relevant to transportation include: (1.) To coordinate transportation and land use planning; to provide a roadway system that satisfies the needs in San Joaquin County for safe, efficient, convenient and reliable vehicle movement of people and goods through and within the County; and (7.) Development shall provide all right-of-way and on-site road improvements necessary to serve the development and mitigate off-site traffic impacts triggered by the development. (2.) Development shall provide transportation system improvements necessary to serve itself.

The **Yuba County General Plan** goals and policies relevant to transportation include: (15-CP) Prior to final action on any development project, the impact that the proposed development project will have on the local road system shall be determined and mitigation incorporated into the project to assure that the established level of service is maintained; (17-CP) New development projects shall be required to pay their fair share for the improvement of impacted roadways.

E. Air Quality

The **Eden Area Final Draft General Plan** is applicable to the area of interest in Alameda County. The following specific policy guidance within the Land Use Element applies to the "Grant Avenue Industrial Area": (4.c.2) A streetscape improvement plan should be developed for Grant Avenue between Washington Boulevard and its western terminus at the Oro Loma Wastewater Treatment Plant. The streetscape plan shall focus on measures that reduce noise and air pollution from trucks accessing the Grant Avenue Industrial Area and improve the scenic quality of the roadway. Multi-modal amenities should also be addressed including pedestrian, bicycle and transit facilities.

The **Alpine County General Plan** addresses air quality as follows: (Goal No. 3) Meet or exceed federal and state air quality regulations; (Policy No. 3) The County should continue to consult with the Great Basin Unified Air Pollution Control District regarding any proposed project which has the potential to adversely affect ambient air.

F. Noise

The **Alameda County General Plan** Noise Element (1976) establishes specific goals which are intended to provide a means to achieve noise-compatible land uses in the vicinity of existing or planned noise producing sources. The following is a list of the specific goals of the Alameda County General Plan Noise Element relevant to this project: (Goal 1) The peace, health safety, and welfare of the residents of Alameda County require protection from excessive, unnecessary, and unreasonable noises from any and all sources in the cities and unincorporated territory; (Goal 2) Promote the compatibility of land uses with respect to noise generation by legislatively protecting sensitive land uses from noise sources. Exterior noise level standards are contained in the county code. The Alameda County Ordinance Code (1966) provides specific noise level standards to be applied to new projects in Title 6 Health and Safety, Chapter 6.60 Noise. (E) Notwithstanding the noise level standards set forth in that section, the noise level standard applicable to the emission of sound from transformers, regulators, or associated equipment in electrical substations shall be 60 dB(A) (Prior gen. code §§ 3-107.401--3-107.405). (8) Vibration. Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty (150) feet (forty-six (46) meters) from the source if on a public space or public right-of-way. Special provisions exist for construction: The provisions of this chapter shall not apply to noise sources associated with construction, provided said activities do not take place before seven a.m. or after seven p.m. on any day except Saturday or Sunday, or before eight a.m. or after five p.m. on Saturday or Sunday.

The **Alpine County General Plan** Noise Element establishes specific goals and policies which are intended to provide a means to achieve noise-compatible land uses in the vicinity of existing or planned noise producing sources. The following is a list of the specific goals and policies of the Alpine County General Plan Noise Element (Element II, Section E) relevant to this project: (G.P. Goal No. 24) Reduce or minimize the number of nuisances created by noise affecting citizens of Alpine County; (Policy No. 24a) No development shall be allowed that would subject persons living in existing or planned residential areas to unhealthful noise levels. (Policy No. 24b) Noise created by new proposed non-transportation noise sources shall be mitigated so as not to exceed the noise level standards as measured immediately at the property line of lands designated for noise sensitive uses. Noise sensitive uses include hospitals, clinics, schools, libraries or residences. (Policy No. 24c) The Planning Commission may allow noise level standards to be exceeded for temporary activities. The Alpine County Code provides specific noise level standards to be applied to new projects in Title 18 Zoning, Chapter 18.68 General Requirements and Exceptions, Section 18.68.090 Noise.

The **Amador County General Plan** lists policies in the most recently adopted General Plan Noise Element (September 6, 1988) that are applicable to the proposed project as

well as a brief consistency analysis. The policies may be found on pages 14 through 32 of the Amador County General Plan Noise Element. Amador County does not have a noise ordinance or performance standards in the Amador County Code (Austin, pers. comm., 2008). The following are goals and policies applicable to the proposed project: It is the policy of the County (1) to prevent the encroachment of noise sources into areas designated or existing or future noise sensitive land uses; (2) to not locate new industrial plants or other ground stationary sources near noise sensitive land uses unless appropriate mitigation; that the following noise sensitive land uses shall not be exposed to an exterior noise level at their property lines which exceeds an L_{dn} 65 dB(A) and will have an interior noise level not to exceed an L_{dn} 45 dB(A): Residential Classifications in the Land Use Element; Residential Projects Including Rezones, Use Permits and Residential Divisions of Land; Schools, Churches, Hospitals, Care Facilities, Libraries, and Auditoriums.

The **Calaveras County General Plan** Noise Element establishes specific goals and policies which are intended to provide a means to achieve noise-compatible land uses in the vicinity of existing or planned noise producing sources. Calaveras County does not have a noise ordinance or performance standards in the Calaveras County Code (Gommes, pers. comm., 2008).The following is a list the specific goals and policies of the Calaveras County General Plan Noise Element relevant to this project: (Goal VI-1) Improve noise compatibility between new and existing land uses; and (Policy VI-1A) Protect existing noise sensitive uses from new non-residential sources of excessive noise. Standards outlined in the General Plan Noise Element do not define specific criteria for transportation and non-transportation noise sources; therefore, for the purpose of this analysis it is assumed that the established maximum day-night noise level standards (L_{dn}) as referenced in the General Plan are applicable to both transportation and non-transportation noise sources.

The Colusa General Plan Safety Element contains specific policies for the determination of a proposed projects compatibility with surrounding land uses. Colusa County does not have a noise ordinance or performance standards in the Colusa County Code (Hackney, pers. comm., 2008). The following are policies applicable to the proposed project: (SAFE-14) New projects should be conditioned, improved, or denied according to the standards of Table SAFE-3 in the General Plan; (SAFE-15) New land uses that produce high levels of noise should not be allowed to encroach upon noise-sensitive uses. Concurrently, new noise-sensitive land uses should be discouraged near uses that produce high levels of noise, including transportation routes; (SAFE-22) Activities which would unnecessarily disturb the peace and quiet of neighborhoods or cause unusual discomfort or annoyance should be prohibited. Regulation of non-vehicular noise (construction, air compressors, manufacturing, loud music) should be encouraged to avoid disturbing adjacent uses.

The **Contra Costa County General Plan** Safety Element contains specific goals, and policies for the determination of a proposed projects compatibility with surrounding land uses. Contra Costa County does not have a noise ordinance or performance standards in the Contra Costa County Code (Berry, pers. comm., 2008). The following are goals and policies applicable to the proposed project: (11-A) To improve the overall environment in the County by reducing annoying and physically harmful levels of noise for existing and future residents and for all land uses; (11-B) To maintain appropriate noise conditions in all areas of the County; and (11-C) To ensure that new developments will be constructed so as to limit the effects of exterior noise on the residents.(11-1) New projects shall be required to meet acceptable exterior noise level standards as established in the Noise and Land Use Compatibility Guidelines contained in Figure 11-6 of the General Plan. These guidelines, along with the future noise levels shown in the future noise contours maps, should be used by the county as a guide for evaluating the compatibility of "noise sensitive" projects in potentially noisy areas; (11-2) The standard for outdoor noise levels in residential areas is a DNL of 60 dB. (11-6) If an area is currently below the maximum "normally acceptable" noise level, an increase in noise up to the maximum should not be allowed necessarily; (11-7) Public projects shall be designed and constructed to minimize long-term noise impacts on existing residents; (11-8) Construction activities shall be concentrated during the hours of the day that are not noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods. (11-11) Noise impacts upon the natural environment, including impacts on wildlife, shall be evaluated and considered in review of development projects.

The **Glenn County General Plan** Noise Element contains specific goals, and policies for the determination of a proposed projects compatibility with surrounding land uses. The following are goals and policies applicable to the proposed project: (Goal: PSG-7) Protection of county residents from the harmful and annoying effects of exposure to excessive noise and preservation of the rural noise environment in Glenn County; It shall be the policy of Glenn County to (PSP-49) Regulate fixed noise sources within the county through the adoption of a local Noise Control Ordinance; (PSP-51) Require acoustical analyses for any development proposal which does not meet the recommended noise level standards, subject to the requirements contained in the General Plan; (PSP-52) Require that noise mitigation measures necessary to achieve compliance with land use compatibility guidelines and noise level standards be incorporated into site planning and project design. The Glenn County Unified Development Code provides specific noise level standards to be applied to new projects in Title 15, Division 4 Development Standards, Part 1 Performance Standards, Chapter 560 Performance Standards, Section 100 Noise. Title 15, Division 4 Development Standards, Part 1 Performance Standards, Chapter 560 Performance Standards, Section 130 Vibrations, exempts temporary construction work from ground vibration as stated below: No use shall generate ground vibration which is perceptible without

instruments beyond the lot line. Ground vibration caused by motor vehicles, aircraft, temporary construction work or agricultural equipment are exempt from these standards.

The **Plumas County General Plan** Noise Element contains specific goals, and policies for the determination of a proposed projects compatibility with surrounding land uses. Plumas County does not have a noise ordinance or performance standards in the Plumas County Code (McCulloch, pers. comm., 2008). The Noise Element establishes acceptable exterior and interior noise level standards for noise sensitive land uses of 60 dB L_{dn} and 45 dB L_{dn}, respectively.

The **County of Sacramento General Plan** Noise Element contains specific goals, and policies for in determination of a proposed projects compatibility with surrounding land uses. The following are policies applicable to the proposed project: (NO-1) Noise created by new transportation noise sources should be mitigated so as not to exceed 60 dB L_{dn}/CNEL at the outdoor activity areas of any affected residential lands or land use situated in the unincorporated areas. When a practical application of the best available noise-reduction technology cannot achieve the 60 dB L_{dn}/CNEL standard, then an exterior noise level of 65 dB L_{dn}/CNEL may be allowed in outdoor activity areas. (NO-2) Noise created by new non-transportation noise sources shall be mitigated so as not to exceed any of the noise level standards of Table II-1in the General Plan as measured immediately within the property line of any affected residentially designated lands or residential land use situated in the unincorporated areas. The Sacramento County Code Noise Control Ordinance contains performance standards for the purpose of preventing unnecessary, excessive and offensive noise levels within the county. Section 6.68.090 of the Sacramento County Code establishes conditions which are considered exempt from the provisions of the Code. The Sacramento County Zoning Code provides further specification for noise levels generated in association with surface mining activities. The Code states that noise levels generated from surface mining activities shall not exceed 70 dB L_{50}, 75 dB L_{99}, or a maximum instantaneous noise level of 90 dB.

The adopted **San Joaquin County General Plan** includes the following objectives and policies relating to noise that are applicable to the proposed project: (Objective 1) To ensure acceptable noise environments for each land use; (a) The maximum allowable noise exposure from transportation noise sources for outdoor activity areas shall be 65 dB for residential development; transient lodging, hospitals, nursing homes, and similar health-related facilities; churches, meeting halls, and similar community assembly facilities. (Policy 3) Development shall be planned and designed to minimize noise impacts on neighboring noise sensitive areas and to minimize noise interference from outside noise sources. San Joaquin County Development Code includes objectives and policies relating to noise and vibration that are applicable to the proposed project: (Section 9-1025.5 Vibration and Section 9-1025.9 Noise).

- All uses and property shall be subject to the following provisions concerning noise levels:

The current **Yuba County General Plan** Noise Element contains objectives for acceptable noise exposure within a myriad of land use designations. The recommended ambient allowable noise level objectives are listed in Table 6-1 of the General Plan. The Yuba County Noise Element does not contain specific standards for transportation noise. But the County has followed the recommendations of U.S. Department of Housing and Urban Development exterior noise level guidelines for assessing exterior noise levels for new residential development adjacent to roadway noise sources. The County has also accepted and approved the assessment of transportation noise (aircraft, roadway, and railroad) in terms of the L_{dn} and/or CNEL, as these descriptors best correlate with the human perception of sound. The exterior noise level standard used for assessing new residential developments within close proximity to a roadway noise source is 65 dBA L_{dn}/CNEL. The Office of Noise Control, California Department of Health Services recommends a 60 dBA L_{dn}/CNEL exterior noise level standard and an interior noise level standard of 45 dBA L_{dn}/CNEL. Yuba County has adopted noise regulations within the County noise ordinance, Chapter 8.20 Noise Regulations. The noise ordinance has a declaration of policies, definitions, criteria for sound level measurements, an ambient base noise level, and the authority to enforce noise ordinance violations, including (8.20.260) It shall be unlawful for any person to operate any machinery, equipment, pump, fan, air conditioning apparatus, or similar mechanical device in any manner so as to create any noise which would cause the noise level at the property plane of any property to exceed the ambient base noise level by more than five (5) decibels. (#1094).

G. Cultural Resources

The **Eden Area Final Draft General Plan** is applicable to the area of interest in Alameda County. The following specific policy guidance within the history and culture play an important role in the Eden Area. A number of historic resources have already been listed on the National Register or on the list of California State Points of Historical Interest. These goals, policies and actions seek to identify and preserve significant cultural resources in the Eden Area (Goal LU-16); (P2) To the extent possible, the County shall cause no substantial adverse change in the significance of a historical or archaeological resource as defined in 15064.5 of the California Environmental Quality Act (Title 14. California Code of Regulations) through its direct or indirect actions; (P5) Prior to the completion of a professionally-prepared historic survey, property owners of potentially significant historic resources shall be required to prepare professional historic surveys prior to demolition of any structure. Potentially significant historic resources may be defined as those resources identified in professionally prepared surveys or where additional evidence suggests that the property or structure may be significant; and (P6) New development, alterations and remodeling projects on or adjacent to historic properties should be sensitive to historic resources and should be compatible with the surrounding historic context.

The **Alpine County General Plan** addresses cultural resources as follows: (Goal No.18) Preserve and promote the archaeology and history of Alpine County; (Policy No. 18b) The County should provide notice and necessary information to the Regional Officer governing archaeological sites of any development project that may have the potential to affect an archaeological site. The officer should be allowed reasonable time to determine whether the project involves an archaeological site and respond with project alternatives and/or mitigation measures which would lessen or mitigate any identified negative effects; (Policy No. 18c) The proponents of applicants for development projects in areas known or suspected of containing historic artifacts should be required to protect any historic sites and/or artifacts that may be found.

The **Calaveras County General Plan** lists several goals and policies to Preserve or allow recovery of the County's significant archeological sites and artifacts (Goal V-4). (Policy V-4A) Review proposed development projects to be located within areas identified as high and moderate potential archaeological sensitivity for potential impacts to archaeological resources.

The **Colusa County General Plan** lists several goals and policies to address preservation of its cultural resources in the conservation element, inlcuding (CO-25) An archaeological survey should be required prior to approval of any project which would require excavation in an area known to contain archaeological resources.

The **Sacramento County General Plan** lists several goals and policies to address preservation of its cultural resources in the conservation element, including the goal to

Promote the inventory, protection and interpretation of the cultural heritage of Sacramento County, including historical and archaeological settings, sites, buildings, features, artifacts and/or areas of ethnic historical, religious or socioeconomical importance. Policies CO-156 to CO-166 detail the County's policies for artifacts and cultural resources.

The **San Joaquin County General Plan** cultural resources objective is to (1) protect San Joaquin County's valuable architectural, historical, archaeological and cultural resources. The subsequent policy reads (2) Significant archaeological and historical resources shall be identified and protected from destruction. If evidence of such resources appears after development begins, and assessment shall be made of the appropriate actions to preserve or remove the resources.

The goals, objectives and policies addressing cultural resources in the **Yuba County General Plan** similarly focus on preservation and restoration of cultural resources, including historic sites and buildings (12-OSCG). The objective (40-OSCO) calls for Attention during development project review and construction to the potential for cultural resources to occur on development sites. Subsequent policies 185-OSCP to 189-OSCP detail which actions should be taken before implementing projects.

H. Visual Resources

Alameda County Visual Resources

The Eden Area Final Draft General Plan is applicable to the area of interest in Alameda County. The following specific guidance for visual resources may be relevant to the WSMP 2040. Guidance includes: (Goal LU-12) Improve the visual quality of the Eden Area. Policies P1 through P6 address how the existing visual character or quality of the Eden Area should be protected. In particular, "The County should not approve projects that have a substantial adverse effect on scenic vistas, substantially damage scenic resources, or substantially degrade the existing visual character or quality of the Eden Area" (P1) and "When reviewing development proposals, the County should ensure that projects do not diminish views of natural features along public rights-of-way. Natural features are both within and around the Eden Area and include the San Francisco Bay and the East Bay Hills" (P2). The General Plan also lists specific policy guidance within the Land Use Element which applies to the "Grant Avenue Industrial Area", addressing design guidelines, access to the Bay Trail and San Lorenzo Creek and a streetscape improvement plan,

Potentially relevant visual resource goals and policies in the Alpine County General Plan are addressed in the conservation element and include: (G.P. Goal No. 17) Develop energy resources including but not limited to solar, wind, geothermal, and small hydro without sacrifice to aesthetics or the existing natural or socioeconomic environment; and (G.P. Goal No.19) Maintain and improve existing aesthetic resources in Alpine County. Subsequent policies include: (Policy No.19a) Maintain scenic highway designations for Highways 4, 88, and 89; (Policy No. 19b) Protect steep slopes from grading, vegetation removal, road construction or other developments or activities that may impact the viewshed from any designated scenic route; (Policy No. 19c) Protect open areas, ridges, peaks, and other skyline features from structures that may impact the viewshed from any designated County or State scenic route; and (Policy No. 19f) Protect nighttime views by minimizing outside lighting.

The Amador County General Plan addresses visual resources as follows: (2) All development projects submitted to Amador County which are proposed to be located partially or wholly within the scenic highway corridor shall be submitted for review and comment to the Tri-County Technical Advisory committee so long as it may be in existence. These projects shall include bout not be limited to building permits, commercial recreation, or other use permits, land divisions, rezones, variances, grading permits, advertising signs and structures, etc; and (4) The California Public Utilities Commission requires undergrounding of utilities "within 1,000 feet from each edge of the right-of-way of designated Scenic Highways" and "…which would be visible from such scenic highways if erected above ground…". This State requirement will protect scenic highways from the intrusion of unsightly utility uses, such as poles, lines, etc.

Calaveras County General Plan addresses visual resources in its open space and circulation elements. Goals and policies include: (Goal V-6) To preserve and protect the scenic qualities of the County; (Policy V-6A) Proposed new development shall consider the scenic qualities of the natural resources in the design of the project; thus new development shall be encouraged to avoid extreme topographic modification, and may be required to restore natural contours and vegetation of the land after grading or other land disturbances. The circulation element includes Goal III-14: Preserve and enhance the natural and historic character of scenic highway corridors in Calaveras County.

The **Colusa County General Plan** requests that (LU-7) "The proposed development pattern should protect the scenic values of Colusa County" and that (CIRC-41) "The natural scenery which exists along locally-recognized scenic highways should be protected from activities which would permanently diminish their aesthetic beauty. Urban development should be discouraged in locally-recognized scenic highway corridors. (CIRC-42) New structures in scenic highway corridors should be set back as far as possible from the designated roadway and should be in low visibility areas. Structures should be built with natural materials that help them blend into the landscape."

The **Contra Costa County General Plan** addresses visual resources in its land use and open space elements with the following goals and policies: (3-C) To encourage aesthetically and functionally compatible development which reinforces the physical character and desired images of the County; (9-19) New water tanks that would harm the visual quality of a scenic ridge shall be buried, camouflaged or screened to mitigate their impacts, and (9-23) Hilltops, ridges, rock outcroppings, mature stands of trees, and other natural features shall be considered for preservation, at the time that any development applications are reviewed.

The **Plumas County General Plan** has a visual element, which states as goal: "To preserve the basic visual aspects of the environment which are of particular importance to the maintenance of the rural character of the County. These include, but are not limited to, views of meadowlands and waterways from highways and populated areas."

The **San Joaquin County General Plan** addresses visual resources as follows: (11) Development should complement and blend in with its setting; (12) Aesthetics should be considered when reviewing development proposals; (23) Scenic corridors along recreation travelways and scenic routes shall be protected from unsightly development; (5) Ridgelines and major hill tops shall remain undeveloped and (10) Views of waterways, hilltops, and oak groves from public land and public roadways shall be protected.

The **Yuba County General Plan** addresses visual resources in its open space and conservation elements. Goals and objectives include: (2-OSCG) Maintain and enhance natural resources, open space lands and the scenic beauty of Yuba County in order to protect the quality of the environment, the county's economy, and the health and well-

being of present and future residents; (7-OSCO) Provide full disclosure and consideration of impacts on natural resources, open space lands and scenic resources identified in this General Plan, when reviewing proposals for development or use of county lands; and (9-OSCO) Preserve important open space lands and scenic views, and create new open space opportunities in conjunction with development projects. Subsequent policies 24-OSCP through 35 OSCP detail the County's policies for visual resources.

I. Hazards

The **Eden Area Final Draft General Plan** is applicable to the area of interest in Alameda County. The following specific guidance for hazards may be relevant to the WSMP 2040. (Goal PF-4) Promote coordination between land use planning and fire protection; (P1) Fire hazards shall be identified and mitigated during the project review and approval process for new development; (Goal SAF-1) Minimize the risks to lives and property due to seismic and geologic hazards; (P4) To the extent feasible, major infrastructure including transportation, pipelines, and water and natural gas mains, shall be designed to avoid or minimize crossings of active fault traces and to accommodate fault displacement without major damage that could result in long-term service disruptions and (P6) New development in areas with the potential for landslides or liquefaction hazards, as indicated in Figure 7-2, shall not be approved unless the County can determine that feasible measures will be implemented to reduce the potential risk to acceptable levels, based on site-specific analysis. The County shall review new development proposals in terms of the risk caused by seismic and geologic activity. In addition, the General Plan addresses wildland fire risk per Goal SAF-4: Reduce the risk of wildland fire hazards in the Eden area; (P2) The County shall consider the severity of wildland fire hazards, potential damage from wildland fires, the adequacy of fire protection services, road access, and the availability of adequate water supply and pressure when reviewing and approving development projects and (P5) Development shall not be permitted where elimination of fire hazards would require any of the following: (a) Major modification of existing land forms and/ or (b) Exposure of slopes that cannot be suitably re-vegetated. Hazardous materials and waste is addressed in Goal SAF-5: Minimize Eden Area residents' exposure to the harmful effects of hazardous materials and waste. Subsequent policies P1 through P7 detail management of hazardous wastes with a focus on reduction.

The **Alpine County General Plan** addresses hazards in its safety, land use and conservation elements. Goals and policies include: (Goal No. 20) Build fire safety measures into new development as a means of lowering fire protection costs and protecting life and property; (Policy No. 20) Fire protection facilities shall be required with the approval of any development permit where it is found such a development may subject persons or property to fire danger; (Objective No. 20) Require fire safety standards which seek to minimize wildland and structure fire hazards in all future development. Hazardous waste materials are addressed as follows: (Policy No. 25a) Ensure that hazardous waste materials used in business and industry are properly handled and that information on their handling and use is available to fire and police protection agencies; (Policy No. 25b) Ensure that hazardous waste is properly handled, treated and disposed of.

The **Amador County General Plan** lists guidance on hazards in its land use and safety elements: (Policy 3.B (2)(b)) It is the policy of the County to minimize damage to public

facilities such as water and gas mains, electric, telephone and sewer lines, streets and bridges located in areas of special flood hazard; Priorities for Abatement of Hazards: (c) Hazards requiring correction or abatement measures related to major flood, erosion, landslide and subsidence controls, to building and highway reconstruction or relocation, and to development of new water sources and distribution systems, etc. may require priorities and timing to fifteen years and longer.

The **Calaveras County General Plan** addresses hazards in its safety element with Goal VII-2: Adequately protect natural resources, life and property from fire hazards and Policy VII-2B: Evaluate new development for fire safety.

The **Colusa County General Plan** lists guidance on hazards in its conservation and open space elements: (CO-13) Waste disposal sites and other sources of hazardous or polluting materials should be discouraged in close proximity to streams, creeks, reservoirs, or the Sacramento River groundwater basins. All future sites shall comply with the RWQCB's requirement of filing a Solid Waste Assessment Test (SWAT report); (OS-10) Development on highly unstable slopes or in areas with high wildfire risk and limited access should be prohibited in the absence of adequate mitigation measures.

The **San Joaquin County General Plan** addresses hazards regarding utility corridors, seismic and geologic hazards, and hazards related to flooding. Guidance includes: (4) To protect the public, existing and planned land uses, and the environment from natural and development hazards and from possible hazards associated with utility corridors; the environmental assessment of new or expanded utility lines shall address the potential adverse impacts on development as a result of a rupture or malfunction, and shall identify mitigation measures to be adopted by the utility to safeguard against such accidents and to respond in the event of an accident. Further guidance includes: to reduce the risk to life and property and increased governmental cost from potential seismic occurrences; and to minimize the adverse economic, social and physical impacts from geologic hazards, and to protect people and property from flood hazards. New residential, public, commercial, and industrial development shall be required to have protection from a 100-year flood. Hazardous materials and wastes shall not contaminate air or water resources or soils; the use of hazardous materials and the creation of hazardous wastes shall be minimized; all development shall be consistent with the County's Waste Management Plans.

The **Yuba County General Plan** lists hazards guidance in its open space and conservation elements. Goals and objectives include: (10-OSCG) Carefully regulate development projects located in floodplains, unstable soil areas, high fire hazard areas, areas of steep slope, and other areas with similar constraints; (35-OSCO) Protect future development projects from the threat of flooding in a 100 year or more frequent flood event. Policies 147-OSCP through 167-OSCP provide more detail, including (155-OSCP) Natural waterways shall be protected from unnecessary alteration whenever flood protection structures or other forms of construction are proposed and (167-OSCP)

Erosion control plans shall be required for all development projects proposed on land with slopes exceeding 5 percent.

J. Public Facilities and Services

The **Eden Area Final Draft General Plan** is applicable to the area of interest in Alameda County. The following specific guidance is addressed in the Alameda County Public Facilities and Services Element: (Goal PF-2) Promote coordination between land use planning and law enforcement; (Goal PF-9) Ensure sufficient water supplies and facilities to serve the residents of the Eden Area in an efficient and financially-sound manner; subsequent policies specifically address recycled water and water supply: (P1) The County shall support the efficient use of water through such means as conservation and recycling, and shall encourage the development of water recycling facilities to help meet the needs in the Eden Area, (P4) The County shall encourage the efficient use of water for non-residential landscape irrigation by supporting the use of recycled water, (P7) The County shall work with EBMUD to ensure effective management and long-term allocation of water resources, to develop a contingency plan for potential short-term water shortages and to develop uniform water conservation programs.

The **Alpine County General Plan** addresses public services, utilities and energy in its conservation and circulation elements. Goals and policies include (Goal No.4) Maintain adequate supplies of surface water in Alpine County for all current and foreseeable needs. (Policy No. 4a) Alpine County should remain opposed to any reduction in quantities of surface water presently administered to users in the County for in county uses under the final decree issued by the District Court for the District of Nevada involving the United States of America versus Alpine Land and Reservoir Company (1980) unless or until reasonable alternatives for supply of water for County's agricultural needs are secured. (G.P. Goal No. 5) Maintain adequate supplies of groundwater in Alpine County for all current and foreseeable needs; (Policy No. 5a) Groundwater withdrawals should not exceed or significantly drawdown groundwater supplies; (Policy No. 5b) Alpine County should oppose any significant reduction in quantities in groundwater in the County due to extractions by wells that serve areas outside of the County. (G.P. Goal No. 16) Achieve maximum levels of energy conservation through proper construction, design and placement of all new developments. (G.P. Goal No.44) Develop, maintain, and use pipeline, power line and communication facilities in a wise and efficient manner; (Policy No. 44c) No Trans-Sierra utility corridors including power lines, pipelines and other utility transmission facilities shall be allowed in Alpine County unless utilities are placed underground and provide a direct benefit to Alpine County in accordance with General Plan Goal No. 17, Policy 17f.

Calaveras County General Plan lists some guidance for public services, utilities and energy in its conservation element: (Goal IV-9) Preserve the County's current water rights and additional water rights necessary to support the County's full development potential; (Policy IV-9A) Support the development of water projects in the County for domestic and irrigation purposes; (Goal IV-10) Provide for adequate domestic water supplies; and (Policy IV-10A) Encourage continued cooperation among water suppliers in meeting the water needs for the County as a whole.

The **Colusa County General Plan** provides guidance regarding public services, utilities and energy in its circulation and community services elements: (CIRC-47) Where financially feasible, utilities in scenic highway corridors should be placed underground. Where this is impossible, utilities should be sited in a way that minimizes their intrusiveness; (WA-I) To protect local water rights and interests, Colusa County should present a unified and coordinated approach to water supply issues. The county should support State water policies which ensure that the county has first right to water originating locally.

The **Contra Costa County General Plan** addresses the public services, utilities and energy-related goals and policies in its land use and public service elements: (3-6) Development of all urban uses shall be coordinated with provision of essential Community services or facilities, including but not limited to, roads, law enforcement and fire protection services, schools, parks, sanitary facilities, water and flood control. (7-5) The County shall take an active role in coordinating major infrastructure construction within the County, particularly the transportation system network and extension of sewer and water service, to assure consistency of these improvements with the General Plan. (7-18) Water service agencies should generally be discouraged from constructing new water distribution infrastructure which exceeds future water needs based on the buildout projections of the County General Plan and city General Plans. (7-24) Opportunities shall be identified and developed in cooperation with water service agencies for use of non-potable water, including ground water, reclaimed water, and untreated surface water, for other domestic use; (7-27) The reclamation of water shall be encouraged as a supplement to existing water supplies; (10-78) No new water districts shall be established; and (10-79) The use of reclaimed water for industrial operations shall be encouraged.

The **Sacramento County General Plan** Public Facilities Element outlines objectives and policies regarding water treatment and distribution facilities. The Treatment and Distribution Facilities objective states: “Water treatment and distribution facilities are located to minimize environmental impact and maximize distribution efficiency with respect to point of withdrawal and area to be served.” A specific policy related to this objective states that new water facilities shall be planned to minimize impacts on instream water flow in the Sacramento and American Rivers (Policy PF-1).The Conservation Element of the Sacramento County General Plan outlines goals and objectives that call for the conjunctive use of surface- and groundwater to provide long-term water supply for Sacramento residents and future residents of unincorporated areas while maintaining river flows and reservoir levels.

The **San Joaquin County General Plan** addresses the public services, utilities and energy-related goals and policies in its infrastructure and services element: (24) Infrastructure shall meet the requirements and standards of the County and the operating agency; (26) Expansion of public facilities and services shall be based on

current needs and projected growth patterns; and (27) Infrastructure improvements should support growth but should not promote growth where it is not planned. A further objective is to (1) to maintain an adequate and safe water supply for County users.

The Yuba County General Plan provides guidance regarding public services, utilities and energy in its open space and conservation elements. Goals and objectives include: (8-OSCG) Develop and implement a countywide water utilization and distribution plan; (123-OSCP) Water utilization and distribution planning shall stress surface water supply rather than groundwater for new development projects and agriculture; (124-OSCP) Groundwater resources shall be managed at the local level, including oversight of exportation, in an effort to ensure that an adequate groundwater supply is available for Yuba County residents. (127-OSCP) Water distribution planning shall rely on county service areas or similar public agencies for retail water delivery to the extent feasible; and (131-OSCP) The County shall support all available avenues to increase Yuba County's surface water supply, including additional onstream storage.

K. Environmental Justice

Most general plans don't include specific information on environmental justice. Below is a summary of a few goals and policies and can be used in regard to it.

The **Eden Area Final Draft General Plan** is applicable to the area of interest in Alameda County. The following goals and policies may be relevant to environmental justice: (Goal PR-2) Develop new parks and recreational facilities in the Eden Area to meeting existing deficiencies. (P9) To the extent feasible, new investments in parks should be focused on neighborhoods that are the least served in terms of park access and the variety of recreational amenities.

The **Contra Costa County General Plan** indirectly addresses environmental justice in Chapter 3, Land Use Element, of the Contra Costa County General Plan identifies land use goals, policies, and implementation measures that encourage compatible development that reinforces the physical character and desired images of the county.

APPENDIX C
BIOLOGICAL RESOURCES

Appendix C: Biological Resources

Vegetation Communities

Agricultural

Agricultural lands within the WSMP 2040 are comprised of a wide variety of types including cultivated fields, irrigated pasture, fallow ground, orchards, vineyards, and rice fields. In addition to the specific crop, these sites can support an assemblage of mostly herbaceous, non-native, annual and perennial grasses and forbs. Cultivated lands are altered sites on which the naturally occurring vegetation has been mostly or entirely removed by grading, levee construction, draining, irrigating, cultivation, and livestock grazing. Agricultural activities also disturb the edges of fields and paddocks. Such areas do not generally support any natural vegetation, although invasive, native, and non-native plant species frequently colonize disturbed sites.

Cultivated lands within the WSMP 2040 often support non-native annual grasses and forbs typical of local grasslands. Plant species potentially found within agricultural areas include non-native species such as hare barley (*Hordeum murinum* ssp. *leporinum*), rip-gut brome (*Bromus diandrus*), Italian ryegrass (*Lolium multiflorum*), yellow star-thistle (*Centaurea solstitialis*), common knotweed (*Polygonum arenastrum*), red-stemmed filaree (*Erodium cicutarium*), yellow sweet-clover (*Medicago indica*), milk thistle (*Silybum marianum*), Italian thistle (*Carduus pycnocephalus*), bull thistle (*Cirsium vulgare*), horehound (*Marrubium vulgare*), and summer mustard (*Hirschfeldia incana*), among others.

Irrigated, cultivated, and disturbed lands as they occur on site are not specifically described by Sawyer and Keeler-Wolf (1995) and would be classified as upland following Cowardin et al. (1979).

Ruderal-Disturbed Areas

Ruderal areas form where native vegetation has been completely removed by grading, cultivation, or other surface disturbances. Such areas, if left undeveloped, may become recolonized by exotic species as well as native species. The native vegetation may ultimately become at least partially restored if the soils are left intact and there is no further disturbance.

The native vegetation on these lands has been completely removed and in some instances replaced by ruderal (weedy) non-native and native plant species. Weedy species commonly encountered include hare barley, rip-gut brome, Italian ryegrass, yellow star-thistle, common knotweed, red-stemmed filaree, yellow sweet-clover, milk thistle, Italian thistle, bull thistle, horehound, and summer mustard, all common on disturbed habitats.

Ruderal-disturbed lands are not specifically described by Sawyer and Keeler-Wolf (1995) and would be classified as upland following Cowardin et al. (1979).

California Annual Grassland

Non-native annual grassland is generally found in open areas in valleys and foothills throughout coastal and interior California (Holland 1986). It typically occurs on soils consisting of fine-textured loams or clays that are somewhat poorly drained. This vegetation type is dominated by non-native annual grasses and weedy annual and perennial forbs, primarily of Mediterranean origin, that have replaced native perennial grasslands as a result of human disturbance. Scattered native grass and wildflower species, representing remnants of the original vegetation may also be present.

Native species found within the WSMP 2040 include blue wildrye (*Elymus glaucus* var. *glaucus*), purple needlegrass (*Nassella pulchra*), creeping ryegrass (*Leymus triticoides*), meadow barley (*Hordeum brachyantherum*), mugwort (*Artemesia douglasiana*), narrowleaf mule-ears (*Wyethia angustifolia*), dove lupine (*Lupinus bicolor*), chick lupine (*Lupinus microcapus* var. *microcapus*), and foothill needlegrass (*Nassella cernua*). Characteristic non-native annual grasses found within the WSMP 2040 include soft chess (*Bromus hordeaceus*), hare barley, ripgut brome, wild oats (*Avena fatua*), Italian ryegrass, and annual fescue (*Vulpia* spp.). Common non-native forbs include bird-foot trefoil (*Lotus corniculatus*), bristly ox-tongue (*Picris echioides*) red-stemmed filaree, poison hemlock (*Conium maculatum*), crane's-bill (*Geranium dissectum*), mouse-ear chickweed (*Cerastium glomeratum*), white sweet-clover (*Medicago alba*), summer mustard, and black mustard (*Brassica nigra*), among others.

Non-native annual grassland conforms to the California annual grassland series as described in Sawyer and Keeler-Wolf (1995), and would be classified as an upland, following Cowardin et al. (1979).

Serpentine Bunchgrass/ Valley Needlegrass Grassland

Serpentine bunchgrass grassland consists of an open grassland dominated by native perennial bunchgrasses. Total cover is typically low, but is markedly dominated by native species. It is restricted to serpentine sites scattered widely through the Coast Ranges and infrequently in the Sierra Nevada and Transverse and Peninsular Ranges. Characteristic species detected onsite include the dominant grass, purple needlegrass June grass (*Koeleria macrantha*), hayfield tarweed (*Hemizonia congesta* ssp. *luzulifolia*), yarrow (*Achillea millefolium*), Douglas iris (*Iris douglasiana*), plantain (*Plantago erecta*), and wavy-leaf soap plant (*Chlorogalum pomeridianum*), among others.

Valley needlegrass grassland consists of a mid-hieght grassland dominated by purple needlegrass. The composition included native and introduced annuals occurring between perennials, and often times exceeding the bunchgrass in total cover. Valley

needlegrass grassland ranges throughout the Sacramento, San Joaquin and Salinas Valleys. Charateristic species include yarrow, blow-wives (*Achyrachaena mollis*), annual agoseris (*Agoseris heterophylla*), wild oats, common goldenstar (*Bloomeria crocea*), Jeffery's shooting star (*Dodecatheon jefferyi*), golden brodiaea (*Triteleia ixioides*), and plantain.

Serpentine bunchgrass and valley needlegrass grassland conforms to the foothill needlegrass and purple needlegrass series as described in Sawyer and Keeler-Wolf (1995), and would be classified as an upland, following Cowardin et al. (1979).

Alkali Meadow/Alkali Seep/Alkali Grassland

Alkali meadow is typically a sparse to densely vegetated plant community consisting of relatively few low growing plant species. It occurs on fine-textured, seasonally or permanently moist alkaline soils. When dominated by annual grasses or forbs, such areas are sometimes referred to as alkali grassland. Alkali meadow or grassland is distributed in poorly drained valley bottoms and on the lower edges of alluvial slopes east of the Cascades and the Sierra Nevada as well as throughout the Sacramento and San Joaquin Valleys and into the Livermore Valley. Although not specifically described in Holland (1986), features commonly referred to as alkali scalds are frequently associated with alkali meadow or grassland. Alkali scalds are relatively barren areas with a saline or alkaline crust on the soil surface, supporting little or no vegetation. Alkali seeps are generally associated with alkali meadows and are characterized by permanently moist alkaline soils with low growing perennial herbs.

Characteristic plant species of alkali meadows, grasslands, or scalds include native species such as saltgrass (*Distichlis spicata*), pickleweed (*Salicornia virginica*), alkali weed (*Cressa truxillensis*), spearscale (*Atriplex triangularis*), silverscale (*Atriplex argentea* var. *mojavensis*), foxtail barley (*Hordeum jubatum*), alkali peppergrass (*Lepidium dictyotum* ssp. *acutidens*), bush seepweed (*Suaeda moquinii*), nitrophila (*Nitrophila occidentalis*), alkali-mallow (*Malvella leprosa*), common spikeweed (*Centromadia pungens* ssp. *pungens*), and Nuttall's alkali grass (*Puccinellia nuttalliana*), as well as non-native species such as Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), sand-spurrey (*Spergularia rubra*), five-hook bassia (*Bassia hyssopifolia*), and sickle grass (*Parapholis incurva*), among others.

Alkali meadow seep and grassland communities found correspond to the saltgrass series as classified by Sawyer and Keeler-Wolf (1995) and is palustrine emergent wetland following Cowardin et al. (1979).

Coastal Brackish Marsh/ Saline Emergent Wetland

Coastal brackish marsh is typically dominated by perennial, emergent and herbaceous monocots to two meters tall. Cover is often complete and dense. Species composition is characterized as being intermediate between coastal salt marsh and coastal freshwater

marsh communities, supporting species from both. Sites are subject to saltwater intrusion from high tides but made brackish from freshwater run-off. Salinity levels vary considerably by season. Coastal brackish marshes are typically found at the interior edges of coastal bays, estuaries and lagoons and are most extensive in Suisun Bay at the mouth of the Sacramento-San Joaquin River delta (Holland 1986).

Characteristic species occurring in this habitat type include spearscale, brass buttons (*Cotula coronopifolia*), alkali weed, alkali heath (*Frankenia salina*), alkali mallow, and pickleweed, among others.

Coastal brackish marsh corresponds to one of several vegetation associations, depending upon the dominant species, as described in Sawyer and Keeler-Wolf (1995) including bulrush-cattail series, cordgrass series, ditchgrass series, among others. Portions of this plant community would be classified as estuarine or palustrine emergent wetland as described by Cowardin et al. (1979).

Northern Coastal Salt Marsh

Northern coastal salt marsh consists of highly productive, herbaceous and suffrutescent perennials up to four feet tall. Usually found along sheltered margins of bays, lagoons and estuaries, this plant community develops a dense to moderate cover. Subject to continuously fluctuating salinity and water levels, northern coastal salt marsh is typically dominated by a low diversity of salt tolerant hydrophytes. Depending on topography, clear transitions in species composition are frequently evident between the lower to middle to upper littoral zones. Northern coastal salt marsh occurs extensively in the San Francisco Bay, Morro Bay, Elkhorn Slough, Humboldt Bay, and Tomales Bay and extends from near Point Conception to the Oregon state line (Holland 1986).

The lower littoral zone of this plant community is dominated by California cordgrass (*Spartina foliosa*). Characteristic native species of the mid and upper littoral zones include pickleweed, marsh gumplant (*Grindelia stricta* var. *angustifolia*), salty dodder (*Cuscuta salina* var. *major*), saltgrass and nitrophila. Characteristic non-native species include spearscale, Hottentot fig (*Carpobrotus edulis*), New Zealand spinach (*Tetragonia tetragonioides*) and sea-rocket (*Cakile maritime)*, among others.

Northern coastal salt marsh conforms to the cordgrass series, pickleweed series, and saltgrass series as described in Sawyer and Keeler-Wolf (1995) and would be classified as estuarine emergent persistent wetland following Cowardin et al. (1979).

Coastal and Valley Freshwater Marsh/Seasonal Wetlands/Perennial Wetlands

Although not specifically described in Holland (1986), seasonal wetlands support annual and perennial native and non-native wetland indicator plant species. This plant association typically resembles a wetland community only following the wet season; it dries up rapidly with the onset of summer and the wetland indicator species go dormant.

During the dry season, such sites may not be readily recognizable as wetland species go to seed and typical upland grasses and forbs become established.

Seasonal wetlands occur where water ponds and soils remain saturated during the growing season. Plant species found in seasonal wetlands can include non-native species such as loosestrife (*Lythrum hyssopifolia*), Itialian ryegrass, rabbit-foot grass (*Polypogon monspeliensis*), and curly dock (*Rumex crispus*). Native species can include toad rush (*Juncus bufonius*), maroon-spotted downingia (*Downingia concolor*), and the floating aquatic water-starwort (*Callitriche marginata*).

Valley freshwater marsh typically occurs in low-lying sites that are permanently flooded with fresh water and lack significant flow. It is found on nutrient-rich mineral soils that are saturated for all or most of the year. This vegetation community is most extensive where surface flow is slow or stagnant or where the water table is so close to the surface as to saturate the soil from below. Valley freshwater marsh is most extensive in the upper portion of the Sacramento-San Joaquin River Delta. It is common in the Sacramento and San Joaquin valleys in river oxbows and other areas on the flood plain, and occasionally along the Colorado River on the California-Arizona border. It is now much reduced in area throughout its range (Holland 1986). This vegetation community characteristically forms a dense vegetative cover dominated by perennial, emergent monocots 1-15 feet high that reproduce by underground rhizomes.

Characteristic native species include cattails (*Typha* spp.), common tule (*Scirpus acutus* var. *occidentalis*), three-square (*Scirpus americanus*), common reed (*Phragmites australis*), Baltic rush (*Juncus balticus*), creeping spike-rush (*Eleocharis macrostachya*), salt-marsh fleabane (*Pluchea odorata*), swamp knotweed (*Polygonum amphibium* var. *emersum*), and water smartweed (*Polygonum punctatum*), among others. Non-native species such as lady's thumb (*Polygonum persicaria*), rabbitfoot grass, swamp grass (*Crypsis schoenoides*), and Dallis grass (*Paspalum dilatatum*) are also common.

Seasonal wetland does not conform to any specific series as classified by Sawyer and Keeler-Wolf (1995); it would be classified as palustrine seasonally flooded wetland following Cowardin et al. (1979).

Northern Claypan and Hardpan Vernal Pools

Vernal pools form in shallow depressions of variable size that fill with water during winter rains. Water accumulates below the soil surface and above a layer of hardpan or other impermeable substance such as volcanic rock or clay in a "seasonally perched water table." The depressions in which vernal pools form commonly occur between small hillocks known as "mima mounds," which are typically populated with grassland species. Northern hardpan vernal pools are characterized by old, very acidic, cemented solid, and are found primarily on old alluvial terraces on the east side of the Central Valley from Tulare County to Shasta County. Claypan vernal pools are characterized by fairly old,

circum-neutral to alkaline soils, often somewhat saline, and are distributed on lower terraces and basin rims, in the Central San Joaquin Valley north to Glenn and Colusa counties (Holland 1986).

Characteristic species include common vernal pool allocarya (*Plagiobothrys stipitatus micrantha*), vernal pool allocarya (*Plagiobothrys stipitatus stipitatus*), coast allocarya (*Plagiobothrys undulates*), finebranched popcornflower (*Plagiobothrys leptocladus*), Torrey's willowherb (*Epilobium torreyi*), smooth spike primrose (*Epilobium pygmaeum*), Alkali weed , Annual hairgrass (*Deschampsia danthonioides*), bristled downingia (*Downingia bicornuta*), toothed calicoflower (*Downingia cuspidata*), flatface calicoflower (*Downingia pulchella*), Hoover's downingia (*Downingia bella*), harlequin downingia (*Downingia insignis*), coyote thistle (*Eryngium vaseyi*), Jepson's button celery (*Eryngium aristulatum*), dwarf rush (*Juncus leiospermus*), twelfth rush (*Juncus uncialis*), Fremont's goldfields (*Lasthenia fremontii*), Ferris' goldfields (*Lasthenia ferrisiae*), white meadowfoam (*Limnanthes alba*), water mudwort (*Limosella aquatica*), white headed navarretia (*Navarretia leucocephala*), vernal pool Indian paintbrush (*Castilleja campestris*), Sacramento pogogyne (*Pogogyne zizyphoroides*), Douglas' pogogyne (*Pogogyne doulasii*), short woollyheads (*Psilocarphus brevissimus*), salt marsh sand spurrey (*Spergularia marina*), corn speedwell (*Veronica arvensis*) and hairy purslane speedwell (*Veronica peregrine xalaphesis*).

Vernal pool habitats within the WSMP 2040 correspond to the vernal pool, northern hardpan vernal pool and northern claypan vernal pool series as classified by Sawyer and Keeler-Wolf (1995) and is wetland following Cowardin et al. (1979).

Elderberry Savanna

Elderberry savannah describes an open shrub savannah dominated by elderberry (*Sambucus mexicana*), with a mixed understory of annual grasses and forbs, found in rich alluvium soils set back from active river channels and subject to flooding. Elderberry savannah is found throughout the Sacramento and San Joaquin Valleys.

Elderberry savannah corresponds to the Mexican elderberry series as classified by Sawyer and Keeler-Wolf (1995) and is a seasonally flooded wetland following Cowardin et al. (1979).

Coastal Scrub/ Chaparral/ Northern Maritime Chaparral/ Ione Chaparral

Chaparral describes a mosaic of vegetation community subtypes whose distribution varies with substrate type and quality, slope, aspect, and disturbance regime. Types of chaparral communities include chemise chaparral, and a variety of other scrub vegetation communities. Chemise chaparral is a dense shrub community overwhelmingly dominated by a single species (*Adenostoma fasciculatum*). Other species typically contribute little to canopy cover, and in very dense stands, herbaceous

understory species may be completely lacking. Chemise chaparral occurs throughout California, but it is more abundant in the southern part of the state. It occupies very dry, shallow soils of steep, usually south-facing slopes, and is subject to a regime of periodic fire (Holland 1986).

Several "soft" chaparrals or coastal scrubs have been described in California including Diablan sage scrub, Diegan sage scrub, Lucian sage scrub, northern (Franciscan) sage scrub, Riversidean sage scrub, Venturan sage scrub and so forth (Sawyer and Keeler-Wolf 1995Characteristic shrub species present include California sagebrush (*Artemisia californica*), sticky monkey flower (*Mimulus aurantiacus*), black sage (*Salvia mellifera*), coyote brush (*Baccharis pilularis*), and chamise among others.

Within the WSMP 2040, chaparral and scrub communities correspond to several series including the black sage series, California sagebrush, lone manzanita, and coyote brush series as classified by Sawyer and Keeler-Wolf (1995) and is upland (non-wetland) following Cowardin et al. (1979).

Great Valley Riparian Forest/Willow Scrub

Great Valley willow scrub typically consists of a dense, shrubby, streamside thicket dominated by any of several species of willows. An herbaceous understory may be present or not. This native plant community occurs close to river channels on fine-grained sand and gravel bars with a high water table. It is distributed along all the major rivers and many smaller streams throughout the Great Central Valley watershed below 1,000 feet in elevation (Holland 1986). Where large, mature trees form dense stands, this community is more appropriately referred to as Great Valley riparian forest.

Typical species include native trees such as Gooding's black willow (*Salix goodingii*), narrow-leaved willow (*Salix exigua*), red willow (*Salix levigata*), arroyo willow (*Salix lasiolepis*), and Fremont cottonwood (*Populus fremontii*) and understory species such as marsh baccharis (*Baccharis douglasii*), western goldenrod (*Euthamia occidentalis*), and numerous other species typical of freshwater marsh such as rushes and cattails.

Within the WSMP 2040, Great Valley willow scrub and forest communities correspond to several series including the mixed willow, Pacific willow, Fremont cottonwood, and narrowleaf willow series as classified by Sawyer and Keeler-Wolf (1995) and is a riparian community following Cowardin et al. (1979).

Central Coast Riparian Scrub/ Riparian Woodland

Central coast riparian scrub refers to a streamside, often impenetrable willow dominated thicket. This community often succeeds into riparian woodland in the absence of severe flooding. This plant community is often associated with fine-grained sand and gravel bars, in close proximity to river channels. Characteristic species include coyote brush and various willow species.

Within the WSMP 2040, Central Coast riparian scrub and woodland communities correspond to several series including the mixed willow, Pacific willow, and Arroyo willow series as classified by Sawyer and Keeler-Wolf (1995) and is a riparian community following Cowardin et al. (1979).

Oak Woodlands (Including Savanna)

Valley Oak Woodland

Valley oak woodland is dominated by valley oak (*Quercus lobata*) and typically forms an open canopy with an herbaceous understory of grasses and forbs. Valley oak is typically the only tree present. This winter-deciduous oak is California's largest broad-leaved tree, growing to over 100 feet high. Valley oak woodland occurs on deep, well-drained alluvial soils on terraces and along creeks and rivers. It once covered extensive areas from the Sacramento and San Joaquin valleys, along the Sierra Nevada foothills, and valleys of the Coast Ranges from Lake County to northern Los Angeles County. Most of the original Valley oak woodlands were cut for fire wood or cleared to accommodate agriculture (Holland 1986). Canopy cover is not continuous, and the understory is generally similar to the surrounding grasslands. Characteristic non-native annual grasses of the surrounding grasslands commonly found include wild oats, ripgut brome, California brome (*Bromus carinatus*), soft chess, wild barley, quaking grass (*Briza minor*), Italian ryegrass, and six-week's fescue (*Vulpia bromoides*). Common non-native forbs include yellow star thistle, field bindweed (*Convolvulus arvensis*), crane's-bill, sheep sorrel (*Rumex acetosella*), bur-clover (*Medicago polymorpha*), black mustard, filaree, among others.

Blue Oak Woodland

Blue oak woodland is typically found on north-facing slopes and in canyons throughout the Coast Ranges, Transverse Ranges; western foothills of the Sierra Nevada, Cascades and Klamath-Siskiyou Ranges, usually below 5,000 feet in elevation. Blue oak woodlands are widely distributed throughout the state from Trinity County to Los Angeles County, almost completely encircling the Great Central Valley. This community is dominated by blue oak (*Quercus douglasii*), often including individuals of other oaks. Stands vary from open savannas with grassy understories at lower elevations, to fairly dense woodlands with closed canopies and shrubby understories (Holland 1986).

Canopy cover is not continuous, and the understory is generally similar to the surrounding grasslands. Such woodlands are frequently referred to as savanna. Other tree species commonly associated with blue oak woodland include California buckeye (*Aesculus californica*) and valley oak.

The shrub layer of blue oak woodland is typically poorly developed and the herbaceous layer is often continuous. Shrubs in the study area include toyon (*Heteromeles arbutifolia*) and scattered species from adjacent plant communities. Characteristic

herbaceous plants detected on site include most of the species found within the grasslands. Native species such are also present, including miner's lettuce (*Claytonia perfoliata*), sanicle (*Sanicula tuberosa*), nemophila (*Nemophila heterophylla*), woodland star (*Lithophragma affine*), among others.

Coast Live Oak Woodland

Coast live oak woodland is typically found on north-facing slopes and shaded ravines in the southern and inland portions of the state and on more exposed, mesic sites in the north. This community is dominated by coast live oak (*Quercus agrifolia*), which frequently occurs in pure, dense stands with a closed canopy. Coast live oak woodland is restricted primarily to the coast side of the state and is distributed from Sonoma County to Baja California. It occurs throughout the outer South Coast ranges and coastal slopes of the Transverse and Peninsular ranges, usually below 4,000 feet in elevation.

The shrub layer is typically well developed and the herbaceous layer is often continuous. Characteristic shrub species include snowberry (*Symphoricarpos mollis*), poison oak (*Toxicodendron diversilobum*), toyon and scattered species such as California sagebrush, black sage and sticky monkey flower from neighboring, often contiguous sage scrub communities. Native species such are also present, including miner's lettuce, among others.

Within the WSMP 2040, oak woodland corresponds to the blue oak, valley oak, coast live oak, and California bay series as described in Sawyer and Keeler-Wolf (1995). These plant communities would be classified as upland as described by Cowardin et al. (1979).

Eucalyptus Woodland

This non-native plant community has naturalized in California since eucalyptus trees were first brought to the state in the mid 1880s. Numerous species of the genus were imported for their horticultural interest and their potential utility as a fast-growing hardwood. Groves of eucalyptus were first planted in the vicinity of Berkeley and later planted in groves throughout the Central Coast and into southern California. Because climatic conditions in the western half of the state are very similar to the range of many of the imported species of eucalyptus in Australia, the planted groves managed to persist and spread without cultivation. It is estimated that there are between 600 and 800 species of *Eucalyptus*, about eighteen of which have become fairly widespread in California. The most common and widely grown species is Tasmanian blue gum (*Eucalyptus globulus*). Because the so-called gum trees form dense, expanding groves, drop a tremendous amount of bark and leaf litter, and greatly alter the chemistry of the soil, eucalyptus have contributed to the loss of native plant communities, which typically cannot persist in the understory. Eucalyptus have had an especially adverse effect on the native coastal scrub and coast grassland communities and often present a fire

hazard. Nonetheless, eucalyptus woodland provides suitable nesting and roosting habitat for many native birds and monarch butterfly.

Eucalyptus woodland conforms to the eucalyptus series in Sawyer and Keeler-Wolf (1995); it would be classified as an upland following Cowardin, *et al.* (1979).

Montane Hardwood/ Big Tree Forest

Montane hardwood habitat is composed primarily of an oak dominated hardwood tree layer, with an infrequent and poorly developed shrub understory, and a sparse herbaceous layer. Specific oak species vary with elevation. Montane hardwood is often interspersed with stands of pine and fir such as ponderosa pine (*Pinus ponderosa*), Coulter pine (*Pinus coulteri*), and Jeffrey pine (*Pinus jeffreyi*), at higher elevations, Douglas fir (*Pseudotsuga menziesii*), madrone (*Arbutus menziesii*), California bay-laurel *(Umbellularia californica),* and California black oak (*Quercus kelloggii*), at middle elevations.

Montane hardwood conforms to the Jeffrey pine, bigcone Douglas fir, California buckeye, and giant sequoia series as described in Sawyer and Keeler-Wolf (1995). This plant community would be classified as upland as described by Cowardin et al. (1979).

Redwood

Upland redwood forest is found on well drained shallow soils on steep slopes in areas where the summer fog reaches the stand. Species commonly associated with redwood forest include bigleaf maple (*Acer macrophyllum*), tanoak (*Lithocarpus densiflora*), sword fern (*Polystichum munitum*), redwood (*Sequoia sempervirens*), and California bay-laurel.

Redwood conforms to the redwood series as described in Sawyer and Keeler-Wolf (1995). This plant community would be classified as upland as described by Cowardin et al. (1979).

Mixed Pine Forest/ Foothill Pine Woodland

Mixed pine forest and foothill pine woodland species compositions vary depending upon elevation with species such as Coulter pine, foothill pine (*Pinus sabiniana*), blue oak, black oak, California buckeye, Interior live oak, and valley oak at lower elevations, knobcone pine (*Pinus attenuata*), ponderosa pine, deer brush (*Ceanothus intergerrimus*), mountain whitethorn (*Ceanothus cordulatus*), and California coffeeberry (*Rhamnus* californica) at moderate elevations, and Sierra chinquapin (*Chrysolepis sempervirens*), pinemat (*Ceanothus prostratus*), and Sierra gooseberry (*Ribes rozelii*) at the higher elevations.

Mixed pine forest and foothill pine woodland conforms to the foothill pine, ponderosa pine, and black oak series as described in Sawyer and Keeler-Wolf (1995). This plant community would be classified as upland as described by Cowardin et al. (1979).

Special-Status Plants

The following section provides detailed information for several special-status plants with potential to occur within the WSMP 2040. Plants with a potential to occur in each component are listed in the tables below. For habitat affinities for all special-status plants with a potential to occur in the WSMP 2040 Preferred Portfolio Study Area, see Table 4.2.C-2 in Chapter 4 of the PEIR.

Table C-1: Plant Species Potentially Occurring at the Bayside Phase 2 Groundwater Project Site

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Alkali milk-vetch	*Astragalus tener* var. *tener*		1B.2
Congdon's tarplant	*Centromadia parryi* ssp. *congdonii*		1B.2
Robust spineflower	*Chorizanthe robusta* var. *robusta*	Endangered	1B.1
Point Reyes bird's-beak	*Cordylanthus maritimus* ssp. *Palustris*		1B.2
Kellogg's horkelia	*Horkelia cuneata* ssp. *sericea*		1B.1
Contra Costa goldfields	*Lasthenia conjugens*	Endangered	1B.1
Adobe sanicle	*Sanicula maritime*		Rare
Most beautiful jewel-flower	*Streptanthus albidus* ssp. *Peramoenus*		1B.1
California seablite	*Suaeda californica*	Endangered	1B.1

Note:
1B = (CNPS) Eligible for State listing, CEQA review
2 = (CNPS) Eligible for State listing, not rare outside California, CEQA review
3 = (CNPS) Review list, more information needed, recommended for CEQA review
4 = (CNPS) Watch list, recommended for CEQA review
Source: CNDDB 2008, USFWS 2008, CNPS 2008.

Table C-2: Plant Species Potentially Occurring within the Proposed Regional Desalination Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Delta tule pea	*Lathyrus jepsonii* var. *jepsonii*		1B.2
Big tarplant	*Blepharizonia plumosa*		1B.1
Congdon's tarplant	*Centromadia parryi* ssp. *congdonii*		1B.2
Soft bird's-beak	*Cordylanthus mollis* ssp. *mollis*	Endangered	Rare 1B.2
Carquinez goldenbush	*Isocoma arguta*		1B.1
Mason's lilaeopsis	*Lilaeopsis masonii*		Rare 1B.1
Delta mudwort	*Limosella subulata*		2.1
Robust monardella	*Monardella villosa* ssp. *globosa*		1B.2
Antioch Dunes evening-primrose	*Oenothera deltoides* ssp. *howellii*	Endangered	Endangered 1B.1
Suisun Marsh aster	*Symphyotrichum lentum*		1B.2

Note:
1B = (CNPS) Eligible for State listing, CEQA review
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4 = (CNPS) Watch list, recommended for CEQA review
Source: CNDDB 2008, USFWS 2008, CNPS 2008.

Table C-3: Plant Species Potentially Occurring within the Enlarge Pardee Reservoir Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Ione Manzanita	*Archtostaphylos myrtifolia*	Threatened	1B.2
Ione buckwheat	*Erigonum apricum* var. *apricum*	Endangered	Endangered 1B.1
Bisbee Peak rush-rose	*Helianthemum suffrutescens*		3.2
Parry's horkelia	*Horkelia parryi*		1B.2
Pincushion navarretia	*Navarretia myersii* ssp. *myersii*		1B.1
Prairie wedge grass	*Sphenopholis obtusata*		2.2

Notes:
1B = (CNPS) Eligible for State listing, CEQA review
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4 = (CNPS) Watch list, recommended for CEQA review
Source: CNDDB 2008, USFWS 2008, CNPS 2008.

Table C-4: Plant Species Potentially Occurring within the Enlarge Lower Bear Reservoir Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Pleasant Valley mariposa-lily	*Calochortus clavatus* var. *avius*		1B.2
Stebbins' lomatium	*Lomatium stebbinsii*		1B.1

Notes:
1B = (CNPS) Eligible for State listing, CEQA review
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4 = (CNPS) Watch list, recommended for CEQA review
Source: CNDDB 2008, USFWS 2008, CNPS 2008.

Table C-5: Plant Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Henderson's bent grass	*Agrostis hendersonii*		3.2
Mountain bent grass	*Agrostis hendersonii*		2.3
Three-bracted onion	*Allium tribracteatum*		1B.2
Large-flowered fiddleneck	*Amsinckia grandiflora*	Endangered	Endangered 1B.1
Ione Manzanita	*Arctostaphylos myrtifolia*	Threatened	1B.2
Alkali milk-vetch	*Astragalus tener* var. *tener*		1B.2
San Joaquin spearscale	*Atriplex joaquiniana*		1B.2
Big tarplant	*Blepharizonia plumosa*		1B.1
Chinese Camp brodiaea	*Brodiaea pallida*	Threatened	Endangered 1B.1
Round-leaved filaree	*California macrophy*		1B.1
Pleasant Valley mariposa-lily	*Calochortus clavatus* var. *avius*		1B.2
Hoover's calycadenia	*Calycadenia hooveri*		1B.3
Bristly sedge	*Carex comosa*		2.1
Western valley sedge	*Carex vallicola*		2.3
Brown fox sedge	*Carex vulpinoidea*		2.2
Succulent owl's-clover	*Castilleja campestris* ssp. *succulenta*	Threatened	Endangered 1B.2
Lemmon's jewelflower	*Caulanthus coulteri* var. *lemmonii*		1B.2

Table C-5: Plant Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area (continued)

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Alpine dusty maidens	*Chaenactis douglasii* var. *alpina*		2.3
Red Hilla soaproot	*Chlorogalum grandiflorum*		1B.2
Slough thistle	*Cirsium crassicaule*		1B.2
Beaded clarkia	*Clarkia rostrata*		1B.3
Fell-fields claytonia	*Claytonia megarhiza*		2.3
Great Basin claytonia	*Claytonia umbellata*		2.3
Palmate-bracted bird's-beak	*Cordylanthus palmatus*	Endangered	Endangered 1B.1
Subalpine cryptantha	*Cryptantha crymophilla*		1B.3
Mariposa cryptantha	*Cryptantha mariposae*		1B.3
Hospital Canyon larkspur	*Delphinium californicum* ssp. *interius*		1B.2
Recurved larkspur	*Delphinium recurvatum*		1B.2
Dwarf downingia	*Downingia pusilla*		2.2
Tahoe draba	*Draba asterophora var. asterophora*		1B.3
Ione buckwheat	*Eriogonum apricum var. apricum*	Endangered	Endangered 1B.1
Irish Hill buckwheat	*Eriogonum apricum var. prostratum*	Endangered	Endangered 1B.1
Tuolumne button-celery	*Eryngium pinnatisectum*		1B.2
Delta button-celery	*Eryngium racemosum*		Endangered 1B.1
Spiny-sepaled button-celery	*Eryngium spinosepalum*		1B.2
Diamond-petaled California poppy	*Eschscholzia rhombipetala*		1B.1
Boggs Lake hedge-hyssop	*Gratiola heterosepala*		Endangered 1B.2
Bisbee Peak rush-rose	*Helianthmum suffrutescens*		3.2
Woolly rose-mallow	*Hibiscus lasiocarpus*		2.2
Parry's horkelia	*Horkelia parryi*		1B.2
Ahart's dwarf rush	*Juncus leiospermus var. ahartii*		1B.2

Table C-5: Plant Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area (continued)

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Delta tule pea	*Lathyrus jepsonii var. jepsonii*		1B.2
Legenere	*Legenere limosa*		1B.1
Mason's lilaeopsis	*Lilaeopsis masonii*		Rare 1B.1
Delta mudwort	*Limosella subulata*		2.1
Stebbins' lomatium	*Lomatium stebbinsii*		1B.1
Showy golden madia	*Madia radiata*		1B.1
Yellow-lip pansy monkeyflower	*Mimulus pulchellus*		1B.2
Whipple's monkeyflower	*Mimulus whipplei*		1A
Pincushion navarretia	*Navarretia myersii ssp. myersii*		1B.1
Robbins' pondweed	*Potamogeton robbinsii*		2.3
Sanford's arrowhead	*Sagittaria sanfordii*		1B.2
Tongue-leaf copper moss	*Scopelophila cataractae*		2.2
Marsh skullcap	*Scutellaria galerculata*		2.2
Side-flowering skullcap	*Scutellaria lateriflora*		2.2
Prairie wedge grass	*Sphenopholis obtusata*		2.2
Long-leaved starwort	*Stellaria longifolia*		2.2
Masonic Mountain jewel-flower	*Streptanthus oliganthus*		1B.2
Suisun Marsh aster	*Symphyotrichum lentum*		1B.2
Wright's trichocoronis	*Tricocoronis wrightii var. wrightii*		2.1
Caper-fruited tropidocarpum	*Tropidocarpum capparideum*		1B.1
Greene's tuctoria	*Tuctoria greenei*		1B.1

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Source: CNDDB 2008, USFWS 2008, CNPS 2008.

Table C-6: Plant Species Potentially Occurring in the Proposed Pre-treatment Facility Project Site

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Henderson's bent grass	*Agrostis hendersonii*		3.2
Ione Manzanita	*Arctostaphylos myrtifolia*	Threatened	1B.2
Hoover's calycadenia	*Calycadenia hooveri*		1B.3
Parry's horkelia	*Horkelia parryi*		1B.2
Legenere	*Legenere limosa*		1B.1

Notes:
1B = (CNPS) Eligible for State listing, CEQA review
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4 = (CNPS) Watch list, recommended for CEQA review
Source: CNDDB 2008, USFWS 2008, CNPS 2008.

Large-Flowered Fiddleneck

Large-flowered fiddleneck (*Amsinckia grandiflora*), federally- and state-listed Endangered and CNPS List 1B.1, is an erect herbaceous annual in the borage family. It has bright orange flowers that are relatively large for the genus, hairy stems. The blooming period is April to May. Habitat includes deep loamy soils of sedimentary origin and relatively moist, north-facing slopes. Naturally-occurring populations are presently found in only three sites, all of which are in northern California: two populations on U.S. Department of Energy's Lawrence Livermore National Laboratory property and one on private property. Several reintroduced populations also exist. The population is vulnerable due to agriculture, development, grazing, non-native plants, and fire frequency. A recovery plan was established in 1997 (Large-Flowered Fiddleneck Recovery Plan) and critical habitat was designated in 1985 (50 Fed. Reg. 19,374).

Ione Manzanita

Ione manzanita (*Arctostapylos myrtifolia),* federally-listed Threatened and CNPS List 1B.2, is a low, somewhat spreading evergreen shrub in the Ericaceae or heath family with small, drooping pale pink urn-shaped flowers. The blooming period is November to March. It can be distinguished from other species in this genus by its narrow, bright green shiny leaves that are the same on the top and bottom, fruit characteristics (small, few stones or seeds), its lack of a burl at the base of the trunk, and its short stature. It depends on fire for seed germination. The species is endemic to a specific soil type in Amador and Calaveras County in the western Sierra Nevada called the Ione Formation, which is characterized by high acidity, lack of nutrients, and coarse sandy texture. In this area, Ione manzanita is a dominant member of the chaparral community, but very rare in

outlying communities. The population is vulnerable due to erosion, mining, development, and fungal infection.

Pallid Manzanita

Pallid manzanita (*Arctostaphylos pallida*), federally- and state-listed Threatened and CNPS List 1B.1, is an upright evergreen shrub in the Ericaceae or heath family with drooping pale pink urn-shaped flowers. The blooming period is December to March. It can be distinguished from other species in this genus by its densely clasping leaves and lack of a burl at the base. It is found only in 13 areas of chaparral habitat in Alameda and Contra Costa County on thin chert and shale soils. The population is vulnerable due to road construction, development, fungal infection, and hybridization. A recovery plan was established in 2003 (Draft Recovery Plan for Chaparral and Scrub Community Species East of San Francisco Bay, California).

Indian Valley Brodiaea

Indian Valley brodiaea (*Brodiaea coronaria* ssp *rosea*), state-listed Endangered and CNPS List 1B.1, is a perennial plant in the lily family with 3-5 basal linear leaves and an umbel of bell-shaped pink- to purplish flowers. The blooming period is May to June. The species is found primarily in serpentine grasslands, chaparral, and coniferous forest of Colusa, Glenn, and Tehama counties. The population is vulnerable due to collecting, dumping, and vehicular disturbance.

Chinese Camp Brodiaea

Chinese Camp brodiaea (*Brodiaea pallida*), state-listed Endangered and CNPS List 1B.1, is a perennial plant in the lily family with 3-5 basal linear leaves and urn-shaped purplish flowers. It is short-lived (i.e., above-ground) and the blooming period is May to early June. The species is found on serpentine and volcanic soils in the central California Sierra foothills and is known from only two locations on private property. The population is vulnerable due to residential development in the area, the small range of the species, and the small number of populations.

Tiburon Mariposa Lily

Tiburon mariposa lily (*Calochortus tiburonensis*), federally- and state-listed Threatened and CNPS List 1B.1, is a perennial plant in the lily family, with a single persistent basal leaf and branched multiple inflorescences. The flowers are bell-shaped, hairy, and yellowish-green with brown speckles. The blooming period is March to June. The distribution of the Tiburon Mariposa lily is limited to the rocky slopes along Ring Mountain in Tiburon, California. Tiburon Mariposa lily is found in serpentine soils, which are characterized by low levels of nutrients and high levels of heavy metals that are toxic to most other species. The population is vulnerable due to human disturbance, non-native plant species, and factors such as fire or disease that could wipe out this single

small population. A recovery plan was established in 1998 (Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area).

Tiburon Paintbrush

Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*), federally-listed Endangered, state-listed Threatened and CNPS List 1B.1, is a semi-woody perennial of the snapdragon family (*Scrophulariaceae*). It has erect, branched stems 1 to 2 feet tall and a sparse covering of soft, spreading hairs. The lance-shaped leaves have one or two pairs of narrow lobes. The blooming period is April to June. Tiburon paintbrush grows in serpentine bunchgrass communities on north to west facing slopes. There are seven known populations: five in Marin County (including three on the Tiburon Peninsula), one in American Canyon in Napa County, and a small population in Santa Clara County. Recently discovered populations within the Golden Gate National Recreation Area and east of Anderson Lake extend the known range to western Marin and Santa Clara counties, respectively. The range of this plant is approximately 30 miles from east to west and 70 miles from north to south. Population sizes are small, ranging from less than 20 plants at the Santa Clara County site to approximately 600 plants at Ring Mountain Preserve on the Tiburon Peninsula. The population is vulnerable due to development, gravel mining, and grazing.

Succulent Owl's Clover

Succulent owl's clover (*Castilleja campestris* ssp. *succulenta*), also known as fleshy owl's-clover, is federally-listed Threatened, state-listed Endangered and CNPS List 1B.1. The species is a hemiparasitic annual herb in the snapdragon family (*Scrophulariaceae*). The flowers and associated sepals are deep yellow to orange, the stems are erect, generally 2-10 inches tall, and the leaves are succulent and brittle. The blooming period is April to May. It primarily occurs on the margins of vernal pools, and also on swales and seasonal wetlands, typically on acidic soils. The population is vulnerable due to urbanization, agriculture, flood control, grazing, and trampling. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2003 (68 Fed. Reg. 46,683) and revised in 2006 (70 Fed. Reg. 46,923).

Hoover's Spurge

Hoover's spurge (*Chamaesyce hooveri*), federally-listed Threatened and CNPS List 1.B.2, is a prostrate, tap-rooted, annual herb in the spurge family (*Euphorbiaceae*) that forms mats. The inflorescences are cup-like and are made up of multiple tiny individual flowers. The flowers' petal-like appendages have red to olive-colored glands. It blooms from July to September. Hoover's spurge is a vernal pool obligate species found in the Sierra Nevada foothills. Its location in vernal pools tends to be in areas that are inundated the longest, although it does not germinate until water has evaporated. The

largest populations are in northeastern Sacramento Valley, primarily in Butte and Tehama County. The population is vulnerable due to grazing, agriculture, and non-native plants. A recovery plan was published in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2003 (68 Fed. Reg. 46,683) and revised in 2006 (70 Fed. Reg. 46,923).

Robust Spineflower

Robust spineflower (*Chorizanthe robusta* var. *robusta*), federally-listed Endangered and CNPS List 1B.1, is a low annual herb with small, grayish, hairy leaves and clusters of small, hairy, jagged-lobed pale pink flowers, in the buckwheat family (*Polygonaceae*). The blooming period is April to September. Suitable habitat is confined to coastal dunes, sandy coastal scrub, chaparral, and cismontane woodland. Its historic distribution included coastal regions of central California and San Francisco Bay. Documented historical CNDDB occurrences include the Cities of Alameda, South San Francisco and Ocean View district in San Francisco; the species has been extirpated from these areas, including all of Alameda County. Populations have been recently documented in Monterey, Santa Cruz, and San Mateo Counties. The population is vulnerable due to development, recreation, mining, and non-native plants. A recovery plan was established in 2004 (Recovery Plan for Robust Spineflower) and critical habitat was designated in 2002 (67 Fed. Reg. 36,822).

Presidio Clarkia

Presidio clarkia (*Clarkia franciscana*), federally- and state-listed Endangered and is a on the CNPS List 1B.1, is a slender, erect, herbaceous annual of the evening-primrose family (*Onagraceae*). It grows to 16 inches tall with few, very small and narrow leaves. The blooming period is May to July. Presidio clarkia is restricted to grassland communities on serpentine soils in San Francisco and Alameda counties. Two populations are known from the San Francisco Presidio. Three are known from the Oakland Hills in Alameda County, all from within 0.5 mile of each other. The population is vulnerable due to military installations, vehicular disturbances, urbanization, and non-native plants. A recovery plan was established in 1998 (Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area).

Soft Bird's-Beak

Soft bird's-beak (*Cordylantus mollis* ssp. *mollis*), federally-listed Endangered , state-listed Rare and CNPS List 1B.2, is an annual hemiparasite belonging to the figwort family (*Scrophulariaceae*). It produces few to many gray-green, glandular pubescent stems reaching four to 16 inches in height. The blooming period is July to November. It occurs in coastal salt marshes in Contra Costa, Napa, and Solano counties; it is believed to be extinct in Sonoma and Marin counties. The population is vulnerable due to non-

native plants, erosion, trampling, and marsh drainage. Critical habitat was designated in 2007 (72 Fed. Reg. 18,517).

Palmate-Bracted Bird's-Beak

Palmate-bracted bird's-beak (*Cordylanthus palmatus*), federally- and state-listed Endangered and CNPS List 1B.1, is an annual herb in the snapdragon family (*Scrophulariaceae*). The plants are 4-12 inches tall and highly branched. The blooming period is May to October. Palmate bracted bird's-beak grows on seasonally-flooded, saline-alkali soils in lowland plains and basins at elevations of less than 500 feet. Within these areas, it grows primarily along the edges of channels and drainages, with a few individuals scattered in seasonally-wet depressions, alkali scalds (barren areas with a surface crust of salts) and grassy areas. Historically, the species is known to occur in 21 locations in the San Joaquin, Sacramento, and Livermore valleys. The population is vulnerable due to agriculture, urbanization, vehicular activity, altered hydrology, grazing, and development. A recovery plan was established in 1998 (Recovery Plan for Upland Species of the San Joaquin Valley, California).

Ione Buckwheat

Ione buckwheat (*Eriogonum apricum* var. *apricum*), federally- and state-listed Endangered and CNPS List 1B.1, is a 3-8 inch tall perennial herb in the buckwheat family (*Polygonaceae*). The genus is characterized by roundish basal leaves, swollen stem nodes, and clusters of small pinkish flowers. The blooming period is July to October. The species is endemic to chaparral habitat found only in a specific soil type in Amador and Calaveras County in the western Sierra Nevada called the Ione Formation, which is characterized by high acidity, lack of nutrients, and coarse sandy texture. This variety is known from only nine locations, only seven of which are on public property. The population is vulnerable due to human disturbance, residential developments, vehicular activity, mining, and erosion.

Irish Hill Buckwheat

Irish Hill buckwheat (*Eriogonum apricum* var. *prostratum*), federally- and state-listed Endangered and CNPS List 1B.1, is a 3-8 inch tall perennial herb in the buckwheat family (*Polygonaceae*). The genus is characterized by roundish basal leaves, swollen stem nodes, and clusters of small pinkish flowers. The blooming period is June to July. The species is endemic to chaparral habitat found only in a specific soil type in Amador and Calaveras County in the western Sierra Nevada called the Ione Formation, which is characterized by high acidity, lack of nutrients, and coarse sandy texture. The two known populations are found on a patch of habitat less than one acre in size on private property in Amador County. The population is vulnerable due to human disturbance, residential developments, vehicular activity, mining, and erosion.

Delta Button-Celery

Delta button-celery (*Eryngium racemosum*), state-listed Endangered and CNPS List 1B.1, is a low, sprawling perennial herb in the carrot family (*Apiaceae*) that grows to be about 20 inches long. It has small inconspicuous flowers in small round heads, and the stems root at the nodes. The blooming period is June to September. The species is found in vernal pool depression of riparian scrub, usually in the floodplain of large watercourses. It requires periodic flooding and takes advantage of openings created by erosion. The species has 19 known populations, centered in Merced County, with one occurrence in Stanislaus County. The population is vulnerable due to agriculture and flood control activities.

Boggs Lake Hedge-Hyssop

Boggs Lake hedge-hyssop (*Gratiola heterosepala*), state-listed Endangered and CNPS List 1B.2, is a miniature member of the snapdragon family (*Scrophulariaceae*). It grows to be 3.9 inches long and has small tubular whitish to yellowish flowers. The blooming period is April to August. Appropriate habitat includes vernal pools, seasonal stock ponds, and fluctuating lake margins. It is found in 13 counties in California and one location in Oregon. The population is vulnerable due to agriculture, development, grazing, and vehicular activity.

Marin Western Flax

Marin western flax (*Hesperolinon congestum*), also known as marin dwarf-flax, is federally- and state-listed Threatened and CNPS List 1B.1. The species is an annual, herbaceous member of the flax family (*Linaceae*). It is an ascending herb up to 12 inches tall with glabrous, alternate, leaves. The blooming period is May to July. Marin western flax is found in serpentine grassland and chaparral and is known from fewer than 20 occurrences in Marin, San Francisco, and San Mateo counties. The population is vulnerable due to development, non-native plants, and foot traffic. A recovery plan was established in 1998 (Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area).

Santa Cruz Tarplant

Santa Cruz tarplant (*Holocarpha macradenia*), federally-listed Threatened, state-listed Endangered and CNPS List 1B.1, is an annual herb in the sunflower family (*Asteraceae*), up to two feet tall. Like other tarplant species, it has yellow ray flowers and sticky scented foliage; it is distinguished from others in the genus by the denser larger floral heads and black anthers. The blooming period is June to October. The species was historically found in coastal prairie habitat throughout central California from Marin to Monterey County. Currently, the species is found at only 20 populations, 8 of which are reintroductions. The natural extant populations are in Monterey County (half are on private lands) and several of the reintroductions are in the San Francisco Bay area. The

population is vulnerable due to urbanization, agriculture, non-native plants, and lack of appropriate ecological disturbance. Critical habitat was designated in 2002 (67 Fed. Reg. 30,642).

Contra Costa Goldfields

Contra Costa goldfields (*Lasthenia conjugens*), federally-listed Endangered and CNPS List 1B.1 is a low herbaceous annual in the sunflower family that produces 6-13 yellow ray flowers per year. The blooming period is March to June. The species inhabits seasonal wetlands including vernal pools and mesic grasslands with typically clay or alkaline soils below 700 feet above sea level. Contra Costa goldfields were once distributed across the southern Sacramento Valley and the San Francisco Bay. It is presently restricted to locations near the Sacramento River Delta in Napa and Solano counties. The species was recorded in the vicinity of Byron Hot Springs. The population is vulnerable due to development, habitat alteration, hydrological alterations, overgrazing, and non-native plants. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2003 (68 Fed. Reg. 46,683) and updated in 2006 (71 Fed. Reg. 7,117).

Beach Layia

Beach layia (*Layia carnosa*), federally- and state-listed Endangered and CNPS List 1B.1, is a small, glandular annual herb with spreading stems and fleshy, oblong leaves in the sunflower family (*Asteraceae*). Depending on conditions, there can be a single stem or multiple stems up to 6 inches tall and more than 16 inches in breadth. The blooming period is March to July. Habitat consists of sparsely vegetated, semi-stabilized coastal dunes with recent wind erosion, usually in nearshore dunes. Historical distribution included Humboldt, Monterey, Marin, Santa Barbara and San Francisco Counties. The species was extirpated from San Francisco with the development of the dunes and has not been documented in the San Francisco Bay region since 1904. Twenty extant populations are found in Humboldt County, Point Reyes National Seashore in Marin County, Monterey County and Santa Barbara. The population is vulnerable due to coastal development, foot traffic, vehicular activity, and non-native plants. A recovery plan was established in 1998 (Seven Coastal Plants and the Myrtle's Silverspot Butterfly Recovery Plan).

Mason's Lilaeopsis

Mason's lilaeopsis (*Lilaeopsis masonii*), state-listed Rare and CNPS List 1B.1, is a diminutive member of the carrot family. It is a prostrate perennial producing rhizomes and linear, cylindric to flattened leaves 1/2 to 3 inches long. The blooming period is April to November. The species forms dense to sparse colonies on streambanks and in intertidal marshes at sea level in the southern Sacramento Valley and northeastern San

Francisco Bay. The population is vulnerable due to erosion, channel stabilization, development, flood control projects, recreation, agriculture, shading from marsh succession, and competition with non-native species.

Milo Baker's Lupine

Milo Baker's lupine (*Lupinus milo-baker*i), state-listed Endangered and CNPS List 1B.1, is an herbaceous annual plant in the pea family (*Fabaceae*) measuring approximately 3-5 ft. The leaves are palmate, and composed of 6 to 9 leaflets radiating from a central point. The blooming period is June to August. Milo Baker's lupine is commonly associated with weedy species. It is found along roadsides in Mendocino and Colusa Counties. The occurrences of Milo Baker's lupine along roads may not represent the original habitat for this species; however, its natural habitat is not well known. The population is vulnerable due to urbanization, road widening, and herbicide application.

Colusa Grass

Colusa grass (*Neostapfia colusana*), federally-listed Threatened, state-listed Endangered and CNPS List 1B.1, is a robust, tufted annual in the grass family (*Poaceae*) that grows 3-12 inches tall. The lower portions of the stems lie on the ground; the upper portions are erect and terminate in dense cylindrical, spike-like inflorescences that superficially resemble small ears of corn. The blooming period is May to August. Colusa grass occurs in large or deep vernal pools with substrates of high mud content. It is sparingly restricted to the Sacramento and San Joaquin Valleys. Currently, no more than 45 occurrences of Colusa grass remain extant. The majority of the extant occurrences are in the southern Sierra Foothills, where they are concentrated northeast of the City of Merced in Merced County and east of Hickman in Stanislaus County. The population is vulnerable due to agriculture, development, overgrazing, flood control, and non-native plants. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2006 (71 Fed. Reg. 7,117).

Antioch Dunes Evening-Primrose

Antioch Dunes evening-primrose (*Oenothera deltoides* ssp. *howellii*), federally- and state-listed Endangered and CNPS List 1B.1, is a short-lived perennial plant in the evening-primrose family (*Onagraceae*). It forms large tufts with coarse drooping stems 4-40 inches long, much branched. Leaves are lance-like in outline, 1-5 inches long, 0.4-1.2 inches wide, grayish with numerous short and fewer longer hairs. The blooming period is March to September. Antioch Dunes evening-primrose now occurs in several locations near the confluence of the Sacramento and San Joaquin Rivers. The only natural stands exist within the sand dunes near Antioch in Contra Costa County. Most of the natural dune habitat is in Antioch Dunes National Wildlife Refuge. The subspecies has been transplanted to Brannan Island State Recreation Area. There are also two small colonies

on Brown's Island in Contra Costa County. The historic range of Antioch Dunes evening-primrose is unknown and open to speculation. Presumably it was limited to the sandy soil type found at the dunes and over a substantial portion of eastern Contra Costa County. A recovery plan was established in 1984 (Revised Recovery Plan for Three Endangered Species Endemic to Antioch Dunes, California) and critical habitat was designated in 1978 (43 Fed. Reg. 39,042).

Hairy Orcutt Grass

Hairy Orcutt grass (*Orcuttia pilosa*), federally- and state-listed Endangered and CNPS List 1B.1, is a small, tufted annual in the grass family (*Poaceae*). The plant has several stems 2-8 inches tall, each stem ending in a long, spike-like inflorescence. Hairy Orcutt grass inhabits vernal pools in rolling topography on remnant alluvial fans and stream terraces in the Central Valley. The historical range includes the eastern margins of Sacramento and San Joaquin Valleys from Tehama County south to Stanislaus County and through Merced and Madera counties. Currently, the main area of concentration is the Vina Plains in Tehama County, which is in the Northeastern Sacramento Valley Vernal Pool Region. An isolated occurrence in central Butte County is in the same region. Eleven occurrences are in the Southern Sierra Foothills Vernal Pool Region, including nine in Madera County between the City of Madera and Millerton Lake, and two in eastern Stanislaus County. The population is vulnerable due to agriculture, urbanization, overgrazing, non-native plants, and trampling. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2003 (68 Fed. Reg. 46,683) and updated in 2006 (71 Fed. Reg. 7,117).

Slender Orcutt Grass

Slender Orcutt grass (*Orcuttia tenuis*), federally-listed Threatened, state-listed Endangered and CNPS List 1B.1, is a small, weakly tufted annual in the grass family (*Poaceae*). The plant has several stems 2-6 inches tall, ending in an elongate inflorescence of scattered spikelets. The blooming period is May to September. Slender Orcutt grass occurs in valley grassland and blue oak woodland. It grows in vernal pools on remnant alluvial fans and high stream terraces and recent basalt flows. It has some ability to colonize artificial habitats, such as the margins of stock ponds. The primary area of concentration is in the vicinity of Dales, Tehama County. A secondary area of concentration is the Modoc Plateau Vernal Pool Region in Lassen, Plumas, Shasta and Siskiyou Counties. There are a few occurrences in the Lake-Napa and Southeastern Sacramento Valley Vernal Pool Regions. The population is vulnerable due to agriculture, residential development, grazing, vehicular activity, recreational activities, logging, fire, trampling, and non-native plants. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2003 (68 Fed. Reg. 46,683) and updated in 2006 (71 Fed. Reg. 7,117).

Sacramento Orcutt Grass

Sacramento Orcutt grass (*Orcuttia viscida*), federally- and state-listed Endangered and CNPS List 1B.1, is a small, densely tufted annual member of the grass family (*Poaceae*). It grows 1 to 4 inches in height. The plant is covered with small glandular hairs and is sticky even when young, and more so at maturity. The blooming period is April to July. Sacramento Orcutt grass grows in relatively large, deep vernal pools. It is restricted to a region of approximately 135 square miles in eastern Sacramento County, with no historic locations are known outside this area. The population is vulnerable due to agriculture, urbanization, overgrazing, vehicular activity, and non-native plants. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was designated in 2003 (68 Fed. Reg. 46,683) and updated in 2006 (71 Fed. Reg. 7,117).

White-Rayed Pentachaeta

White-rayed pentachaeta (*Pentachaeta bellidiflora*), federally- and state-listed Endangered and CNPS List 1B.1, is a small annual plant of the aster family (*Asteraceae*). It has a few erect, unbranched stems, 2.5 to 7 inch tall. The stems grow from a slender taproot. The alternate leaves are about 1.8 inch long and very narrow. The blooming period is March to May. This species grows in serpentine bunchgrass habitat. Historically, it was known from at least nine sites in Marin, San Mateo, Santa Cruz and Monterey counties. Suitable habitat remains in two San Mateo County locations, but the species has not been seen at either site in many years. The species is now known from only one confirmed location in San Mateo County, in the "Triangle" area and adjacent Edgewood County Park. The population is vulnerable due to urbanization and vehicular activity. A recovery plan was established in 1998 (Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area).

San Francisco Popcorn-Flower

San Francisco Popcorn-flower (*Plagiobothrys diffusus*), state-listed Endangered and CNPS List 1B.1, is a diminutive annual herb in the borage family (*Boraginaceae*). It is semi-erect to erect, with hairy (strigose) branches five to ten inches long. The blooming period is April to June. San Francisco popcorn-flower is restricted to coastal prairie habitat on sites subject to a marine influence. It is known from six occurrences in Santa Cruz County and is presumed extirpated in San Francisco County. It has only been reported on clay soils. The population is vulnerable due to development and non-native plants.

Adobe Sanicle

Adobe sanicle (*Sanicula maritime*), state-listed Rare and CNPS List 1B.1, is a member of the carrot family (*Apiaceae*). Adobe sanicle grows as stout, aromatic, perennial herb with large basal leaves, smaller upper leaves, and yellow flowers in head-like clusters. The

blooming period is February to May. The species is found in wet to dry clay soils of coastal prairie and coastal sage scrub plant communities. Its distribution is centered in the coastal hills of San Luis Obispo and Monterey counties with additional historical records from the San Francisco. Fewer than 10 occurrences of adobe sanicle are still extant and all but two, located in the Los Padres National Forest and Andrew Molera State Park, are privately owned. The population is vulnerable due to foot traffic, non-native plants, recreational activities, trampling, and urbanization.

Layne's Butterweed

Layne's butterweed (*Senecio layneae*), federally-listed Threatened, also known as Layne's ragwort, is a perennial herb of the aster family (*Asteraceae*). The plant sprouts from a rootstock. Its mostly basal lance-shaped leaves are 3 to 10 inches long. The blooming period is April to June. Layne's butterweed grows in open rocky areas of gabbro and serpentine soils within chaparral plant communities. Most known sites are scattered within a 40,000 acre area in western El Dorado County that includes the Pine Hill intrusion and adjacent serpentine. A few other colonies occur in the Eldorado National Forest in El Dorado County, in the Bureau of Land Management (BLM) Red Hills Management Area in Tuolumne County, and on BLM land in Yuba County. The population is vulnerable due to urbanization, road construction, herbicide spraying, and mining. A recovery plan was established in 2002 (Recovery Plan for Gabbro Soil Plants of the Central Sierra Nevada Foothills).

Red-Mountain Catchfly

Red Mountain catchfly (*Silene campanulata* ssp. *campanulata*), state-listed Rare and CNPS List 1B.1, a member of the pink family (*Caryophyllaceae*), is a short, much-branched, perennial herb with long, narrow leaves, short, glandular hairs and cream to greenish or pink flowers. It occurs on rocky, dry serpentine soils within lower montane coniferous forest and montane chaparral communities on Red Mountain and Little Red Mountain in Mendocino County. A population of Red Mountain catchfly also occurs on serpentine soils in the vicinity of Cook Springs, Colusa County. There are fewer than 13 occurrences of Red Mountain catchfly, 3 of which were discovered on the Shasta-Trinity National Forests in 1998. The population is vulnerable due to agriculture and development.

Tiburon Jewelflower

Tiburon jewelflower (*Streptanthus niger*), federally- and state-listed Endangered and CNPS List 1B.1, is an annual herb of the mustard family (*Brassicaceae*). It reaches 1 to 2 feet in height. The blooming period is May to June. Tiburon jewelflower is found on shallow rocky serpentine soils on southwest-facing slopes on the Tiburon Peninsula of Marin County. Two populations are known. Both fluctuate a lot in size. The population is vulnerable due to road construction, foot traffic, non-native plants, and development. A

recovery plan was established in 1998 (Recovery Plan for Serpentine Soil Species of the San Francisco Bay Area).

California Seablite

California seablite (*Suaeda californica*), federally-listed Endangered and CNPS List 1B.1, is a low perennial semi-woody shrub in the goosefoot family (traditionally *Chenopodiaceae*, now *Amaranthaceae*). The species has numerous sprawling branches, fleshy linear leaves, and inconspicuous pale green flowers. The blooming period is July to October. Suitable habitat is confined to sandy upper salt marshes and sandy or shell estuarine beaches in the high tide line. Its historic distribution included Central and South San Francisco Bay, Petaluma River, and Central Coast marshes. The plant is now extant only in Morro Bay and near Cayucos Point. The population is vulnerable due to recreation, erosion, and alteration of marsh habitat.

Two-Fork Clover

Two-fork clover (*Trifolium amoenum*), also known as showy Indian clover, is federally-listed Endangered and CNPS List 1B.1. The species is an annual herb in the pea family (*Fabaceae*). The blooming period is April to June. This wildflower has an erect growth habit and is typically found on heavy soils at elevations less than 100 meters. The historic range of two-fork clover was from the western extreme of the Sacramento Valley in Solano County, west and north to Marin and Sonoma counties. Presently there is only a single extant population, subsequently discovered in 1996, in northern Marin County, which numbers approximately 200 plants. The population is vulnerable due to development and vehicular activity.

Greene's Tuctoria

Greene's tuctoria (*Tuctoria greenei*), federally-listed Endangered and state-listed Rare and CNPS List 1B.1, is a small, tufted annual in the grass family (*Poaceae*). The plant has several to many stems 2-6 inches tall, each ending in a spike-like inflorescence that may be partly enfolded in the upper leaf. The blooming period is May to July. Greene's tuctoria is currently found in widely separated occurrences in Butte, Merced, Shasta and Tehama counties. The species has been extirpated from Fresno, Madera, San Joaquin, Stanislaus and Tulare counties. The population is vulnerable due to agriculture, urbanization, and overgrazing. A recovery plan was established in 2005 (Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon) and critical habitat was originally designated in 2003 (68 Fed. Reg. 46,683) and updated in 2006 (71 Fed. Reg. 67,602).

Wildlife Natural History

The following section provides natural history information for several special-status species that are prominent in the regulatory environment, with potential to occur, within

the WSMP 2040. Wildlife species with a potential to occur in each component are listed in the tables below. For habitat affinities for all special-status wildlife with a potential to occur in the WSMP 2040 Preferred Portfolio Study Area, see Table 4.2.C-3 in Chapter 4 of the PEIR.

Table C-7: Wildlife Species Potentially Occurring at the Bayside Phase 2 Groundwater Project Site

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Invertebrates			
Monarch butterfly	*Danaus plexippus*		CNDDB
Mimic tryonia (=California brackishwater snail)	*Tryonia imitator*		CNDDB
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	SC
Reptiles			
Western pond turtle	*Clemmys marmorata*		SC
Birds			
Cooper's hawk	*Accipiter cooperii*	MBTA	WL
Western burrowing owl	*Athene cunicularia hypugaea*	MBTA	SC
Western snowy plover	*Charadrius alexandrinus nivosus*	Threatened	SC
Northern harrier	*Circus cyaneus*	MBTA	SC
Saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	MBTA	SC
Loggerhead shrike	*Lanius ludovicianus*	MBTA	SC
California black rail	*Laterallus jamaicensis coturniculus*	MBTA	Threatened
California clapper rail	*Rallus longirostris obsoletus*	Endangered	Endangered, FP
Black skimmer	*Rynchops niger*	MBTA	SC
California least tern	*Sternula antillarum browni*	Endangered	Endangered
Mammals			
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	Endangered	Endangered, FP
Salt-marsh wandering shrew	*Sorex vagrans halicoetes*		SC

Notes:
SC = CDFG Species of Concern
WL = CDFG Watch List
MBTA = Migratory Bird Treaty Act
CNDDB = tracked by the CNDDB
FP = CDFG Fully Protected
Source: CNDDB 2008, USFWS 2008

Table C-8: Wildlife Species Potentially Occurring within the Proposed Regional Desalination Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Invertebrates			
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	
Delta green ground beetle	*Elaphrus viridis*	Threatened	
Callippe silverspot butterfly	*Speyeria callippe callippe*	Endangered	
California freshwater shrimp	*Syncaris pacifica*	Endangered	Endangered
Bridges' coast range shoulderband	*Helminthoglypta nickliniana bridgesi*		CNDDB
Reptiles			
Western pond turtle	*Actinemys marmorata*		SC
Giant garter snake	*Thamnophis gigas*	Threatened	Threatened
Alameda whipsnake	*Masticophis lateralis euryxanthus*	Threatened	Threatened
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	SC
California red-legged frog	*Rana draytonii*	Threatened	SC
Birds			
Tricolored blackbird	*Agelaius tricolor*	MBTA	SC
Short-eared owl	*Asio flammeus*	MBTA	SC
Western burrowing owl	*Athene cunicularia hypugea*	MBTA	SC
Saltmarsh common yellowthroat	*Geothlypis trichas sinuosa*	MBTA	SC
California black rail	*Laterallus jamaicensis coturniculus*	MBTA	Threatened
Suisun song sparrow	*Melospiza melodia maxillaris*	MBTA	SC
California clapper rail	*Rallus longirostris obsoletus*	Endangered	Endangered, FP
California least tern	*Sternula antillarum browni*	Endangered	Endangered
Mammals			
San Joaquin pocketmouse	*Perognathus inornatus inornatus*		CNDDB
Salt-marsh harvest mouse	*Reithrodontomys raviventris*	Endangered	Endangered, FP

Notes:
SC = CDFG Species of Concern
WL = CDFG Watch List
MBTA = Migratory Bird Treaty Act
CNDDB = tracked by the CNDDB
FP = CDFG Fully Protected
Source: CNDDB 2008, USFWS 2008

Table C-9: Wildlife Species Potentially Occurring within the Enlarge Pardee Reservoir Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Invertebrates			
Rudolph's cave harvestman	*Banksula rudolphi*		CNDDB
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	
Leech's skyline diving beetle	*Hydroporus leechi*		CNDDB
Reptiles			
Northwestern pond turtle	*Actinemys marmorata marmorata*		SC
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	SC
California red-legged frog	*Rana draytonii*	Threatened	SC
Western spadefoot toad	*Spea hammondii*		SC
Birds			
Bald eagle	*Haliaeetus leucocephalus*	Delisted	Endangered, FP

Notes:
SC = CDFG Species of Concern
WL = CDFG Watch List
MBTA = Migratory Bird Treaty Act
CNDDB = tracked by the CNDDB
FP = CDFG Fully Protected
Source: CNDDB 2008, USFWS 2008

Table C-10: Wildlife Species Potentially Occurring within the Enlarge Lower Bear Reservoir Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Amphibians			
Foothill yellow-legged frog	*Rana boylii*		SC
Sierra Nevada yellow-legged frog	*Rana sierrae*	Candidate	SC
Birds			
Northern goshawk	*Accipiter gentilis*		SC
American peregrine falcon	*Falco peregrinus anatum*	Delisted	Endangered, FP
Mammals			
Pacific fisher	*Martes pennanti (pacifica) DPS*	Candidate	SC

Notes:
SC = CDFG Species of Concern
WL = CDFG Watch List
MBTA = Migratory Bird Treaty Act
CNDDB = tracked by the CNDDB
FP = CDFG Fully Protected
Source: CNDDB 2008, USFWS 2008

Table C-11: Wildlife Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Invertebrates			
Yates snail = tight coin	*Ammonitella yatesii*		CNDDB
Blennosperma vernal pool anrenid bee	*Andrena blennospermatis*		CNDDB
Vernal pool anrenid bee	*Andrena subapasta*		CNDDB
California floater	*Anodonta californiensis*		CNDDB
Sacramento anthicid beetle	*Anthicus sacramento*		CNDDB
Grubbs' cave pseudoscorpion	*Aphrastochthonius grubbsi*		CNDDB
Grubbs' cave harvestman	*Banksula grubbsi*		CNDDB
Martins' cave harvestman	*Banksula martinorum*		CNDDB
Melones cave harvestman	*Banksula melones*		CNDDB
Rudolph's cave harvestman	*Banksula rudolphi*		CNDDB
King Tut Cave harvestman	*Banksula tutankhamen*		CNDDB
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	
Midvalley fairy shrimp	*Branchinecta mesovallensis*		CNDDB
Tulare cuckoo wasp	*chrysis tularensis*		CNDDB

Table C-11: Wildlife Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area (continued)

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	
Mono checkerspot butterfly	*Euphydryas editha monoensis*		CNDDB
Ricksecker's water scavenger beetle	*Hydrochara rickseckeri*		CNDDB
Leech's skyline diving beetle	*Hydroporus leechi*		CNDDB
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	
California linderiella	*Linderiella occidentalis*		CNDDB
Moestan blister beetle	*Lytta moesta*		CNDDB
Button's Sierra sideband	*Monadenia mormonum buttoni*		CNDDB
Carson Valley silverspot	*Speyeria Nokomis carsonensis*		CNDDB
Grady's Cave amphipod	*Stygobromus gradyi*		CNDDB
Reptiles			
Western pond turtle	*Actinemys marmorata*		SC
Northwestern pond turtle	*Actinemys marmorata marmorata*		SC
Silvery legless lizard	*Anniella pulchra pulchra*		SC
San Joaquin whipsnake	*Masticophis flagellum ruddocki*		SC
Coast (California) horned lizard	*Phrynosoma coronatum (frontale population)*		SC
Giant garter snake	*Thamnophis gigas*	Threatened	Threatened
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	SC
Yosemite toad	*Bufo canorus*	Candidate	SC
Mount Lyell salamander	*Hydromantes platycephalus*		SC
Foothill yellow-legged frog	*Rana boylii*		SC
California red-legged frog	*Rana draytonii*	Threatened	SC
Sierra Nevada yellow-legged frog	*Rana sierrae*	Candidate	SC
Western spadefoot toad	*Spea hammondii*		SC
Birds			
Northern goshawk	*Accipiter gentilis*	MBTA	SC
Sharp-shinned hawk	*Accipiter striatus*	MBTA	WL

Table C-11: Wildlife Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area (continued)

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Tricolored blackbird	*Agelaius tricolor*	MBTA	SC
Golden eagle	*Aquila chrysaetos*	MBTA	FP
Great blue heron	*Ardea herodias*	MBTA	CNDDB
Western burrowing owl	*Athene cunicularia hypugea*	MBTA	SC
Ferruginous hawk	*Buteo regalis*	MBTA	WL
Swainson's hawk	*Buteo swainsoni*	MBTA	Threatened
Northern harrier	*Circus cyaneus*	MBTA	SC
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	Endangered
Black swift	*Cypseloides niger*	MBTA	SC
Yellow warbler	*Dendroica petechia brewsteri*	MBTA	SC
White-tailed kite	*Elanus leucurus*	MBTA	
Willow flycatcher	*Empidonax trailii*	MBTA	Endangered
California horned lark	*Eremophila alpestris actia*	MBTA	WL
Prairie falcon	*Falco mexicanus*	MBTA	WL
American peregrine falcon	*Falco peregrinus anatum*	Delisted	Endangered, FP
Bald eagle	*Haliaeetus leucocephalus*	Delisted	Endangered, FP
Yellow-breasted chat	*Icteria virens*	MBTA	SC
Loggerhead shrike	*Lanius ludovicianus*	MBTA	SC
California black rail	*Laterallus jamaicensis coturniculus*	MBTA	Threatened
Osprey	*Pandion haliaetus*	MBTA	WL
Great grey owl	*Strix nebulosa*	MBTA	Endangered
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	MBTA	SC
Mammals			
Pallid bat	*Antrozous pallidus*		SC
Townsend's big-eared bat	*Corynorhinus townsendii*		SC
Western mastiff bat	*Eumops perotis californicus*		SC
California wolverine	*Gulo gulo*		Threatened
Silver-haired bat	*Lasionycteris noctivagans*		CNDDB
Western red bat	*Lasiurus blossevillii*		SC
Hoary bat	*Lasiurus cinereus*		CNDDB

Table C-11: Wildlife Species Potentially Occurring within the IRCUP/ San Joaquin Groundwater Banking / Exchange Project Area (continued)

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Western white-tailed jackrabbit	*Lepus townsendii*		SC
Sierra marten	*Martes americana sierrae*		CNDDB
Pacific fisher	*Martes pennanti (pacifica) DPS*	Candidate	SC
Long-legged myotis	*Myotis volans*		CNDDB
Yuma myotis	*Myotis yumanensis*		CNDDB
Riparian (=San Joaquin Valley) woodrat	*Neotoma fuscipes riparia*	Endangered	SC
Yosemite pika	*Ochotona princeps muiri*		CNDDB
San Joaquin pocket mouse	*Perognathus inornatus inornatus*		CNDDB
Riparian brush rabbit	*Sylvilagus bachmani riparius*	Endangered	Endangered
American badger	*Taxidea taxus*		SC
San Joaquin kit fox	*Vulpes macrotis mutica*	Endangered	Threatened
Sierra Nevada red fox	*Vulpes vulpes necator*		Threatened

Notes:
SC = CDFG Species of Concern
WL = CDFG Watch List
MBTA = Migratory Bird Treaty Act
CNDDB = tracked by the CNDDB
FP = CDFG Fully Protected
Source: CNDDB 2008, USFWS 2008

Table C-12: Wildlife Species Potentially Occurring in the Proposed Pre-treatment Facility Project Site

COMMON NAME	SCIENTIFIC NAME	FEDERAL LISTING STATUS	STATE LISTING STATUS
Invertebrates			
Vernal pool fairy shrimp	*Branchinecta lynchi*	Threatened	
Midvalley fairy shrimp	*Branchinecta mesovallensis*		CNDDB
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	Threatened	
Vernal pool tadpole shrimp	*Lepidurus packardi*	Endangered	
California linderiella	*Linderiella occidentalis*		CNDDB
Reptiles			
Western pond turtle	*Clemmys marmorata*		SC
Amphibians			
California tiger salamander	*Ambystoma californiense*	Threatened	SC
Western spadefoot toad	*Spea hammondii*		SC
Birds			
Tricolored blackbird	*Agelaius tricolor*	MBTA	SC
Western burrowing owl	*Athene cunicularia hypugea*	MBTA	SC
Swainson's hawk	*Buteo swainsoni*	MBTA	Threatened
Prairie falcon	*Falco mexicanus*	MBTA	WL
Yellow-breasted chat	*Icteria virens*	MBTA	SC
Osprey	*Pandion haliaetus*	MBTA	WL

Notes:
SC = CDFG Species of Concern
WL = CDFG Watch List
MBTA = Migratory Bird Treaty Act
CNDDB = tracked by the CNDDB
FP = CDFG Fully Protected
Source: CNDDB 2008, USFWS 2008, Jones & Stokes 2003.

Special-Status Invertebrates

Vernal Pool Crustaceans

Fairy shrimp and tadpole shrimp are aquatic crustaceans associated with vernal pools, grassy swales and other temporarily ponded bodies of water in California. As a taxonomic group, they are collectively referred to as branchiopods. Fairy shrimp and tadpole shrimp represent two different orders, Anostraca and Notostraca respectively, within the crustacean class Branchiopoda. Most branchiopods are small freshwater organisms with limited specialization of their appendages as compared to other crustacean groups.

Vernal pools form in regions with Mediterranean climates, where shallow depressions fill with water during fall and winter rains, and then which evaporate in the spring (Holland and Jain 1988). Downward percolation is prevented by the presence of an impervious

subsurface layer, such as claypan, hardpan, or volcanic stratum. Fairy shrimp and tadpole shrimp are ecologically dependent upon these seasonal fluctuations in their environment. After pools become inundated with water, these crustaceans hatch from eggs that have been dormant in the soil from previous wet seasons. The eggs are highly tolerant of heat, cold, and prolonged desiccation. In general, two to three weeks of inundation are required for eggs to hatch and for completion of development, although this time period varies by species. When the pool dries, the eggs survive as cysts among the soil and detritus at the bottom of the pool. Generally, there is one generation per rainy season, but in some locations and in some years, depending on weather patterns and rainfall amounts, conditions may permit two or more generations to complete their development. Egg cysts are dispersed from one pool to another via wind, water, or animals such as birds that may ingest them, or cattle that may pick them up on their feet.

Fairy shrimp are found in vernal pools, seasonal wetlands, and swales of various sizes ranging from small puddles to Boggs Lake (40 ha), 90 miles north of San Francisco. The water chemistry characteristics [pH, turbidity, total dissolved solids (TDS), conductivity, and alkalinity] of these habitats vary widely as well (Eng et al. 1990). Generally, fairy shrimp have a broad tolerance range for physical and chemical attributes. Vernal pool branchiopods that have the potential to occur within the WSMP 2040 include Conservancy fairy shrimp (*Branchinecta conservatio*), federally-listed Endangered, longhorn fairy shrimp (*Branchinecta longiantenna*), federally-listed Endangered, vernal pool fairy shrimp (*Branchinecta lynchi*), federally-listed Threatened, Midvalley fairy shrimp (*Branchinecta mesovallensis*), a species tracked by the CNDDB, and California linderiella fairy shrimp (*Linderiella occidentalis*), a species tracked by the CNDDB.

Valley Elderberry Longhorn Beetle

The Valley elderberry longhorn beetle, federally-listed Threatened, inhabits elderberry (*Sambucus* spp.) shrubs and trees in a variety of habitats, but most often occurs in riparian, elderberry savannah or moist oak woodlands in the Sacramento River Valley and northern San Joaquin Valley low hills of central California. Elderberry beetle larvae feed on the soft core of elderberry stems and excavate passages in the wood as they feed. Eggs are laid in May on elderberry stems greater than 1 inch in diameter. Elderberry beetles may remain in larval stage for as long as two years before emerging from the host elderberry plant as adults. Additionally, the adult life-stage is short lived, with the entire life cycle taking approximately one to two years to complete. Exit holes are usually on stems greater than 0.5 inch in diameter, with 70 percent of the exit holes at heights of 4 feet, or greater (Steinhart 1990). Holes are circular to slightly oval, with a diameter of 7 to 10 mm (Barr 1991). In March and early June, adults feed in riparian areas in which they breed on the foliage and possibly the flowers of elderberry trees or shrubs. Threats to elderberry beetles include urbanization, insecticides, herbicides, and fluctuations in stream water levels (Steinhart 1990). Numbers of Valley elderberry longhorn beetle have drastically declined due to the widespread elimination of

streamside woodlands that support elderberry, which have been developed or converted to agricultural uses.

Curved-Foot Hygrotus Diving Beetle

The curved-foot hygrotus diving beetle (*Hygrotus curvipes*), a species tracked by the CNDDB, typically inhabits seasonal ponds, pools, streams, and drainages. They are usually found in temporary wetlands characterized by salt-tolerant plant species such as saltgrass. However, at present, the curved-foot hygrotus diving beetle is afforded no formal protection under state or federal law.

Special-Status Amphibians

California Red-Legged Frog

Optimal habitat for the California red-legged frog, federally-listed Threatened and a California Species of Special Concern, includes ponds, stream courses, permanent pools (Storer 1925), and intermittent streams fed by drainage areas no larger than 300 km^2 (Hayes and Jennings 1988) between sea level and 1,500 meters (5,000 feet) in elevation (Bulger *et al.* 2003). Habitat characteristics include water depth of at least 0.7 meters (2.5 feet), largely intact emergent or shoreline vegetation, *e.g.* cattails, tules (*Scirpus* spp.) or willows (*Salix* spp.), and absence of competitors/predators such as bullfrogs and largemouth bass (*Micropterus salmoides*) (Hayes and Jennings 1988). However, according to Jennings (pers. comm. 2003), California red-legged frogs will use a wide variety of habitats, including temporary pools and streams, permanent watercourses, wells, and ponds. Outside of an ideal habitat, California red-legged frogs have been found in concrete-lined pools, isolated wells, stock ponds absent of shoreline vegetation, and refuse piles near ponds. In order to survive, permanent ponds and neighboring aquatic habitat that lasts for at least 6 months a year must be nearby. Less optimal habitat is most likely used during wet periods, but a permanent water source is essential to the survival of the population.

Adults are highly aquatic and are most active at night (Storer 1925). However, California red-legged frogs do make use of terrestrial habitat, especially after precipitation events, for non-migratory forays into upland habitats and migratory overland movements between aquatic sites. California red-legged frogs have been documented to migrate between aquatic sites at distances up to 3,200 meters (approximately 2 miles) (Bulger *et al*. 2003).

California Tiger Salamander

The California tiger salamander (Central Population), federally-listed Threatened[1] and a California Species of Special Concern, is a relatively large, terrestrial salamander that inhabits grasslands and oak savanna habitats in the valleys and low hills of central and northern California (Storer 1925, Stebbins 2003, Barry and Shaffer 1994, USFWS 2004a). The California tiger salamander has been recorded from all of the nine Bay Area counties at elevations ranging from approximately 10 to 3,500 feet above mean sea level (Shaffer and Fisher 1991). California tiger salamanders appear to be in the initial stages of habitat fragmentation and decline (Fisher and Shaffer 1996). They require vernal pools, ponds (natural or human-made), or semi-permanent calm waters (where ponded water is present for a minimum of three to four months) for breeding and larval maturation, and adjacent upland areas that contain small mammal burrows or other suitable refugia for aestivation.

Adult California tiger salamanders spend most of their lives underground in small mammal burrows typically those of Beechey's (=California) ground squirrels (*Spermophilus beecheyi*) (Loredo *et al.* 1996). Adults emerge from underground retreats to feed, court and breed during warm winter rains typically from November through March. Adults may migrate long distances, up to a kilometer or more, to reach pools for breeding and egg laying (Jennings and Hayes 1994). The eggs are attached singly or in small groups of 2-4 to vegetation under water or directly on the bottom of the pool if emergent vegetation is sparse or nonexistent (Storer 1925, Jennings and Hayes 1994). After hatching in about 10-14 days the larvae continue to develop in the pools for several months until they metamorphose, which takes a minimum of 10 weeks (Anderson 1968, Feaver 1971).

Following metamorphosis, juvenile salamanders seek refugia, typically mammal burrows, traveling distances of 1.6 km (about 1 mile) or more from their breeding sites (Austin and Shaffer 1992) in which they may remain until they emerge during a subsequent breeding season. Trenham *et al.* (2000) found that most individuals did not reach sexual maturity for 4-5 years. After completion of breeding, adult California tiger salamanders retreat to underground burrows. During some years in which the conditions are sub-optimal, adult females have been known to forego reproduction completely (Loredo and Van Vuren 1996, Trenham *et al.* 2000). California tiger salamander populations and breeding habits are vitally influenced by environmental conditions including seasonal rainfall and pond duration (Loredo and Van Vuren 1996). California tiger salamanders are dependent on the integrity of both breeding ponds and adjacent

[1] In 2004 the California tiger salamander was listed as Threatened statewide. The Santa Barbara County and Sonoma County Distinct Vertebrate Population Segments (DPS), formerly listed as Endangered, were reclassified to Threatened. On August 19, 2005, a U.S. District Court vacated the downlisting of the Sonoma and Santa Barbara populations, restoring them to Endangered status. Therefore, the Sonoma & Santa Barbara populations are once again listed as Endangered while the California tiger salamander Central Population is still listed as Threatened.

upland habitat, especially long-lasting vernal pool complexes (Jennings and Hayes 1994; Trenham and Shaffer 2005). The alteration of either habitat component through the introduction of exotic predators or the construction of barriers, e.g. roads, berms, and certain types of fences, that fragments habitat and reduces connectivity can be detrimental to the survival of the California tiger salamander (Jennings and Hayes 1994; Trenham *et al* 2001).

Western Spadefoot Toad

The western spadefoot toad, a California Species of Special Concern, is a medium-sized (37-62 mm SUL) toad that inhabits the Central Valley and adjacent foothills and valleys, as well as the central and south coastal region of California from Monterey Bay to Baja California (Stebbins 2003, Morey 1985). They are green to grey with irregular stripes on the back, pale gold eyes, and a distinctive glossy black spade on the hind feet. Insects, especially caterpillars and beetles, are the primary components of the adult's diet, though they also eat worms, ants, and other invertebrates. Adult forms are almost entirely terrestrial and prefer areas of open vegetation and short grasses with sandy or gravelly soils (Stebbins 2003). Western spadefoot toads are found in grasslands, open chaparral and pine-oak woodland. They emit an odor similar to roasted peanuts when handled (Stebbins 2003).

Following a period of dormancy that can last as long as eight to nine months, western spadefoot toads become active and leave their burrows following warm rains in the late winter/spring and fall (between October and April) (Jennings and Hayes 1994). Vernal pools or sometimes pools within ephemeral stream courses that last longer than three weeks are used for breeding (Stebbins 2003, Jennings and Hayes 1994). Sometimes western spadefoot toads form large, highly vocal breeding aggregations of up to 1000 individuals, though they are generally much smaller (Jennings and Hayes 1994). Their hoarse call is snore-like and lasts between ½ to one second (Stebbins 2003). Females lay their eggs between February and late May. Tadpoles metamorphose to adults during late spring and disperse after spending up to a few days near the pond margin (Morey 1985). Loss of habitat is one of the primary concerns, with declines documented throughout its range (Jennings and Hayes 1994).

Special-Status Reptiles

Giant Garter Snake

The giant garter snake (*Thamnophis gigas*), federally-listed Threatened and state-listed Threatened, historically occurred throughout the Central Valley of California, from Kern County in the south to Butte County in the north, within the boundaries of the Coastal and Sierra Nevada ranges (Hansen and Brode 1980). The current range of the giant garter snake is confined to the Sacramento Valley and isolated parts of the San Joaquin Valley (Stebbins 2003, USFWS 1999a), with scattered sightings in the Sacramento-San

Joaquin Delta. Currently the highest densities of giant garter snake are found in the Sacramento Valley within the American Basin, where the species persists largely in seasonally flooded agricultural fields, primarily rice, and irrigation ditches (CDFG 2000). Loss of habitat has occurred throughout the range as a result of urban expansion (USFWS 1993, Dickert 2005), agricultural practices such as intensive vegetation control along canal banks that potentially fragment available habitat and changes in crop composition, and livestock grazing at waters edge, which can degrade the habitat available to giant garter snakes.

The giant garter snake is highly aquatic and primarily feeds on fish, tadpoles, and frogs (Fitch 1941). Historically these prey items included thick-tailed chub (*Gila crassicuada*) and the Sacramento blackfish (*Orthodox microlepidus*), both of which have been extirpated from the giant garter snake's current range (Dickert 2005). The habitat requirements of the giant garter snake include wetland areas such as sloughs, streams and other waterways, ponds or small lakes, marshes, and agricultural wetlands, with sufficient emergent vegetation for cover, openings in vegetation for basking, relatively low water flow, and access to high ground with abandoned rodent burrows for shelter and winter periods of reduced activity (USFWS 1993). The giant garter snake has been found to use altered habitats such as irrigation ditches and rice fields (CDFG 2000) in addition to more natural waterways. Furthermore, it has been noted that giant garter snakes tend to be absent from larger rivers that support populations of invasive or introduced predatory fish as well as wetlands that have sand, gravel, or rocky substrates (Hansen 1980).

Giant garter snakes are less active (Wylie *et al* 1997), or dormant from October until April when they emerge to breed and forage. They are viviparous, giving birth to as many as 10 to 46 young from late July through early September (Hansen and Hansen 1990). The giant garter snake is the largest member of its genus, reaching lengths of 120 cm (Stebbins 2003), and become sexually mature in 3 (males) to 5 (females) years (USFWS 1993). Giant garter snakes are vulnerable to predation from both native (raccoons, skunks, opossums, foxes, hawks, egrets and herons) and invasive (bullfrogs, catfish, large mouth bass, and feral cats) species (USFWS 1993, Carpenter *et al* 2002). Additionally they face threats from parasites and contaminants. Giant garter snakes are found sympatrically with the western terrestrial garter snake (*Thamnophis elegans*) and the common garter snake (*Thamnophis sirtalis*).

Alameda Whipsnake

The Alameda whipsnake, federally and state-listed Threatened, is a fast moving, diurnal snake with large eyes like all species within the genus Masticophis. It is also known as the "Alameda striped racer" (Stebbins 2003). It typically measures three to five feet in length, with a fairly wide head and slender neck. The Alameda whipsnake is considered to be a subspecies of the California whipsnake (*Masticophis lateralis*), which ranges from Red Bluff in northern California to Central Baja California, inhabiting the Coast Ranges

and foothills of the Sierra Nevada. The Alameda whipsnake is restricted to the hills of Alameda, Contra Costa, and northern Santa Clara counties within the San Francisco Bay region (Stebbins 2003). There are five remaining populations with little to no genetic flow between them: Sobrante Ridge, Oakland Hills, Hayward Hills, Mount Diablo vicinity, the Black Hills, and Wauhab Ridge. This regional restriction corresponds to the distribution of coastal scrub and chaparral within the area (Stebbins 2003). This habitat restriction may reflect the species' preference for friable, well-drained soils. The Alameda whipsnake is distinguished from other California whipsnakes by the thickness of the orange stripes on its sides.

Primary habitats for Alameda whipsnake typically include east, southeast, south and southwest facing slopes containing coastal scrub and chaparral, including rock outcrops that are within approximately 0.5 miles (Swaim 1994). However, current unpublished data suggests Alameda whipsnake may also utilize a wider range of habitat types. Canopy cover within these habitats is typically open (<75% cover of total area) with little to no herbaceous understory (Swaim 1994). Recent telemetry data indicate that, although home ranges of Alameda whipsnakes are centered on shrub communities, whipsnakes frequently venture into adjacent habitats, including grassland, oak savanna, and occasionally oak-bay woodland. Swaim (1994) recorded male Alameda whipsnake homeranges of 1.9 ha (4.7 acres) to 8.8 ha (21.7 acres).

Grassland habitats are used by male whipsnakes most extensively during the mating season in spring. Female whipsnakes use grassland areas most extensively after mating, possibly in their search for suitable egg-laying sites (Swaim 1994). Rock outcrops can be an important feature of Alameda whipsnake habitat because they provide retreat opportunities for whipsnakes and support lizard populations. Lizards, especially the western fence lizard (Sceloporus occidentalis), appear to be the primary prey item of whipsnakes (Stebbins 2003, Swaim 1994, Ellis 1987), although other prey items are taken, including skinks, frogs, snakes, and birds (Stebbins 2003, Swaim 1994).

Alameda whipsnake retreat in November into hibernacula and have been reported emerging March-April, with the males emerging from their hibernacula first (Ellis 1987). Courtship and mating occurs from late-March to mid-June. Hatchlings emerge in the first part of August through November (Swaim, pers. comm. 1996).

San Joaquin Whipsnake

The San Joaquin whipsnake (*Masticophis flagellum ruddocki*), a California Species of Special Concern, inhabits open hillsides with little or no tree cover, oak and pine woodlands, grassy areas, dunes, and saltbush scrub vegetation, and typically uses rodent burrows, rocks, or bushes for refugia. The species' known range extends eight miles west of Arbuckle in Colusa County southward to the Kern County portion of the San Joaquin Valley and westward into the South Coast Ranges. An isolated population occurs in the Sutter Buttes (Stebbins 1985, Jennings and Hayes 1994).

Western Pond Turtle

The western pond turtle, a California Species of Special Concern, originally inhabited many of the pacific drainage basins in California (Stebbins 2003). This medium sized turtle ranges in size to just over 8 inches (21cm) with a low carapace that is generally olive, brownish or blackish (Stebbins 2003, Jennings and Hayes 1994). Primary habitats include permanent water sources such as ponds, streams and rivers. It is often seen basking on logs, mud banks or mats of vegetation, although wild populations are wary and individuals will often flee after detecting movement from a considerable distance. Although it is an aquatic species with webbed feet, it can over-winter on land or in water or remain active during the winter, depending upon environmental conditions (Rathbun *et al.* 1993, Jennings and Hayes 1994). Females travel from aquatic sites into open, grassy areas to lay eggs in a shallow nest 2-400 meters (7-1300 feet) or more away from water bodies (Holland 1992, Rathbun *et al.* 1992, Jennings and Hayes 1994). It appears that most hatchlings overwinter in the nest (Holland 1992, Jennings and Hayes 1994), and placing nests away from watercourses makes young less susceptible to death by flood events that commonly occur during the winter (Rathbun *et al.* 1992). Additional explanations for placing nests away from watercourses include avoidance of predators such as raccoon, and sex determination, which may be affected by temperature (Rathbun *et al.* 1992).

Western pond turtles may live for 40 years or more (Jennings and Hayes 1994), and are therefore sometimes found in degraded areas. Adults appear to be able to persist for several years in poor aquatic habitat without any successful recruitment, presumably due to introduced predators or unsuitable conditions for egg deposition.

California Horned Lizard

The California horned lizard (*Phrynosoma coronatum frontale*), a California Species of Special Concern and a species tracked by the CNDDB, occupies a variety of open habitats including coastal scrub, oak savanna and grasslands (Stebbins 2003). Historically, the species ranged throughout the Central Valley and Coast Range from Sonoma County south to Santa Barbara, Kern and Los Angeles Counties where it likely intergrades with the San Diego horned lizard (*Phrynosoma coronatum blainvillei*). Despite a wide-ranging distribution, the species appears to be restricted to localized populations because of its close association with loose soils that have a high sand content (Jennings and Hayes 1994). However, local abundance and geographic distribution are poorly understood for this region. Horned lizards require open areas to forage and feed primarily on native harvester ants (*Pogonomyrmex barbatus*) species. The spread of introduced Argentine ants (*Linepithema humile*), which are toxic to horned lizards and eliminate native ants, has probably contributed significantly to localized extirpations in urban and semi-rural areas. The species cannot exist in areas that have been converted to agriculture, so its current distribution throughout the Central Valley is highly restricted.

Special- Status Birds

Raptors

Most raptors such as white-tailed kites (*Elanus leucerus*)and hawks (i.e. *Accipiter* spp. and *Buteo* spp.) nest in large trees and use twigs or branches as nesting material. Smaller raptors such as American kestrel (*Falco sparverius*) and western screech owl (*Otus kennicottii*) nest in cavities in anthropogenic structures and trees. Short-eared owl (*Asio flammeus*) and northern harriers (*Circus cyaneus*) nest on the ground in grasslands, agricultural fields, and marshes with moderate ground cover. Northern harriers, short-eared owls, and ferruginous hawks (*Buteo regalis*) (winter resident only) typically forage over open terrain in plains and foothills. Burrowing owls (*Athene cunicularia hypugea*) typically use small mammal burrows in open dry lands for shelter and nesting, but have been known to utilize any ground cavity of similar size as well as anthropogenic structures. The nesting period for raptors generally occurs between December 15 and August 31.

Suitable nesting and foraging habitat exists within the Specific Plan study area for many raptor species, especially those that can withstand high levels of disturbance such as red-tailed hawks (*Buteo jamaicensis*), American kestrels, and burrowing owls. Cultivated lands can provide a rich source of food and cover for a wide range of small mammal species, which in turn can be utilized as a prey base by raptors. Several mature trees occur along the roads and around the homesites, and provide highly suitable nesting habitat for raptors. Furthermore, ground squirrel burrows were observed over most of the Project Sites, including drier portions of irrigated fields, levees, berms, roadsides, and sand mounds.

Special-status raptors with the potential to nest, winter, or forage on the Project Sites and possibly the Program-Level Sites include the golden eagle (*Aquila chrysaetos*), a California Fully Protected Species, sharp-shinned hawk (*Accipiter striatus*), a California Watchlist Species, Cooper's hawk (*Accipiter cooperii*), a California Watchlist Species, white-tailed kite, a California Fully Protected Species and a species tracked by the CNDDB, Swainson's hawk (*Buteo swainsoni*), state-listed Threatened, northern harrier, a California Species of Special Concern, short-eared owl, a California Species of Special Concern, ferruginous hawk, a species tracked by the CNDDB and a California Species of Special Concern, merlin (*Falco columbarius*), and western burrowing owl, a California Species of Special Concern. Other raptors potentially nesting within the Specific Plan study area include red-tailed hawk, red-shouldered hawk (*Buteo lineatus*), American kestrel, great horned owl (*Bubo virginianus*), barn owl (*Tyto alba*), and western screech owl. All raptors are protected under the Federal Migratory Bird Treaty Act and California Fish and Game Code 3503 and 3503.5, which prohibits the taking or destroying of nest or eggs of any bird, except European starlings, English house sparrows, and rock doves (pigeons), and prohibits the taking or destroying of any bird or nest in the order of Falconiformes (falcons, kites, and hawks) and Strigiformes (owls).

Western Burrowing Owl

In California, the western burrowing owl, a California Species of Special Concern and a species tracked by the CNDDB, occurs in the Central Valley, inner and outer Coastal region, the San Francisco Bay Area, southern California Coast, from southern California to the Mexican Border, the Imperial Valley and in portions of the desert and high desert habitats in southeastern and northeastern California. Burrowing owls inhabit available burrows in flat, open areas characterized by dry vegetation that is typical of heavily grazed grasslands, low stature grasslands, or desert vegetation (Johnsgard 1988). Burrowing owls occur in deserts, plains and open grasslands, and in some cases, urban and agricultural landscapes. Burrowing owls require underground burrows or artificial, man-made structures for shelter and nesting, and are often associated with fossorial animals such as prairie dogs, ground squirrels, badgers and some canids. In the Bay Area, burrowing owls typically utilize burrows of Beechey (California) ground squirrel for denning. Burrows are used year-round and are an essential component to the life history of burrowing owls.

Burrowing owls are mostly crepuscular, being primarily active during the early morning and late evening hours, with some limited activity throughout the day. In general, burrowing owls primarily consume insects, amphibians, reptiles, and small mammals (Zarn 1974, Collins 1979). The breeding season for burrowing owl begins in the late winter and extends through late summer. Courtship is evident when males decorate burrow entrances with dung, feathers, shiny objects, and/or desiccated skins of various animals. In California, egg laying may begin as early as March in some areas (Zarn 1974) but typically begins in late April and early May (Thomsen 1971). Once eggs are laid, the female does the majority of incubating (although there are conflicting reports; see Coulombe 1971), which lasts approximately three to four weeks.

Swainson's Hawk

The Swainson's hawk, state-listed Threatened, occurs in open habitats throughout much of the western United States, Canada, and northern Mexico. Swainson's hawks breed in North America and winter in the open grassland areas of southern South America (pampas) as well as parts of Mexico. In the Central Valley, Swainson's hawk arrive at nesting areas in late February and early March, 4-6 weeks earlier than they arrive at nesting sites in northeastern California. They begin to depart for wintering areas in early September. In California, they breed in desert, shrub steppe, agricultural, and grassland habitats. Swainson's hawk construct their nests in a variety of tree species in existing riparian forests, remnant riparian trees, shade trees at residences and alongside roads, planted windbreaks, and solitary upland oaks. However, they typically do not nest in large continuous patches of woodland other than along edges next to open habitats (England *et al.* 1997). The diet of Swainson's hawk varies considerably during breeding and non-breeding seasons. They depend largely on small mammals during the breeding season and shift to feeding on insects during the non-breeding season, particularly

crickets and grasshoppers. During the breeding season, Swainson's hawk will travel long distances (up to 18 miles) in search of suitable foraging habitat that provides abundant prey (Estep 1989). The vegetation types/agricultural crops considered suitable foraging habitat for Swainson's hawk due to the availability of small mammals and insects include alfalfa, fallow fields, beet, tomato, and other low-growing row or field crops, dry land and irrigated pasture, rice land (when not flooded), and cereal grain crops (including corn after harvest) (CDFG 1994).

Passerines and Nonpasserine Landbirds

Passerines (perching birds) are a taxonomic grouping that consists of several families including swallows (*Hirundinidae*), larks (*Alaudidae*), crows, ravens and jays (*Corvidae*), shrikes (*Laniidae*), vireos (*Vireonidae*), finches (*Fringillidae*) and Emberizids (*Emberizidae*, warblers, sparrows, blackbirds, *etc.*), among others. Non-passerine land birds are a non-taxonomic based grouping typically used by ornithologists to categorize a loose assemblage of birds. Families grouped into this category include kingfishers (*Alcedinidae*), woodpeckers (*Picidae*), swifts (*Apodidae*), hummingbirds (*Trochilidae*) and pigeons and doves (*Columbidae*), among others. Habitat, nesting and foraging requirements for these species are wide ranging, therefore outlining generic habitat requirements for this grouping is difficult. These species typically use most habitat types and are known to nest on the ground, in shrubs and trees, on buildings, under bridges, and within cavities, crevices and manmade structures. Many of these species migrate long distances and all species except starlings, English house sparrows, and rock doves (pigeons), are protected under the Federal Migratory Bird Treaty Act. The nesting period for passerines and non-passerine land birds occurs between February 1 and August 31.

Special-Status Mammals

Special-Status Bat Species

There are 24 known species of bats in California. Of those, 13 are species tracked by the CNDDB and 11 are California Species of Special Concern (CDFG 2008b). Bats use a wide variety of roost sites in California and are site-faithful, rarely abandoning an established roosting area unless disturbed. Hibernation and roosting areas depend on the location of the roost and the species. Natural roost sites include caves, tree hollows, rock crevices, exfoliating tree bark, and rotting wood in snags. Suitable man-made roost sites include buildings, mines and bridges (Constantine 1961, Davis and Cockrum 1963, Fenton 1983, Kunz 1982).

Roost sites provide thermoregulation for bats as they sleep, rest while foraging, hibernate, mate, socialize, and consume prey. Most of these activities occur at particular times of the day and roosts are generally classified as either day or night roosts (Kunz 1982). Since bats are nocturnal, day roosts typically provide resting sites, while night roosts are associated with temporary resting and intra-specific communication

throughout periods of foraging. Depending on the species, day roosts, generally consist of crevices and cavities where males roost separate from females, and where breeding and maternal care may take place in addition to rest.

San Joaquin Kit Fox

The San Joaquin kit fox, federally-listed Endangered and state- listed Threatened, is one of seven subspecies of kit fox and is considered the most genetically distinct (Mercure *et al.* 1993). The San Joaquin kit fox is the smallest North American canid (member of the dog family, Canidae). Adult males weigh approximately 2.3 kilograms (approximately 5 lbs.) and adult females weigh 2.1 kilograms (about 4.6 lbs.), on average (Morrell 1972). Historically, the San Joaquin kit fox occurred extensively throughout California's Central Valley and parts of the Salinas and Santa Clara valleys. Kit fox currently inhabit some areas of suitable habitat on the San Joaquin Valley floor and in the surrounding foothills of the coastal ranges, Sierra Nevada, and Tehachapi Mountains, from southern Kern County north to Contra Costa, Alameda, and San Joaquin Counties on the west, and near La Grange, Stanislaus County on the east side of the Valley and some of the larger scattered islands of natural land on the Valley floor in Kern, Tulare, Kings, Fresno, Madera, and Merced Counties (taken from the Recovery Plan for Upland Species of the San Joaquin Valley, California, USFWS 1998).

A number of reviews of the distribution of kit fox in the northern portion of their range have been prepared (Laughrin 1970, Swick 1973, Morrell 1975, USFWS 1983, Orloff *et al*. 1986, Wesler 1987, Bell 1994, H.T. Harvey and Associates 1997, USFWS 1998). Detection of kit fox in the past decade in the Black Diamond Mines East Bay Regional Park have extended the kit fox range farther north than earlier descriptions. San Joaquin kit foxes prefer habitats of open or low vegetation with loose soils. In the northern portion of their range, they occupy grazed grasslands and to a lesser extent valley oak woodlands. In the southern and central portion of the Central Valley, San Joaquin kit foxes are found in valley sink scrub, valley saltbrush scrub, Upper Sonoran subshrub scrub, and annual grassland (USFWS 1998). San Joaquin kit foxes are also found in grazed grasslands, urban settings and in areas adjacent to tilled or fallow fields (USFWS 1998). The San Joaquin kit foxes requires underground dens to raise pups in order to avoid predators (Golightly and Ohmart 1984) and to regulate temperature and avoid other adverse environmental conditions. In the northern portion of their range, burrowing mammals, primarily ground squirrels usually provide these holes. Dens are usually located on loose-textured soils on slopes less than 40 degrees (O'Farrell 1980).

Salt Marsh Harvest Mouse

The salt marsh harvest mouse, state- and federally-listed Endangered, inhabits tidally influenced, saline or brackish marshes dominated by dense stands of pickleweed, but will use adjacent upland habitats for foraging and escape cover. They are highly dependent on cover and are most abundant in areas of tall, dense vegetation dominated

by pickleweed, especially when mixed with fat hen (*Atriplex patula*), Australian salt bush (*Atriplex semibaccata*), alkali heath, and saltgrass (Fisler 1965).

Special-Status Fish

Fisheries and Aquatic Resources

Aquatic resources (i.e., aquatic habitats) in the WSMP 2040 Preferred Portfolio Study Area include Central Valley and Upcountry river systems and reservoirs, the Sacramento-San Joaquin Delta (Delta), the San Francisco Bay estuary (Bay) and tributaries. These aquatic resources provides vital fish spawning, rearing, and/or migratory habitat for a diverse assemblage of native and nonnative fish species (see Table 4.2.C-2). Native species can be separated into anadromous (i.e., species that spawn in fresh water after migrating as adults from marine habitat) and resident species.

Central Valley Rivers and Upcountry Reservoirs

Primary aquatic habitats in the Central Valley and Upcountry area with the potential to be influence by implementation of the program components include the Sacramento River, Mokelumne River, Pardee Reservoir, Lake Comanche, and Lower Bear Reservoir.
The use of different portions of aquatic resources by various fish species in these aquatic habitats is influenced by variations in habitat conditions, and by the habitat requirements, life history, and daily and seasonal movements and behavior of each species.
The distribution of common native fishes in these habitats reflects the historical distribution of common native fishes in the larger Central Valley drainage combined with introduced nonnative species and alterations to habitats.

Water resource development and management, and land modification activities resulting primarily from agriculture and urbanization have altered the Central Valley rivers and resulted in the creation of reservoirs. Importantly, many of these alterations have resulted in a reduction in the amount favorable floodplain and shaded riverine aquatic (SRA) habitat in certain reaches of the river systems. SRA habitat is defined as the nearshore aquatic habitat occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this cover type are: (1) an adjacent bank composed of natural, eroding substrates supporting riparian vegetation that either overhang or protrude into the water; and (2) water that contains variable amounts of woody debris, such as leaves, logs, branches, and roots and has variable depths, velocities, and currents. Riparian habitat provides structure (through SRA habitat) and food for fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of large woody debris (LWD) that furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates.

Delta

The Delta represents the most important, complex, and controversial geographic area for both anadromous fisheries production and distribution of California water resources for numerous beneficial uses. Approximately 42 percent of the State's annual runoff flows through the Delta's maze of channels and sloughs surrounding 57 major reclaimed islands (WEF 1992). The Delta's channels are used to transport water from upstream reservoirs to the south Delta, where Federal and State facilities pump water for agricultural and municipal uses.

Environmental conditions in the Delta depend primarily on the physical structure of Delta channels, inflow volume and source, Delta exports and diversions, and tides. These factors also determine outflow and the location of the entrapment zone, which is an area of high organic carbon that is critically important to a number of fish and invertebrate species, as well as to the overall ecology of the Delta. In addition to these physical factors, environmental conditions such as water temperature, predation, food production and availability, competition with introduced exotic fish and invertebrate species, and pollutant concentrations all contribute to interactive, cumulative conditions that have substantial effects on Delta fish populations.

San Francisco Bay Region

The San Francisco Bay region is predominantly developed for urban and industrial uses with limited anadromous fisheries. The region contains numerous small streams and reservoirs used primarily for domestic water supply. All anadromous species use these habitats, with the exception of some American shad and striped bass that complete their entire life cycles within the Delta and upstream. The four runs of Chinook salmon and steelhead migrate as adults from the Pacific Ocean, through San Francisco Bay and into their natal rivers, while salmon and steelhead smolts migrate downstream through the Bay on their way to the ocean.

Steelhead

The Central Valley steelhead ESU is a Federally-threatened species. The Central Valley steelhead includes all naturally spawned populations of steelhead in the Sacramento and San Joaquin rivers and their tributaries (63 Federal Register [FR] 13347). Steelhead have a complex life history, including the capability to be anadromous or resident (called rainbow trout) (Moyle 2002). Species that are anadromous spend most or a portion of their adult life in the ocean and then migrate back into freshwater to reproduce. Spawning and rearing habitat for steelhead typically occurs in perennial streams with clear, cool to cold, fast flowing water with a high dissolved oxygen content and abundant gravels and riffles. After spending 1–4 years in the ocean, adult steelhead return to their home streams to spawn (Moyle 2002).

Chinook Salmon

The Sacramento River winter-run Chinook salmon ESU is listed as endangered by State and Federal agencies. Central Valley spring-run Chinook are State and Federally listed as threatened. The Central Valley fall/late fall-run Chinook salmon ESU are Federal Species of Concern. Fall-run chinook salmon is the most widely distributed and most numerous run occurring in the Sacramento and San Joaquin rivers and their tributaries (Moyle 2002). Chinook salmon is an anadromous fish species that requires cold, freshwater streams with suitable gravel for reproduction. After spending 2–4 years maturing in the ocean, Chinook salmon return to their natal streams to spawn (Moyle 2002). After spawning, eggs generally hatch in 6–12 weeks, and newly emerged larvae remain in the gravel for another 2–4 weeks until the yolk is absorbed. Juveniles typically rear in fresh water for up to 5 months before migrating to sea. Unlike steelhead, adult Chinook salmon die after spawning (Moyle 2002).

Green Sturgeon

The Southern Distinct Population Segment (DPS) of the green sturgeon is Federally listed as threatened. They occur in the WSMP 2040 area in the Sacramento River, tributaries, and Delta. Spawning takes place in cold, freshwater streams with suitable gravel once every three to four years, when adults move from the Pacific Ocean into these rivers and hydrologically connected rivers such as the Eel River, where they mate and lay eggs in deep pools. Young sturgeon spend several years in the natal river and estuary system before venturing out into the open ocean, where they have been known to travel extensively along the coast.

Delta Smelt

The delta smelt has been listed as threatened by both State and Federal agencies. Delta smelt are endemic to the Sacramento-San Joaquin Delta estuary. Delta smelt inhabit the freshwater portions of the Delta and Sacramento and San Joaquin rivers and the low-salinity portions of Suisun Bay. Delta smelt typically have a 1-year lifecycle, although a small percentage of the adults may live to year two. Adult delta smelt migrate upstream into channels and sloughs of the Delta during fall and winter in preparation for spawning. They spawn in tidally influenced freshwater wetlands and seasonally submerged uplands and rear in seasonally inundated floodplains, tidal marsh in the Delta.

Longfin Smelt

Longfin smelt are under consideratrion by the US Fish and Wildlife Service for listing under the Endangered Species Act. Longfin smelt in California are primarily an anadromous estuarine species that can tolerate salinities ranging from freshwater to nearly pure seawater. Their spatial distribution within a Bay-Delta estuary is seasonally variable: they are found closer to the ocean during summer whereas they move upstream in cool seasons. Longfin smelt move into freshwater to spawn, with the peak

breeding season occurring between February and April. Longfin smelt typically die after spawning though a few females may survive another year. The eggs hatch in around 40 days and the larvae are washed downstream into the estuary. In the San Francisco estuary high stream flows seem to lead to higher resulting populations of smelt. Larvae are mobile and move according to salinity preferences. In 30-60 days the larvae transform into juvenile fish (Calfish 2008).

Sacramento Splittail

Sacramento splittail was de-listed from its Federal Threatened status in 2003 but remains a California Species of Special Concern. This large cyprinid (minnow family) is endemic to California and occurs in sloughs, lakes, and rivers of the Central Valley (Moyle 2002). Splittail typically live eight years or more (McGinnis 2006) and reach sexual maturity by the end of their second year. During winter and spring adult splittail move upstream to forage and later spawn between late February and early July (Calfish 2008). Spawning occurs in flooded vegetation and debris on floodplains inundated by high spring flows (Moyle 2002). The larvae remain in the vegetation for 10-14 days where they have adequate cover and access to small prey. Young-of-year splittail move into the estuary in April-August where they occupy shallow water habitats.

Hardhead

Hardhead is a California Species of Special Concern. It is a large minnow that resembles the pikeminnow. It prefers clear, deep pools and runs with sand-gravel-boulder substrates and slow water velocities. Most of the streams in which it occurs have summer temperatures in excess of 15.5 °C. However, hardhead tends to be absent from streams that have been severely altered by humans and where introduced species, especially sunfish, predominate (Moyle 2002). Hardhead is widely distributed in low to mid-elevation streams in the main Sacramento-San Joaquin river drainage. Despite its widespread distribution, hardhead populations are increasingly isolated from one another, making them vulnerable to local extinctions (Moyle 2002). As a result, hardhead is much less abundant than it once was (Moyle 2002).

San Joaquin Roach

San Joaquin roach is a California species of special concern. It is one of six subspecies of California roach. San Joaquin roach is a small native minnow found throughout the San Joaquin river drainage (Moyle 2002). San Joaquin roach is abundant in a large number of streams but is now absent from many stream reaches where it once occurred. San Joaquin roach is generally found in small, warm streams. Dense populations are also frequently sighted in isolated pools in intermittent streams. However, within a watershed, roach can be found in a diversity of habitats, from cool headwater streams to warm water areas characterizing many lower stream reaches. It appears to be excluded from many waters by piscivorous (fish-eating) fishes, especially in habitats occupied by

introduced piscivorous fishes. Roach is tolerant of relatively high water temperatures (30-35°C) and low oxygen levels, a characteristic that enables it to survive in conditions too extreme for other fishes (Moyle 2002). Roach reach maturity at 2 or 3 years of age. Spawning occurs between March through early July, when water temperatures exceed 15.5 °C (Moyle 2002). Spawning occurs in pools and side pools of small rivers and creeks. Juveniles rear in pools of small rivers and creeks. San Joaquin roach occur in the WSMP 2040 in the San Joaquin River and tributaries and Delta.

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APPENDIX D
AIR QUALITY

Appendix D: Air Quality

Topography, Meteorology, and Climate

EBMUD Service Area (San Francisco Bay Area Air Basin)

The San Francisco Bay Area Air Basin (SFBAAB) covers an area of approximately 5,540 square miles and is characterized by complex terrain consisting of mountain ranges, inland valleys, and bays, which distort normal wind flow patterns. The SFBAAB is generally bounded on the west by the Pacific Ocean, on the north by the Coast Range, and on the east and south by the Diablo Range.

The climate is dominated by the strength and location of a semi-permanent, subtropical high-pressure cell over the northeastern Pacific Ocean. Climate is also affected by the moderating effects of the adjacent oceanic heat reservoir. Mild summers and winters, moderate rainfall, daytime onshore breezes, and moderate humidity characterize Bay Area regional climatic conditions. In the summer, when the high-pressure cell is strongest and farthest north, fog forms in the morning and temperatures are mild. In the winter, when the high-pressure cell is weakest and farthest south, occasional rainstorms occur.

Central Valley (San Joaquin Valley and Sacramento Valley Air Basins)

San Joaquin Valley Air Basin

The San Joaquin Valley Air Basin (SJVAB), which occupies the southern half of the Central Valley, is approximately 250 miles long and, on average, 35 miles wide. The SJVAB includes San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, and Tulare Counties, as well as the western portion of Kern County. The SJVAB is a well-defined climatic region, with distinct topographic features on three sides. The Coast Range, which has an average elevation of 3,000 feet, forms the western border of the SJVAB. The San Emigdio Mountains, which are part of the Coast Range, and the Tehachapi Mountains, which are part of the Sierra Nevada, are both located on the south side of the SJVAB. The Sierra Nevada forms the eastern border of the SJVAB. The northernmost portion of the SJVAB is San Joaquin County. There is no topographic feature delineating the northern edge of the basin. The SJVAB is predominately flat with a downward gradient in terrain to the northwest. Air flows into the SJVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Sacramento-San Joaquin River Delta (Delta) from the San Francisco Bay Area. The mountains surrounding the SJVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution.

The inland Mediterranean climate type of the SJVAB is characterized by hot, dry summers and cool, rainy winters. The climate is a result of the topography and the strength and location of a semi-permanent, subtropical high-pressure cell. During summer, the Pacific high-pressure cell is centered over the northeastern Pacific Ocean, resulting in stable meteorological conditions and a steady northwesterly wind flow. Upwelling of cold ocean water from below to the surface as a result of the northwesterly flow produces a band of cold water off the California coast. Daily summer high temperatures often exceed 100°F, averaging in the low 90s in the north and high 90s in the south. Throughout the entire SJVAB, daily summer high temperatures average 95°F. Over the last 30 years, temperatures in the SJVAB averaged 90°F or higher for 106 days a year and 100°F or higher for 40 days a year. The daily summer temperature variation can be as high as 30°F (SJVAPCD 2002). In winter, the Pacific high-pressure cell weakens and shifts southward, resulting in wind flow offshore, the absence of upwelling, and the occurrence of storms. Average high temperatures in the winter are in the 50s, and the average daily low winter temperature is 45°F, but lows in the 30s and 40s can occur on days with persistent fog and low cloudiness (SJVAPCD 2002).

A majority of the precipitation in the SJVAB occurs as rainfall during winter storms. The rare occurrence of precipitation during the summer is in the form of convective rain showers. The amount of precipitation in the SJVAB decreases from north to south primarily because of the Pacific storm track. The Pacific storm track often passes through the northern part of the SJVAB, depositing precipitation while the southern portion remains protected by the Pacific high-pressure cell, which deflects the Pacific storm track. Stockton in the northern part of the air basin receives about 20 inches of precipitation per year, Fresno, in the center, receives about 10 inches per year, and Bakersfield at the southern end receives less than 6 inches per year. Average annual rainfall for the entire SJVAB is approximately 9.25 inches on the valley floor (SJVAPCD 2002).

The winds and unstable atmospheric conditions associated with the passage of winter storms result in periods of low air pollution and excellent visibility. Precipitation and fog tend to reduce or limit some pollutant concentrations. For instance, clouds and fog block sunlight, which is required to fuel photochemical reactions that form ozone. Because carbon monoxide (CO) is partially water soluble, precipitation and fog also tend to reduce CO concentrations in the atmosphere. In addition, respirable particulate matter (PM_{10}) can be washed from the atmosphere during rain events. However, between winter storms, high pressure and light winds lead to the creation of low-level temperature inversions and stable atmospheric conditions, resulting in the concentration of air pollutants (e.g., CO and PM_{10}).

Summer is considered the ozone season in the SJVAB. This season is characterized by poor air movement in the mornings and longer daylight hours, which together provide a plentiful amount of sunlight to fuel photochemical reactions between reactive organic

gases (ROG) and oxides of nitrogen (NO_X), resulting in ozone formation. During the summer, wind speed and direction data indicate that summer wind usually originates at the north end of the San Joaquin Valley and flows in a south-southeasterly direction through the San Joaquin Valley, through Tehachapi Pass, and into the Southeast Desert Air Basin (SJVAPCD 2002).

Sacramento Valley Air Basin

The Sacramento Valley Air Basin (SVAB) is comprised of all of Butte, Colusa, Glenn, Sacramento, Sutter, Shasta, Tehama, Yolo, and Yuba Counties, the western portion of Placer County, and the eastern portion of Solano County. Land within the SVAB is relatively flat, bordered by the north Coast Range to the west and the northern Sierra Nevada to the east. Air flows into the SVAB through the Carquinez Strait, the only breach in the western mountain barrier, and moves across the Delta from the San Francisco Bay Area.

The Mediterranean climate of the project area is characterized by hot, dry summers and cool, rainy winters. During the summer, daily temperatures range from 50°F to more than 100°F. The inland location and surrounding mountains shelter the area from many of the ocean breezes that keep the coastal regions moderate in temperature.

Most precipitation in the SVAB results from air masses that move in from the Pacific Ocean, usually from the west or northwest during the winter months. More than half the total annual precipitation falls during the winter rainy season (November–February); the average winter temperature is a moderate 49°F. Periods of dense and persistent low-level fog, which are most prevalent between storms, are common during the winter months in the SVAB. The prevailing winds are moderate in speed and vary from moisture-laden breezes from the south to dry-land flows from the north.

The mountains surrounding the SVAB create a barrier to airflow, which leads to the entrapment of air pollutants when meteorological conditions are unfavorable for transport and dilution. Poor air movement occurs most frequently in fall and winter when high-pressure cells are present over the project area and meteorological conditions are stable. The lack of surface winds during these periods, combined with the reduced vertical flow caused by less surface heating, reduces the influx of air and results in the concentration of pollutants. Surface concentrations of air pollutant emissions are highest when these conditions occur in combination with agricultural burning activities or temperature inversions, which hamper dispersion by creating a ceiling over the area and trapping air pollutants near the ground.

As discussed above for the SJVAB, winds and unstable atmospheric conditions in the SVAB associated with the passage of winter storms result in periods of low air pollution and excellent visibility.

May–October is ozone season in the SVAB, and is characterized by poor air movement in the mornings and the arrival of the Delta sea breeze from the southwest in the afternoons. In addition, longer daylight hours provide a plentiful amount of sunlight to fuel photochemical reactions between ROG and NO_X, which in turn result in ozone formation. Typically, the Delta breeze transports air pollutants northward out of the SVAB; however, during approximately half of the time from July to September, a phenomenon known as the Schultz Eddy prevents this from occurring. The Schultz Eddy phenomenon causes the wind pattern to shift southward, blowing air pollutants back into the SVAB. This phenomenon exacerbates the concentration of air pollutant emissions in the air basin and contributes to violations of the ambient air quality standards.

Upcountry (Mountain Counties Air Basin)

The Mountain Counties Air Basin (MCAB) includes Plumas, El Dorado, Amador, Calaveras, Tuolumne, and Mariposa Counties, as well as the northeast portion of Sierra County and the eastern portion of Placer County. Elevations within the MCAB vary from less than 1,000 feet above sea level in the west to more than approximately 6,000 feet above sea level in the east. The general climate in the MCAB varies considerably with elevation and proximity to the Sierra Nevada crest. The terrain features of the MCAB make it possible for various climates to exist in relatively close proximity. The pattern of mountains and hills causes a wide variation in rainfall, temperature, and localized winds throughout the MCAB.

The local topographical and meteorological conditions in the MCAB largely determine the effect of air pollutant emissions in the basin. Regional airflows are affected by the mountains and hills, which direct surface airflows, cause shallow vertical mixing, and hinder dispersion, thereby creating areas of high pollutant concentrations. Inversion layers, where warm air overlies cooler air, frequently occur and trap pollutants close to the ground. In the winter, these conditions can lead to CO “hot spots” along heavily traveled roads and at busy intersections. During the summer, longer daylight hours, stagnant air, high temperatures, and plentiful sunshine provide the energy needed to fuel photochemical reactions between ROG and oxides of nitrogen NO_X, which in turn result in ozone formation.

Relative humidity in the basin is generally in the moderate to low range. Precipitation is moderate to occasionally heavy in the winter; the normal annual precipitation, which occurs primarily from November through March, is approximately 35 inches. January temperatures range from a normal minimum of 36°F to a normal maximum of 54°F. July temperatures range from a normal minimum of 62°F to a normal maximum of 93°F (NOAA 1992). The predominant wind direction and speed is from the south-southwest at less than 9 miles per house (mph), although winds can reach high speeds during storms (ARB 1994).

Criteria Air Pollutants

Concentrations of several air pollutants—ozone (O_3), CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead—are used as indicators of ambient air quality conditions. These pollutants are commonly referred to as "criteria air pollutants" because they are the most prevalent air pollutants known to be deleterious to human health, and extensive documentation is available on the health-effects criteria for these pollutants.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of ROG and NO_X in the presence of sunlight. ROG are volatile organic compounds (VOCs) that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NOx are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.

A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high ROG and NO_X levels are present to sustain the ozone formation process. Once the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional scale, ozone is a regional pollutant.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 part per million (ppm) to 0.40 ppm for 1–2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes (the amount of air inhaled and exhaled), and impairing respiratory mechanics. Ambient levels of ozone

above 0.12 ppm are linked to such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increased response of the respiratory system to challenges, and a decrease in the immune system's ability to defend against infection (Godish 2004).

Emissions of the ozone precursors ROG and NO_X have decreased over the past several years because of more stringent motor vehicle standards and cleaner burning fuels. However, ozone continues to be a major concern in California. Peak levels within the state have not declined as much as the number of days that standards are exceeded. From 1990 to 2006, the maximum peak 8-hour indicator decreased by 37 percent. The numbers of state and national 8-hour exceedance days have declined by 43 and 44 percent, respectively. Most of this progress has occurred since 2003. However, the numbers of exceedance days in 2005 and 2006 were among the lowest in this 17-year period (ARB 2008a). Data from 2006 showing the trend in 3-year averages of 8-hour ozone data indicate that only Lake County, North Central Coast, North Coast, and Northeast Plateau Air Basins now attain the federal 8-hour ozone standard (ARB 2008a).

Carbon Monoxide

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 81 percent of California's CO emissions are from mobile sources. The other 19 percent consists of CO emissions from area-wide and stationary sources such as wood-burning stoves, incinerators, and industrial sources (ARB 2008a).

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (USEPA 2008a).

The highest CO concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to problems caused by ozone, which tends to be a regional pollutant, CO problems tend to be localized.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines.

Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (USEPA 2008a).The combined emissions of NO and NO_2 are referred to as NO_X and reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (i.e., ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Due to the relatively low solubility of NO_2 in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms such as coughing, difficulty with breathing, vomiting, headache, and eye irritation during or shortly after exposure. After a period of approximately 4–12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has occasionally been linked with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung function (USEPA 2008a).

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant; constriction of the bronchioles occurs with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources; construction operations; fires and natural windblown dust; and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (USEPA 2008a). Fine particulate matter (i.e., $PM_{2.5}$) is a subgroup of PM_{10}, consisting of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2008a).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons (PAH), and other toxic substances adsorbed onto fine particulate matter (referred to as the “piggybacking effect”), or with fine dust particles of

silica or asbestos. Generally, effects may result from both short-term and long-term exposure to elevated concentrations of PM_{10} and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis, and premature death (USEPA 2008a). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Direct emissions of PM_{10} increased in California from 1975 and 2005 and are projected to increase through 2020. PM_{10} emissions in California are dominated by emissions from areawide sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, dust from farming operations, fugitive dust from construction and demolition, and residential fuel combustion. Annual average $PM_{2.5}$ emissions in California decreased slightly from 1999 through 2005, with more significant drops in 2001 and 2003. However, $PM_{2.5}$ emissions are also projected to increase through 2020. $PM_{2.5}$ emissions in California are dominated by emissions from the same areawide sources as PM_{10} (ARB 2008a).

Lead

Lead is a metal found naturally in the environment and in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline (discussed in detail below), metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the U. S. Environmental Protection Agency (USEPA) set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. USEPA banned the use of leaded gasoline in highway vehicles in December 1995 (USEPA 2008a).

As a result of USEPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95 percent between 1980 and 1999), and levels of lead in the air decreased by 94 percent between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13 percent of lead emissions. A National Health and Nutrition Examination Survey reported a 78 percent decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded gasoline (USEPA 2008a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story with regard to air quality management. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent California Air

Resources Board (ARB) regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard USEPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a TAC.

Emissions Inventory

ARB maintains an emissions inventory for criteria air pollutants for each county and basin within California, as shown in Tables D-1, D-2, D-3 and D-4.

Odor

The human nose is the sole sensing device for odors. The ability to detect odors varies considerably among the population and is quite subjective. Some individuals can smell very minute quantities of specific substances; others may not have the same sensitivity but may be sensitive to odors of other substances. In addition, people may have different reactions to the same odor; an odor that is offensive to one person (e.g., an odor from a fast food restaurant) may be perfectly acceptable to another. It is important to also note that an unfamiliar odor is more easily detected and is more likely to cause complaints than a familiar one. This is because of the phenomenon known as odor fatigue, in which a person can become desensitized to almost any odor and recognition occurs only with an alteration in the intensity.

Quality and intensity are two properties present in any odor. The quality of an odor indicates the nature of the smell experience. For instance, if a person describes an odor as flowery or sweet, then the person is describing the quality of the odor. Intensity refers to the strength of the odor. For example, a person may use the word "strong" to describe the intensity of an odor. Odor intensity depends on the odorant concentration in the air. When an odorous sample is progressively diluted, the odorant concentration decreases. As this occurs, the odor intensity weakens and eventually becomes so low that the odor is quite difficult to detect or recognize. At some point during dilution, the concentration of the odorant reaches a detection threshold. An odorant concentration below the detection threshold means that the concentration in the air is not detectable by the average human.

Industries and/or facilities that are likely to emit objectionable odors include wastewater treatment plants, landfills, composting facilities, petroleum refineries, chemical and fiberglass manufacturers, among others.

Table D-1: Summary of 2006 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (San Francisco Bay Area Air Basin)

SOURCE TYPE/CATEGORY	ESTIMATED ANNUAL AVERAGE EMISSIONS (TONS PER DAY)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary Sources						
Fuel Combustion	4.1	34.4	42.7	15.3	4.9	4.8
Waste Disposal	2.6	0.0	0.2	0.0	0.0	0.0
Cleaning and Surface Coating	31.6	0.0	0.0	-	0.0	-
Petroleum Production and Marketing	23.7	0.6	0.8	22.6	0.8	0.7
Industrial Processes	11.3	1.6	3.9	7.7	9.6	5.8
Subtotal (Stationary Sources)	73.3	36.6	47.6	45.6	15.3	11.4
Areawide Sources						
Solvent Evaporation	70.9	-	-	-	-	-
Miscellaneous Processes	17.2	177.9	19.7	0.6	176.1	53.0
Subtotal (Areawide Sources)	88.0	177.9	19.7	0.6	176.1	53.0
Mobile Sources						
On-Road Motor Vehicles	128.4	1,229.9	233.7	1.9	10.4	7.4
Other Mobile Sources	79.4	484.5	191.1	6.9	11.1	9.9
Subtotal (Mobile Sources)	207.9	1,714.4	424.8	8.8	21.5	17.3
Total for San Francisco Bay Area Air Basin	**369.2**	**1,928.9**	**492.0**	**55.1**	**212.8**	**81.7**

Notes:

ROG = reactive organic gases; CO = carbon monoxide; NO_X = oxides of nitrogen; SO_X = oxides of sulfur; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

Source: ARB 2008b

Table D-2: Summary of 2006 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (San Joaquin Valley Air Basin)

SOURCE TYPE/CATEGORY	ESTIMATED ANNUAL AVERAGE EMISSIONS (TONS PER DAY)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary Sources						
Fuel Combustion	6.6	49.4	87.2	14.2	6.8	6.8
Waste Disposal	2.4	0.2	0.2	0.0	0.1	0.1
Cleaning and Surface Coating	14.9	0.0	0.0	-	0.1	0.1
Petroleum Production and Marketing	36.8	0.6	0.4	0.1	0.1	0.1
Industrial Processes	18.3	4.0	19.9	6.9	16.7	9.6
Subtotal (Stationary Sources)	79.0	54.2	107.7	21.3	23.9	16.7
Areawide Sources						
Solvent Evaporation	58.7	-	-	-	-	-
Miscellaneous Processes	88.8	268.7	18.1	1.1	248.1	67.0
Subtotal (Areawide Sources)	147.5	268.7	18.1	1.1	248.1	67.0
Mobile Sources						
On-Road Motor Vehicles	92.2	828.9	379.3	3.0	17.0	14.0
Other Mobile Sources	61.2	338.2	149.1	2.5	9.8	8.9
Subtotal (Mobile Sources)	153.4	1,167.1	528.4	5.5	26.8	22.9
Total for San Joaquin Valley Air Basin	**380.0**	**1,490.0**	**654.3**	**27.9**	**298.7**	**106.7**

Notes:

ROG = reactive organic gases; CO = carbon monoxide; NO_X = oxides of nitrogen; SO_X = oxides of sulfur; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

Source: ARB 2008b

Table D-3: Summary of 2006 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (Sacramento Valley Air Basin)

SOURCE TYPE/CATEGORY	ESTIMATED ANNUAL AVERAGE EMISSIONS (TONS PER DAY)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary Sources						
Fuel Combustion	3.1	36.4	32.8	1.1	3.0	3.0
Waste Disposal	0.6	0.2	0.1	0.0	0.0	0.0
Cleaning and Surface Coating	9.7	0.5	0.0	0.0	0.0	0.0
Petroleum Production and Marketing	11.8	0.6	2.3	0.0	0.0	0.0
Industrial Processes	5.4	11.2	2.9	0.5	14.4	7.1
Subtotal (Stationary Sources)	30.5	48.9	38.1	1.6	17.4	10.2
Areawide Sources						
Solvent Evaporation	35.3	-	-	-	0.0	0.0
Miscellaneous Processes	26.0	284.7	9.2	0.8	198.3	54.0
Subtotal (Areawide Sources)	61.4	284.7	9.2	0.8	198.3	54.0
Mobile Sources						
On-Road Motor Vehicles	61.5	572.6	157.7	1.2	6.9	5.3
Other Mobile Sources	45.9	253.4	85.7	1.9	5.5	4.9
Subtotal (Mobile Sources)	107.5	826.0	243.3	3.2	12.4	10.2
Total for Sacramento Valley Air Basin	**199.4**	**1,159.6**	**290.7**	**5.6**	**228.1**	**74.4**

Notes:
ROG = reactive organic gases; CO = carbon monoxide; NO_X = oxides of nitrogen; SO_X = oxides of sulfur; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

Source: ARB 2008b

Table D-4: Summary of 2006 Estimated Emissions Inventory for Criteria Air Pollutants and Precursors (Mountain Counties Air Basin)

SOURCE TYPE/CATEGORY	ESTIMATED ANNUAL AVERAGE EMISSIONS (TONS PER DAY)					
	ROG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Stationary Sources						
Fuel Combustion	0.6	19.3	5.4	0.8	1.1	1.0
Waste Disposal	0.1	0.0	0.0	0.0	0.0	0.0
Cleaning and Surface Coating	1.8	-	-	-	0.0	0.0
Petroleum Production and Marketing	1.1	-	-	-	-	-
Industrial Processes	1.3	0.2	0.3	0.3	5.5	2.6
Subtotal (Stationary Sources)	4.9	19.6	5.6	1.1	6.6	3.5
Areawide Sources						
Solvent Evaporation	8.0	-	-	-	-	-
Miscellaneous Processes	21.9	304.1	4.6	1.0	114.6	40.5
Subtotal (Areawide Sources)	29.9	304.1	4.6	1.0	114.6	40.5
Mobile Sources						
On-Road Motor Vehicles	17.2	152.6	34.0	0.2	1.3	1.0
Other Mobile Sources	32.0	134.2	17.3	0.4	1.9	1.5
Subtotal (Mobile Sources)	49.2	286.8	51.2	0.7	3.2	2.5
Total for Mountain Counties Air Basin	**83.9**	**610.5**	**61.5**	**2.7**	**124.3**	**46.6**

Notes:
ROG = reactive organic gases; CO = carbon monoxide; NO_X = oxides of nitrogen; SO_X = oxides of sulfur; PM_{10} = respirable particulate matter; $PM_{2.5}$ = fine particulate matter

Source: ARB 2008b

Regulatory Setting

Regional Regulations

The WMSP 2040 Preferred Portfolio includes components that would be constructed in various regional and local jurisdictions. The following section describes the regional regulatory agencies that are responsible for maintaining air quality in the proposed project's disturbance area.

Bay Area Air Quality Management District

CEQA Guidelines

Management of air quality in the SFBAAB is the responsibility of the Bay Area Air Quality Management District (BAAQMD). The BAAQMD is responsible for bringing and/or maintaining air quality in the basin within federal and state air quality standards. Specifically, the BAAQMD has responsibility for monitoring ambient air pollutant levels throughout the basin and developing and implementing attainment strategies to ensure that future emissions will be within federal and state standards.

In April 1996, the BAAQMD prepared its *BAAQMD California Environmental Quality Act (CEQA) Guidelines* as a guidance document to provide lead government agencies, consultants and project proponents with uniform procedures for assessing air quality impacts and preparing the air quality sections of environmental documents for projects subject to CEQA. The *BAAQMD CEQA Guidelines* were last revised by the BAAQMD in December 1999. This document describes the criteria that the BAAQMD uses when reviewing and commenting on the adequacy of environmental documents. The *BAAQMD CEQA Guidelines* recommend thresholds for determining whether projects would have significant adverse environmental impacts, identify methodologies for predicting project emissions and impacts, and identify measures that can be used to avoid or reduce air quality impacts.

Air Quality Plans

2001 Ozone Attainment Plan. BAAQMD prepares ozone attainment plans (OAPs) for the national ozone standard and clean air plans (CAPs) for the California standard, both in coordination with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG). Past plans include the 2001 OAP and the 2000 CAP. The 2001 OAP is a revision to the Bay Area part of the SIP and was prepared in response to USEPA's partial disapproval of the 1999 OAP. The 2001 OAP for the national 1-hour ozone standard includes two commitments for further planning: (1) Conduct a midcourse review of progress toward attaining the national 1-hour ozone standard by December 2003; and (2) provide a revised ozone attainment strategy to USEPA by April 2004.

In July 2003, USEPA proposed an interim final determination that the 2001 OAP corrected the deficiencies of the 1999 plan and proposed approval of the 2001 OAP. After 3 years of low ozone levels (2001, 2002, and 2003), in October 2003, USEPA proposed a finding that the SFBAAB had attained the national 1-hour standard and that certain elements of the 2001 OAP (attainment demonstration, contingency measures, and reasonable further progress) were no longer required. In April 2004, USEPA made final the finding that the SFBAAB had attained the 1-hour standard and approved the remaining applicable elements of the 2001 OAP: emission inventory, control measure commitments, motor vehicle emission budgets, reasonably available control measures, and commitments to further study measures. However, as part of a transition from the national 1-hour standard to an 8-hour standard, the 1-hour standard was revoked on June 15, 2005, and is no longer applicable.

The 8-hour standard took effect in June 2004. In April 2004, USEPA designated regions for the new national 8-hour standard and these designations took effect on June 15, 2004. USEPA formally designated the SFBAAB as a nonattainment area for the national 8-hour ozone standard and classified the region as "marginal" according to five classes of nonattainment areas for ozone ranging from marginal to extreme. Compliance with the standard is determined at each monitoring station using an average of the fourth highest ozone reading for 3 years. A violation at any monitoring station results in a nonattainment designation for the entire region because ozone is a regional pollutant. Monitoring data for the San Martin station for the years 2001, 2002, and 2003 show an average of the fourth highest ozone values of 86 parts per billion (1 part per billion above the standard), hence the Bay Area's "marginal" nonattainment classification. Marginal nonattainment areas were required to attain the national 8-hour ozone standard by June 15, 2007. The results have not yet been released.

Although certain elements of Phase 1 of the 8-hour implementation rule are still undergoing legal challenge, USEPA signed Phase 2 of the 8-hour implementation rule on November 9, 2005. It is not currently anticipated that marginal areas will be required to prepare attainment demonstrations for the 8-hour standard (BAAQMD 2008).

2000 Clean Air Plan. The 2000 Clean Air Plan (CAP) was adopted by BAAQMD on December 20, 2000, is the third triennial update of the original 1991 CAP. The California Clean Air Act (CCAA) requires BAAQMD to update the CAP for attaining the state 1-hour ozone standard every 3 years. CAPs are intended to focus on the near-term actions through amendments of existing regulations and promulgation of new District regulations. The 2000 CAP includes a control strategy review to ensure that the CAP includes all feasible measures to reduce ozone, updates to the emissions inventory, estimates of emission reductions, and assessments of air quality trends. The transportation control measures (TCMs) in the 2000 CAP are unchanged from the 1997 CAP. The 2000 CAP continues to discourage urban sprawl while strongly endorsing

high-density mixed-use developments near transit centers that reduce the need for commuting by personal vehicles.

The BAAQMD is currently developing its 2009 CAP, in accordance with the CCAA. The 2009 CAP will evaluate the impact of ozone control measures on particulate matter, air toxics, and greenhouse gases in a single, integrated plan. In addition, the CAP will review the progress of air quality since the 2005 CAP and establish new control measures to be implemented or adopted in the upcoming 2009-2012 planning period.

2005 Ozone Strategy. The *Bay Area 2005 Ozone Strategy* is a comprehensive document that maps how the SFBAAB will comply with the state 1-hour air quality standard for ozone as expeditiously as practicable, and how the region will reduce the transport of ozone and ozone precursors to neighboring air basins. The strategy, which was adopted by BAAQMD's board of directors on January 4, 2006, describes how the SFBAAB will fulfill the CCAA planning requirements for the state 1-hour ozone standard and transport mitigation requirements through the proposed control strategy. The control strategy includes stationary-source control measures to be implemented through BAAQMD regulations; mobile-source control measures to be implemented through incentive programs and other activities; and transportation control measures to be implemented through transportation programs in cooperation with the MTC, local governments, transit agencies, and others. BAAQMD will continue to adopt regulations, implement programs, and work cooperatively with other agencies, organizations, and the public on a wide variety of strategies to improve air quality in the region and reduce transport to neighboring air basins.

The *Bay Area 2005 Ozone Strategy* explains how the SFBAAB plans to achieve these goals with respect to ozone. It also discusses related air quality issues of interest: the public involvement process, climate change, fine particulate matter, BAAQMD's Community Air Risk Evaluation program, local benefits of ozone control measures, the environmental review process, national ozone standards, and photochemical modeling.

Currently, the BAAQMD is developing a 2007 Ozone Strategy to address achieving attainment with both the state 1-hour and 8-hour ozone standard. The 2007 Ozone Strategy will continue to focus on reducing transport of ozone and ozone precursors to neighboring air basins. In addition, a review of the progress achieved from 2004 to 2006 will be evaluated and used to establish meaningful and effective control measures for 2007 to 2009.

Association of Bay Area Governments

ABAG is a regional planning agency (for the Counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Sonoma, and Solano) and serves as a forum for regional issues relating to transportation, the economy, community development and the environment. Although ABAG is not an air quality management

agency, it is responsible for several air quality planning issues. As the designated Metropolitan Planning Organization for the nine counties, ABAG is responsible, pursuant to Section 176(c) of the 1990 Amendments to the federal Clean Air Act (CAA), for providing current population, employment, travel and congestion projections for regional air quality planning efforts.

San Joaquin Valley Air Pollution Control District

CEQA Guidelines

SJVAPCD seeks to improve air quality conditions within the SJVAB through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. As part of its clean-air strategy, SJVAPCD prepares plans and programs for the attainment of ambient air quality standards, adopts and enforces rules and regulations, and issues permits for stationary sources. SJVAPCD also inspects stationary sources, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements other programs and regulations required by the CAA, Clean Air Act Amendments (CAAA), and CCAA.

In January 2002, SJVAPCD released the revised *Guide for Assessing and Mitigating Air Quality Impacts* (SJVAPCD 2002). This guide is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The guide contains the following applicable components:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact;
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts;
- Methods available to mitigate air quality impacts; and
- Information for use in air quality assessments that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

Air Quality Plans

SJVAPCD prepares and submits air quality attainment plans (AQAPs) to ARB in compliance with the requirements set forth in the CCAA. The CCAA also requires a triennial assessment of the extent of air quality improvements and emissions reductions achieved through the use of control measures. As part of the assessment, the AQAPs must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. Due to the nonattainment status of the area, SJVAPCD is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. These milestone reports include compliance

demonstrations to show that the requirements have been met for the nonattainment area. The air quality attainment plans and reports present comprehensive strategies to reduce ROG, NO_X, and PM_{10} emissions from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect source review program; adoption of local air quality plans; and stationary-, mobile-, and indirect-source control measures.

2004 Extreme Ozone Attainment Demonstration Plan. The 2004 Extreme Ozone Attainment Demonstration Plan (OADP) was developed by the SJVAPCD to meet attainment for the federal 1-hour ozone standard by November 15, 2010. An OADP is required to evaluate baseline and future emissions inventories while presenting control measures that will help reduce ozone precursors. The plan should include results from photochemical modeling which demonstrate that the region will meet attainment by the proposed date. The 2004 Extreme OADP includes emission reduction measures sufficient to meet the attainment date of November 2010, and also the rate-of-progress milestone in 2008. Although the federal 1-hour ozone standard was revoked in 2005, control measures contained in the 2004 Extreme OADP would also help the region achieve the federal 8-hour ozone standard. The 2004 Extreme OADP was adopted by the SJVAPCD and ARB in October 2004 and is currently in review by USEPA.

2007 Ozone Plan. The 2007 Ozone Plan was prepared by the SJVAPCD to achieve expeditious attainment of the federal 8-hour ozone standard. The plan contains an "exhaustive" list of regulatory and incentive-based measures to reduce emissions of ozone precursors and particulate matter within the region. The proposed local measures to achieve attainment with the 8-hour ozone standard are anticipated to be adopted before 2012. The plan notes that a 75 percent reduction in NO_X from 2005 levels (i.e., 624 tons per day) is necessary to achieve the new ozone standard. Due to mobile sources being a dominate source of ozone precursors in the region, strong participation and cooperation between local, state, and federal agencies is necessary to achieve the goals of the 2007 Ozone Plan. Based on future technology and full implementation of the proposed control measures, the plan estimates that 90 percent of the San Joaquin Valley will be in attainment by 2020. The 2007 Ozone Plan was adopted by the SJVAPCD in April 2007, and approved by the ARB in June 2007.

8-Hour Ozone Reasonably Available Control Technology. The USEPA required that all areas classified as moderate or higher under the new 8-hour ozone standard must demonstrate that their current rules meet 8-hour ozone reasonable available control technology (RACT). The RACT demonstration plan would be a revision to the SIP. The SJVAPCD fulfilled this requirement with the 8-Hour Ozone RACT SIP Analysis, which was adopted by its Governing Board in August 2006.

2004 Revision to the California SIP for Carbon Monoxide. The 2004 Revision the California SIP for Carbon Monoxide (Revision) documents the drop in CO levels since the 1998 CO Maintenance Plan. CO levels within the San Joaquin Valley dropped to levels 30 to 90 percent below the state 8-hour CO standard. The Revision extended the 1996 CO Maintenance Plan to 2018, incorporated significant emissions inventory improvements due to models such as EMFAC2002, and revised on-road vehicle emissions budgets for transportation conformity based on the new inventories. The Revision was adopted by the ARB on July 22, 2004.

2007 PM10 Maintenance Plan and Request for Redesignation. Although USEPA acknowledged that SJVAPCD had attained the PM_{10} NAAQS in 2006, the District still had not fulfilled all the requirements of the federal CAA to achieve attainment status. The 2007 PM_{10} Maintenance Plan and Request for Redesignation fulfills those outstanding requirements and requests a redesignation for PM_{10}. The Plan addresses the federal CAA requirements that improvements to air quality and control measures used to achieve reductions be permanent, and that a maintenance plan, as well as a contingency plan, be approved by USEPA. Although the federal annual PM_{10} was revoked, the 2007 PM_{10} Maintenance Plan applied to both annual and 24-hour standards. The ARB approved the Maintenance Plan in October 2007. However, USEPA has 18 months to act on the maintenance plan and request redesignation. The SJVAPCD anticipates a formal redesignation sometime in 2009.

2008 PM2.5 Plan. The SJVAPCD developed the 2008 $PM_{2.5}$ Plan to achieve all of the $PM_{2.5}$ standards as soon as possible. The 2008 $PM_{2.5}$ Plan would benefit from existing emissions reduction measures and programs in place due to current ozone and PM_{10} plans. Modeling conducted as part of this plan determined that the San Joaquin Valley could achieve the federal annual $PM_{2.5}$ standard by 2014. Reductions for the $PM_{2.5}$ Plan would be achieved through strict regulatory and incentive-based measures that reduce directly emitted $PM_{2.5}$ and precursor emissions. The plan also cites reductions in NO_X would be the main pollutant for reducing $PM_{2.5}$, but reductions in directly emitted $PM_{2.5}$ and SO_X are also necessary to achieve attainment. The SJVAPCD Governing Board adopted the 2008 $PM_{2.5}$ Plan in April 2008, and submitted it to the ARB for review.

Natural Events Action Plan for High Wind Events in San Joaquin Valley. In 2004, USEPA approved a high wind data flag for PM_{10} in Corcoran. The Natural Events Action Plan (NEAP) was developed by the SJVAPCD as result of the high wind data flag. NEAPs are intended to protect public health during exceedances of the PM_{10} standard due to natural events. The NEAP for San Joaquin Valley was adopted by the SJVAPCD Governing Board in February 2006, and has been submitted to ARB.

Sacramento Metropolitan Air Quality Management District

CEQA Guidelines

The Sacramento Metropolitan Air Quality Management District (SMAQMD) attains and maintains air quality conditions in all of Sacramento County through a comprehensive program of planning, regulation, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean-air strategy of SMAQMD includes the preparation of plans and programs for the attainment of ambient air-quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. SMAQMD also inspects stationary sources of air pollution, responds to citizen complaints, monitors ambient air quality and meteorological conditions, and implements programs and regulations required by the CAA, CAAA, and CCAA. Air quality plans applicable to the proposed project are discussed below.

In July 2004, SMAQMD released the revised *Guide for Assessing and Mitigating Air Quality Impacts* (SMAQMD 2004). This guide is an advisory document that provides lead agencies, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The guide contains the following applicable components:

- Criteria and thresholds for determining whether a project may have a significant adverse air quality impact,
- Specific procedures and modeling protocols for quantifying and analyzing air quality impacts,
- Methods available to mitigate air quality impacts, and
- Information for use in air quality assessments that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

Air Quality Plans

SMAQMD in coordination with the air quality management districts and air pollution control districts of El Dorado, Placer, Solano, Sutter, and Yolo Counties prepared and submitted the *1991* AQAP in compliance with the requirements set forth in the CCAA, which specifically addressed the nonattainment status for ozone and, to a lesser extent, CO and PM_{10}.

The CCAA also requires a triennial assessment of the extent of air quality improvements and emission reductions achieved through the use of control measures. As part of the assessment, the attainment plan must be reviewed and, if necessary, revised to correct for deficiencies in progress and to incorporate new data or projections. The requirement of the CCAA for a first triennial progress report and revision of the 1991 AQAP was fulfilled with the preparation and adoption of the *1994 Ozone Attainment Plan*. The OAP

stresses attainment of ozone standards and focuses on strategies for reducing emissions of ozone precursors (ROG and NO_X). It promotes active public involvement, enforcement of compliance with SMAQMD rules and regulations, public education in both the public and private sectors, development and promotion of transportation and land-use programs designed to reduce vehicle miles traveled (VMT) within the region, and implementation of control measures for stationary and mobile sources. The OAP became part of the SIP in accordance with the requirements of the CAAA and amended the 1991 AQAP. However, at that time the region could not show that the national ozone (1-hour) standard would be met by 1999. In exchange for moving the deadline to 2005, the region accepted a designation of "severe nonattainment" coupled with additional emission requirements on stationary sources. Additional triennial reports were also prepared in 1997, 2000, 2003, and 2006 in compliance with the CCAA; these reports act as incremental updates.

Sacramento County is also part of the Sacramento Federal Ozone Nonattainment Area (SFNA), which comprises all of Sacramento and Yolo Counties and portions of El Dorado, Placer, Sutter, and Solano Counties. As a nonattainment area, the region is also required to submit rate-of-progress milestone evaluations in accordance with the CAAA. Milestone reports were prepared for 1996, 1999, 2002, and most recently in 2006 for the 8-hour ozone standard. These milestone reports include compliance demonstrations that the requirements have been met for the SFNA. The AQAPs and reports present comprehensive strategies to reduce emissions of ROG, NOx, and PM_{10} from stationary, area, mobile, and indirect sources. Such strategies include the adoption of rules and regulations; enhancement of CEQA participation; implementation of a new and modified indirect-source review program; adoption of local air quality plans; and control measures for stationary, mobile, and indirect sources.

The Sacramento region was classified by USEPA as a "serious" nonattainment area on June 15, 2004, for the national 8-hour ozone standard with an attainment deadline of June 15, 2013. Emission reductions needed to achieve the air quality standard were identified using an air quality modeling analysis. An evaluation of proposed new control measures and associated ROG and NOx emission reductions concluded that no set of feasible controls were available to provide the needed emission reductions before the attainment deadline year. Given the magnitude of the shortfall in emission reductions, and the schedule for implementing new control measures, the earliest possible attainment demonstration year for the Sacramento region is determined to be the "severe" area deadline of 2019.

Section 181(b)(3) of the CAA permits a state to request that USEPA reclassify a nonattainment area to a higher classification and extend the time allowed for attainment. This process is appropriate for areas that must rely on longer-term strategies to achieve the emission reductions needed for attainment.

The board of director's for each of the five air districts (including SMAQMD) which comprises the SFNA requested that ARB submit a formal request for voluntary reclassification from a "serious" to a "severe" for the 8-hour ozone nonattainment area with an associated attainment deadline of June 15, 2019. ARB submitted that request on February 14, 2008.

On March 24, 2008, USEPA published in the Federal Register a finding of Failure to Submit the 2011 Reasonable Further Progress Plan for the SFNA in the Federal Register. The Failure to Submit finding triggered sanctions clocks, which include offset sanctions, more stringent emission mitigation requirements for new and modified "major stationary sources", if a complete plan is not submitted within 18 months of USEPA findings of failure to submit the plan.

The sanctions clocks will stop once the air districts (including SMAQMD) submit the 2011 Reasonable Further Progress Plan and USEPA accepts the plan as complete. The Sacramento Regional Nonattainment Area 8-Hour Attainment and Reasonable Further Progress Plan was published September 10, 2008 (SMAQMD 2008). It should be noted that the published plan is based on the assumption that USEPA will grant SFNA a bump-up to the "severe" classification for the federal ozone standard. The bump-up will push the SFNA's attainment date to June 15, 2019, which would require an ozone attainment demonstration by 2018.[1] In order to achieve this goal, the Plan evaluated existing and future ozone precursor control strategies, updated emissions inventories, photochemical modeling results, and RACT implementation measures. Although the Plan is expected to achieve its goal, attainment demonstration will rely on existing control measures and adopted rules, state and federal regulations, and new SIP local and regional measures. Lastly, reasonable further progress demonstrations will be required for the milestone years 2011, 2014, 2017, and 2018 (attainment analysis year).

Amador County Air Pollution Control District

CEQA Guidelines

The Amador County Air Pollution Control District (ACAPCD) is responsible for attaining and maintaining State and national ambient air quality standards within Amador County. The ACAPCD regulates air quality in the region through permits for industrial and commercial businesses, compliance inspections by ACAPCD staff, testing of air pollutant emissions from businesses, and written reports of business activities, malfunctions, and breakdowns. In order to maintain air quality in the region, the ACAPCD is also involved in public planning efforts within Amador County. Their involvement at the planning level allows the businesses to incorporate air quality control measures, rules, and regulations into their project design. Lastly, the ACAPCD assists the public with air quality issues and education.

[1] The previous attainment was "serious," which would require an ozone attainment date of June 15, 2013.

Air Quality Plans

The ACAPCD has not developed any air quality plans.

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APPENDIX E
CULTURAL RESOURCES

Appendix E: Cultural Resources Background

Prehistoric Setting

The earliest well-documented entry and spread of humans into California occurred at the beginning of the **Paleo-Indian Period (10,000–6000 B.C.)**. Social units are thought to have been small and highly mobile. Known sites have been identified in the contexts of ancient pluvial lake shores and coast lines evidenced by such characteristic hunting implements as fluted projectile points and chipped stone crescent forms. Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers working in the area since the early 1900s, as summarized by Fredrickson (1974) and Moratto (1984).

Few archaeological sites have been found in the San Francisco Bay Area (Bay Area) and Central Valley that date to the Paleo-Indian or the **Lower Archaic (6000–3000 B.C.)** time periods, however archaeologists have recovered a great deal of data from sites occupied by the Middle Archaic period. The lack of sites from earlier periods may be because of high sedimentation rates, leaving the earliest sites deeply buried and inaccessible. During the **Middle Archaic Period (3000–500 B.C.)**, the broad regional patterns of foraging subsistence strategies gave way to more intensive procurement practices. Subsistence economies were more diversified, possibly including the introduction of acorn processing technology. Populations were growing and occupying more diverse settings. Permanent villages that were occupied throughout the year were established, primarily along major waterways. The onset of status distinctions and other indicators of growing sociopolitical complexity mark the **Upper Archaic Period (500 B.C.–A.D. 700)**. Exchange systems become more complex and formalized and evidence of regular, sustained trade between groups was seen for the first time.

Several technological and social changes characterized the **Emergent Period (A.D. 700–1800)**. The bow and arrow were introduced, ultimately replacing the dart and atlatl. Territorial boundaries between groups became well established. It became increasingly common that distinctions in an individual's social status could be linked to acquired wealth. Exchange of goods between groups became more regularized with more goods, including raw materials, entering into the exchange networks. In the latter portion of this period (A.D.1500–1800), exchange relations became highly regularized and sophisticated. The clamshell disk bead became a monetary unit for exchange, and increasing quantities of goods moved greater distances and specialists arose to govern various aspects of production and exchange.

The Middle and Upper Archaic and Emergent Periods are further broken down under the CCTS. These three time periods are well represented in archaeological assemblages in the general vicinity of the project area. The assemblages are discussed in detail in Bennyhoff and Fredrickson (1969) and Moratto (1984) and summarized here.

The **Windmiller Pattern (3000–500 B.C.)** peoples placed an increased emphasis on acorn use as well as a continuation of hunting and fishing activities. Ground and polished charmstones, twined basketry, baked-clay artifacts and worked shell and bone were hallmarks of Windmiller culture, as well as distinctive burial practices. The **Berkeley Pattern (500 B.C.–A.D. 700)** appears to have developed in the Bay Area and was spread thought the migration of Plains Miwok Indians. The Berkeley Pattern exhibited an increase in the use of acorns as a food source than was seen previously in the archaeological record. Distinctive stone and shell artifacts differentiated it from earlier or later cultural expressions. Burials were predominantly placed in a tightly flexed (fetal) position, and frequently included red ochre. The **Augustine Pattern (A.D. 700–1800)** may have been stimulated by the southern migration of Wintuan people from north of Sacramento Valley. The Augustine Pattern reflected increasing populations resulting from more intensive food procurement strategies, as well as a marked change in burial practices and increased trade activities. Mortars and pestles were more carefully shaped, bow and arrow technology was present, and fishing implements became more common.

Historic Setting

Missions and Ranchos

Spanish colonial expansion into Alta California in the latter part of the eighteenth century was stimulated by geopolitical and religious considerations (Cleland 1944). Spain and its colonial authorities were interested in countering Russian expansion into northern California and the perceived threat of British colonial expansion. Additionally, the replacement of the Jesuits by the Franciscan Order in the missions of Baja California created renewed fervor for the conversion of Native Americans to Christianity. As elsewhere along the northern borderlands of New Spain, the plan for the colonization of Alta California included three types of settlements: missions to convert the Native Americans and provide them with an agricultural subsistence; pueblos to act as residential, commercial, and administrative centers; and presidios to protect the colony from foreign powers and potential Native American hostility (Hallenbeck 1926).

King Carlos III of Spain gave orders to the Viceroy of Mexico to begin forming settlements at San Diego and Monterey. The King's viceroy authorized establishment of each mission and chose the approximate location (Blackmar 1976). Once the location was determined, the padres were sent with a few soldiers to establish the new mission (Blackmar 1976). The Franciscans eventually established 21 missions and four presidios between Sonoma and San Diego from 1769 to 1823 (Beck and Haase 1974). The missions were situated so that they could be reached within a day's ride of each other. The presidios were spread out evenly among the missions although some missions also housed soldiers within their walls.

Mexico achieved independence from Spain in 1821 and in 1822 California was declared a territory of the Mexican republic. In 1834, the Mexican government secularized the missions and divided their land holdings into ranchos; because the ranchos included large landholdings throughout California, some may overlie project components.

During the 1830s and 1840s, new settlers from the United States arrived in California and commercial activity between the United States and California increased. Settlers in search of large expanses of land or trappers and mountain men in search of fur-bearing animals began to occupy California in large numbers. Tensions between the settlers and Native Americans escalated during the Mexican War in 1846. The war ended with the signing of the Treaty of Guadalupe Hidalgo in February of 1848 and the cession of California to the United States.

Early Exploration and Settlement

While the earliest Euro-American explorers and trappers essentially blazed the trail for future settlement of Alta California, sustained historic-era development in the Central Valley only occurred with the establishment of the great land-grant ranchos awarded to politically-connected Mexican and American citizens during the late 1830s and 1840s. One of the earliest (1839), and largest of these was granted to John Sutter established a small trading post. Later, in 1841, he was granted an additional 11 leagues by the Mexican government, where he established New Helvetia and Sutter's Fort, now known as Sacramento (Hoover et al. 1990).

Discovery of Gold

James Marshall's gold discovery in Coloma in 1848 led to an influx of miners, prospectors, and settlers into California looking for their fortune. Beginning in 1849, prospectors and entrepreneurs overran the streams of the Sierra Nevada in search of riches (Hoover et al. 1966). Hoards of miners came, water systems were developed, settlements grew up around the more successful and environmentally rich mining areas, and transportation networks between these areas developed, first as trails and then as wagon roads. Farms, orchards, and truck gardens sprang up; saloons and fandango halls, along with boarding houses provided entertainment, bed, bath, and sustenance to the miners. The bare bones of civilization in the form of government, law, newspapers, and social lodges developed; and violence became commonplace, not only among the newly arrived argonauts, but also with the Indians who had lived in the area so long (Davis-King and Marvin 1994:3.26).

Hydraulic mining, first conducted in Nevada in 1852, was the most cost effective means of recovering gold deposits from deeply buried gravels along and near river and stream channels. In order to access these deeply buried deposits, streams of water under high pressure were used to wash away sediments and gravels. The sands and gravels were passed through sluices which separated out the placer gold. Silt and sand washed into

nearby creeks, streams, and rivers, raising watercourse beds, clogging the channels, and generally polluting the waters. Between 1849 and 1909, 64 million cubic meters of mining debris were deposited in the Yuba River alone. By the time legislation put an end to hydraulic mining in 1883, an estimated 1.2 million cubic meters of soil had been washed away from Sierra hillsides (Baumgart 2002).

Foothill Communities

In Amador and Calaveras counties in particular, hundreds of small towns and camps began to be established in 1848 even before the world-wide announcement of gold having been discovered in Coloma in El Dorado County. The first discovery in Amador County occurred in the spring of 1848 on the Mokelumne River by 1849 numerous "camps" such as Big Bar and Middle Bar were being established. Unlike many camps, however, Middle Bar had a longer life span and while it largely depopulated later in the nineteenth century as readily accessible deposits played out, it had a brief secondary boom period in the 1920s as local quartz vein was discovered and mined for a short time. Following the end of that boom, the East Bay Municipal Utility District (EBMUD) purchased what remained of the town and the surrounding property and six miles below Middle Bar constructed the Pardee Dam which inundated the site of Middle Bar and the remains of numerous smaller camps and settlements (Hoover et al. 1990:27-28). By the World War I period many of the mines were closed as deposits played out but the town still served as a major center for miners, loggers, and ranchers in the foothill region (Gudde: 1975: 19-20; Hoover et al. 1990: 42-43).

Transportation Network

Highways

Prior to the 1860, the main form of transportation throughout the Bay region was either by boat or stagecoach. A maritime transportation network grew up around the economy of the Bay Area to facilitate the movement of agricultural products. Shipping centers developed in the Bay Area such as Redwood City, Union City, and Oakland which became active commercial and industrial ports. Additional access to the ports and points inland was provided by the development of the railroads.

In the 1890s the first commercial automobiles began to arrive in the Central Valley and by July, 1911, residents were buying seventy-five autos per day in the Sacramento region along. This large influx of automobiles required a network of paved roads to allow for travel, leading to construction of new roads throughout the region. Although numerous roadways were established in the Central Valley during the nineteenth century, it wasn't until the popularity of the automobile exploded that major changes to the landscape occurred to accommodate the shift towards the automobile as the primary form or transport for people, goods, and services throughout the region.

Railroads

San Francisco, Alameda and Stockton Railroad Company

The San Francisco, Alameda and Stockton Railroad Company organized in 1863 for the purpose of connecting these three cities. This railroad line was extended to San Leandro and later to Hayward (Jones & Stokes 2001). The entire line was acquired by Central Pacific Railroad in 1870, which was absorbed by Southern Pacific Railroad in 1899. All of these railroad lines would ultimately be absorbed into the Union Pacific railroad system, the largest railroad in North America and still operating today.

Central Pacific

Railroad construction was a natural outgrowth of the increasing economic expansion of the Central Valley and the need to deliver supplies to the California foothills and the goldfields. The first system constructed in the Central Valley was the Sacramento Valley Railroad. This line was incorporated in 1852, but it wasn't until 1854 that the railroad's first president, Col. Charles Wilson, retained Theodore Judah as the chief engineer (Historic Environment Consultants 1998). To help gain financing, Judah published a series of reports beginning in 1854, predicting routes, construction methods, expenses and revenues for the enterprise (Judah 1854). The railroad was completed by February of 1856. The first rail line ran to the town of Folsom, where at least 21 different wagon trains then carted goods from the depot to outlying areas as far away as Carson City, Nevada.

After the Sacramento Valley Railroad was completed, Judah was free to pursue a grander scheme – construction of a transcontinental railroad. He enlisted a group of men, Leland Stanford, Charles Crocker, Mark Hopkins and C.P. Huntington (later known as the Big Four) in the venture. The Central Pacific Railroad (CPRR) incorporated in 1861, and broke ground on the project in January 1863. The Central Pacific bought the Sacramento Valley Railroad in 1865, and added its facilities to those already being built. The CPRR and its successor, the Southern Pacific Railroad (SPRR) became the single largest industrial employer in the Sacramento region after 1863. It is estimated that early in its history, the railroad employed 20 percent - 30 percent of salaried employees in the City of Sacramento (Historic Environment Consultants 1998). Through the following years, the SPRR actively promoted settlement and tourism in the west and merged with the Union Pacific in 1996.

Western Pacific

Another of the more important rail systems vital to the historical development of the Central Valley was the Western Pacific. The largest segment of this line within the Central Valley consists of the Sacramento Valley Division. The company had its beginning with the creation of the Alameda & San Joaquin Railroad by the San Francisco & San Joaquin Coal Company to haul coal from the Tesla Mine in the Corral Hollow

Canyon southwest of Tracy 36 miles to Stockton in June 1896. Around the turn of the last century, Walter Bartnett and his associates with the California Safe Deposit & Trust Company conceived of a plan to extend the railroad west to San Francisco and east across the Sierra Nevada to Salt Lake City (JRP 1995).

Agriculture and Flood Control

Most immigrants traveling to the gold fields of the Sierra Nevada foothills from San Francisco in the mid-nineteenth century sailed through the Central Valley and Delta waterways upriver to Sacramento, seeing vast tule marshes and grassy range lands along the way. Many no doubt realized that these lands were prime for agricultural and ranch development and various settlements and farms were soon established on the natural levees of the Sacramento and San Joaquin rivers. However, seasonal flooding repeatedly devastated any number of Central Valley communities and farms during the middle years of the nineteenth century, underscoring the need for flood protection. Lands that drained rapidly were quickly reclaimed, but long term flooding prevented further reclamation efforts within the river floodplains themselves.

The Swamp Land Act of 1850 ceded all overflow lands to the State to facilitate their reclamation. Limitations to acreage were capped at first at 320, then 640 acres, which were made available by the State for one dollar an acre. If a purchaser could certify he had spent two dollars an acre in reclamation, his purchase price was refunded, and he was given deed to the land. In an attempt to increase this acreage limit, the Board of Reclamation was created in 1861, which authorized the formation of reclamation districts to accomplish the task of more wholesale reclamation efforts. Thirty-two reclamation districts were formed in the Central Valley at this time.

Eventually, local control of reclamation and flood control efforts was desired, and by 1866 this control was turned over to the counties. At this time, acreage restrictions were removed, clearing the way for speculators. Military script from the Civil War was received at face value, although it could be obtained for a few cents on the dollar. In this way land agents acquired properties sometimes exceeding 100,000 acres. It was charged that the only expense incurred by some purchasers was that of paying witnesses to testify that the land had been reclaimed, so that the owners could get a refund on the amount paid, although less than one sixth of the property actually was reclaimed.

Early in the twentieth century, the U.S. Geological Survey recognized the wisdom of Green's observations and proposals and confirmed that the Sacramento River Channel was inadequate to handle massive flows. The Sacramento River Flood Control Project was adopted as part of the Flood Control Act of 1917, making the federal government responsible for flood control which is still the case today.

East Bay Municipal Utility District

The transformation of EBMUD's water system from a collection of private entities to a regional, publicly-owned water utility was part of a national trend that began on the East Coast before the Civil War, and spread to major Midwestern and California cities in the later nineteenth and early twentieth centuries. Rapidly growing communities were faced with the conflicting goals of handling the large quantities of waste produced in cities, without sanitary sewer systems, and assuring their citizens of adequate water supplies. City wells and local streams in urban areas were often fouled by animal and human waste, garbage, and leaking cesspools. Although the relationship between water-borne pollution and disease was not scientifically understood until late in the nineteenth century, water managers were already becoming more conscious of the need for cleaner water supplies. Water consumption on a per-capita basis was also increasing in United States (U.S) urban centers during this period, due to the introduction of toilets, showers, and bathtubs connected to indoor plumbing. While they were not common in the latter nineteenth century, their expanded presence over the following decades had a profound effect on water demand. Per-capita water use in major U.S. cities just before the outbreak of World War II was nearly four times that of European cities in the same era.[1]

Thus, the development of EBMUD's water system shared themes in common with other major urban areas that made a similar transition:

- Consolidation of private water companies into a single public entity;
- Acquisition of distant but purer water supplies through reliance upon gravity for delivery;
- Development of formal water supply and distribution planning to ensure that supplies would keep pace with growing demand; and
- Legislative authorization of government agencies to finance public works projects through bonded indebtedness.

By 1910, the collection of small local reservoirs were unable to meet demand reliably. Community leaders in the East Bay sought a larger supply of better quality water after the turn of the twentieth century.

Dissatisfaction with private utilities as inefficient and sometimes corrupt led to the passage of the Municipal Water District Act of 1911, followed by the Public Utilities Act, which put private utilities under the jurisdiction of the California Railroad Commission (later the Public Utilities Commission). In the years following the massive bank failures in the latter nineteenth century, municipalities relied on private capital to build their water infrastructure, usually under an exclusive and lucrative franchise. Rates often exceeded

[1] Blake, Nelson M., Water for the Cities: A History of the Urban Water Supply Problem in the United States. (Syracuse University Press, 1956).

those charged by municipally owned systems. Private companies tended to concentrated on profitable areas in their service area to the exclusion of poor or outlying neighborhoods.[2] In the face of such abuses, a movement began in the East Bay to establish a municipal utility district, a special district enabled by passage of the Municipal Utility District (MUD) Act in 1921.

The MUD Act allowed these special-purpose districts to cross county lines, to include incorporated cities in its place of use, and most importantly, to issue revenue bonds to fund water system construction. EBMUD was the first such district formed under the MUD Act, in May 1923.[3] EBMUD initially considered approaching San Francisco officials to share development of the Tuolumne River water source, but ultimately decided to proceed independently on the Mokelumne River. Following completion of Pardee Dam and reservoir, and Mokelumne Aqueduct No. 1, deliveries to the service area began in June 1929. The ability to fund large-scale water infrastructure with municipal bonds was a key to their development. The MUD Act, among other bonding provisions in state law, allowed special-purpose districts like EBMUD to assume public debt to build their systems.

Ethnographic Setting

Coastanoan

The Coastanoans were organized as clans, divided into deer and bear moieties. Households consisted of patrilineally extended families ranging from 10 to 15 members. The most common type of house described ethnographically was a dome-shaped structure constructed of willow poles and thatched with tule, grasses, ferns, or wild alfalfa (Kroeber 1925, Levy 1978). Tule was also employed in making clothing and to construct the balsas used to cross San Francisco Bay and maneuver among the marshes and streams surrounding the bay. The balsas were propelled by a double-bladed paddle and were used as transportation and for hunting water fowl and perhaps sea mammals. Sinew-backed bows were made by the Coastanoans, and used with arrows tipped by either stone or bone points. Nets were employed to hunt a variety of ducks, quail, rabbits, and, along with basketry traps, to capture the small schooling fish common to the bay-estuary (Kroeber 1925, Levy 1978).

Like most California groups, acorns were probably an important part of the Coastanoan diet, as were numerous other nut and seed crops which occur on the bay plain and surrounding foothills and canyons. Seasonal burning of the grassland helped to promote the growth of annual seeds and forbs and increased the grazing area for deer, elk, and

[2] East Bay Municipal Utility District, *The Story of Water: A Brief History of the East Bay Municipal Utility District*. 1931,

[3] Plumb, John H. "Summary of the History of Municipal Utility Districts in California and of the Municipal Utility District Act," November, 1974.

pronghorn. These large animals were hunted communally or in small groups. Waterfowl were an important part of the diet, often attracted by the use of tule or feather-clad decoys.

In 1776, the San Francisco Presidio and the mission of Our Seraphic Father San Francisco de Asís were begun near the northern end of the San Francisco peninsula. Later that year, the mission of Our Seraphic Mother Santa Clara began construction to the south, and a small civilian settlement was begun near Mission Santa Clara. At first, the local Natives came to see the strange people, technologies, and structures that were being erected. However, cultural differences and misunderstandings almost immediately became felt. The first Indians were killed in the fall of 1776 after some Spanish items were stolen (Milliken 1995). Similar violence erupted a year later in Santa Clara.

Central Sierra Me-Wuk

Linguistically, the Central Sierra Me-wuk are related and are included in the Eastern Me-wuk, which comprises one of two major branches of the Me-wukan subgroup of the Utian language family (Levy 1978). Further evidence indicates that the Eastern Me-wuk separated from the Western Me-wuk branch some 2,500 years ago and suggests that the Me-wuk have resided in the central California region for at least several thousand years.

Central Sierra Me-wuk settlement and subsistence systems were based on technological approaches to the exploitation of the diverse natural resources present in the lower and middle elevations of their traditionally occupied territory. In general, Me-wuk technology was typical of the region and few material elements of their daily lives stand out as unique to the tribe. As did many other peoples in the area, the Me-wuk utilized an approach that mixed hunting and gathering strategies with main settlements near staple food sources such as acorn-bearing oak groves and smaller sites located on areas of the landscape near where seasonal resources were available.

Material culture among the Central Sierra Me-wuk differed little from other tribes throughout the region and probably varied from their neighbors mostly as a result of differential resource availability. All groups in the north-central Sierra Nevada used brush, grasses and tule reeds to build their structures. Prehistorically, flaked and ground stone implements comprised the technological foundation until large-scale European incursions into the area in the mid nineteenth century, when steel tools became highly valued and preferred. Basketry, in prehistoric and historic times, was a notable Me-wuk skill and the coiled and warp-and-weft products were standard household equipment.

Known Cultural Resources in and Around Pardee Reservoir

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Water Systems/ Engineering	Pardee Dam	JRP 1996, Mikesell 1994, Herbert and Mikesell 1995	Pardee dam, South Spillway, Jackson Creek Spillway, powerhouse, intake facility tower	225	N/A	Jackson and Valley Springs	Yes, listed on NRHP, 710/95 Criterion A and C	HAER completed (Herbert and Mikesell 1995)
Historic-Mining Settlement	P-S-12	PAR 1992	French Bar; stone walls, foundations, rock walls and retaining walls for ditches and trails, tent or other mining related features	560-720	104,138	Jackson	Undetermined; recommended for eligibility by Parr, 1992.	Recommended archival research and possibly excavation.
Historic-Mining Settlement	D-3	Pacific Legacy 1997	Earthen ditch known as Kreth Ditch	580	Unknown	Jackson Creek	Undetermined; Pacific Legacy, 1997, suggests not eligible	None
Historic Settlement	PD-2	Pacific Legacy 1997	Nine formed concrete pier footings	580	Unknown	Jackson Creek	Undetermined; Suggested not eligible	None

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Homestead	PD-1	Pacific Legacy 1997	Wooden barn, introduced ornamental plants and fruit trees, stacked rock alignments, small rock walls, historic debris	580-600	11,304	Jackson Creek	Undetermined; Pacific Legacy 1997, suggests not eligible	None
Historic-Placer Mining	P-S-11	PAR 1992	Linear rock wall, possible mining and diversion channel	600	11,190	Jackson	Undetermined; recommend further work (Parr 1992)	Potential for buried deposits, maybe old 1870s road.
Historic-Mining Settlement	CA-CAL-956H	Chavez et al. 1984	Big Bar; depression-era houses and older houses, historical bridge abutments, cables, concrete footings, toll house, roadbeds, adits, pits, pocket mines, terraces, ditch with penstock, concrete piers, tailing piles	600-700	117,750	Mokelumne Hill	Undetermined; Chavez, et al. 1984, suggest not eligible	California Historical Landmark No. 41

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Mining Settlement	CA-AMA-280H	Chavez et al. 1984	Adits, shafts areas of ground sluicing and placer mining, ditches, possible smelters, habitation terraces, dry-laid stone walls and stone lined ditch, penstock, possible stamp mill foundation, roadbeds, tailings, historic artifacts	600-800	98,125	Mokelumne Hill	Undetermined; Chavez, et al. 1984, suggest not eligible	L.K. Hall and Confidence Quartz Mine
Historic-Structure, Truss Bridge	Middle Bar Bridge	OHP #055824	Bridge built by Clinton Bridge and Iron Works	600	N/A	Mokelumne Hill	Yes, Listed on the NRHP 12/24/85	Bridge #306 16
Historic-Mining	P-S-1	PAR 1992	Two mine shafts, tailing pile, roadbed	605-710	30,656	Jackson	Undetermined; Parr 1992 suggest it is not	I.Q. Horton and J.P. Hase homestead and mine
Historic-Quartz Mine	CA-AMA-298H	Chavez et al. 1984	Adit, shaft, possible tent or house terrace, rock-lined ditch, waterwheel footing, concrete bridge footing, roadbed, tailings, historic artifacts	640-800 (mapped below 613)	54,940	Mokelumne Hill	Undetermined; Chavez, et al. 1984, suggest not eligible	Kearsing Mine

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Placer Mine	CA-CAL-953H	Chavez et al. 1984	Two dry-laid stone foundations and terraces for structures, three concrete footings, and a platform for a pump, roadbed, ditch with flume pipe, power lines, rails, tailings	680 (mapped below 625)	35,325	Mokelumne Hill	Undetermined; Chavez, et al. 1984, suggest not eligible	Placer mine
Historic-Industrial Site	CA-AMA-228H	Chavez et al. 1984	Blue Lakes Powerhouse, foundations, elements of the penstock, dry-laid stone retaining walls, dry-laid stone ditch	680	8,831	Mokelumne Hill	Undetermined; Chavez, et al. 1984, suggest not eligible	Site of Blue Lakes Powerhouse

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Mining Settlement	CA-CAL-946H	Chavez et al. 1984	James Bar or Lower Bar; ruins of water-powered compressor plant, dry-laid stone walls and foundations for houses, stores, and other structure; excavated storage pit; mining shafts; adits; ditches; roadbeds; abundant historic artifacts	700-1200 (according to site map the site extends to Pardee Reservoir)	706,500	Jackson	Undetermined; probably eligible, see Chavez et al. 1984	None
Prehistoric-Native American Occupation	P-S-13	PAR 1992	Bedrock mortar station, lithic and groundstone scatter	540	667	Jackson	Undetermined; recommended for eligibility by Parr 1992	None
Prehistoric-Native American Occupation	P-S-4	PAR 1992	Bedrock mortar station with three mortar holes	560	126	Valley Springs	Undetermined; Parr 1992 suggests not eligible	None
Prehistoric-Native American Occupation	P-S-5	PAR 1992	Two bedrock mortar stations	560	79	Jackson	Undetermined; Parr 1992 suggests not eligible	None

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Prehistoric-Native American Occupation	CA-AMA-299	Chavez et al. 1984	Three bedrock mortar stations with possible midden	580	600	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	None
Prehistoric	CA-AMA-18	Chavez et al.	Shallow midden	600	2,000	Mokelumne Hill	See CA-AMA-18(A)	CA-AMA-19/H(a), CA-AMA-19/H(b), CA-AMA-19, CA-AMA-18/H, CA-CAL-968/H, CA-AMA-18/H(a), CA-AMA-18/H(b), and CA-AMA-18 are all within close proximity. It is possible that some are duplicated site data.
Prehistoric-Native American Occupation	CA-AMA-18(A)	Chavez et al.	Midden, lithic scatter, groundstone fragments, faunal bone, hematite, charcoal, historic artifacts	600	1,099	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	This site is located within CA-AMA-18/CA-CAL-0968 site boundary

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Prehistoric-Native American Occupation	CA-AMA-18(B)	Chavez et al. 1984	Dense midden, fire cracked rock, lithics, faunal bone, charcoal, hematite, groundstone fragments, historic artifacts	600	4,710	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	This site is located within CA-AMA-18/CA-CAL-0968 site boundary
Prehistoric-Native American Occupation	P-S-2	PAR 1992	Lithic and groundstone concentration	600	11,492	Jackson	Undetermined; recommended for eligibility by Parr 1992	None
Prehistoric-Native American Occupation	CA-AMA-282	Chavez et al. 1984	Two bedrock mortar stations; each station has one mortar cup	600	300	Mokelumne Hill	Undetermined; Chavez et al. 1984 suggests not eligible	None
Prehistoric-Native American Occupation	P-S-3	PAR 1992	Lithic scatter with bedrock mortar station consisting of four outcrops with one mortar cup each	620-640	2,426	Jackson	Undetermined; recommended for eligibility by Parr 1992	None
Prehistoric-Native American Occupation	CA-CAL-951	Chavez et al. 1984	Bedrock mortar station with one outcrop and seven mortar cups	620	14	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	Possible associated with CA-CAL-959-H

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Prehistoric-Native American Occupation	CA-CAL-969	Chavez et al. 1984	Three bedrock mortar stations, one mano (stone with flat side used to grind food) fragment, possible midden	620	275	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	This site is located within CA-AMA-18/CA-CAL-0968 site boundary
Prehistoric	CA-AMA-19	Chavez et al. 1984	Lithic scatter. Site recorded by J. Davis in 1953	600	1,000	Mokelumne Hill	See CA-AMA-19/H(A)	CA-AMA-19/H(a), CA-AMA-19/H(b), CA-AMA-19, CA-AMA-18/H, CA-CAL-968/H, CA-AMA-18/H(a), CA-AMA-18/H(b), and CA-AMA-18 are all within close proximity. It is possible that some are duplicated site data.
Prehistoric/ Historic Native American Occupation/ Placer Mining/ Homestead	CA-AMA-19/H(A)	Chavez et al. 1984	Shafts, mining cuts, ditches, tailings piles, walls for corral, probable house walls, bedrock mortar station	560-800	125,600	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	Location of Hunt Gulch (placer mining) and early homestead

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Prehistoric/ Historic-Native American Occupation/ Ranching	P-S-10	PAR 1991	1861 Wildermuth House; rock fences, sandstone building, barn, possible house pits, midden lithic scatter and bedrock mortar stations	585-665	68,571	Valley Springs	Undetermined; recommended for eligibility by Parr 1992	Building has been reconstructed
Prehistoric/ Historic-Native American Occupation/ Mining	P-S-7	PAR 1991	Piled and stacked rock, mining test pits, lithics	585-670	25,524	Jackson	Undetermined; recommended for eligibility by Parr 1992	Archival search for historic site
Prehistoric/ Historic-Native American Occupation/ Ethnic Mining Settlement	P-S-8	PAR 1991	Dwelling pads, waste rock reinforced rock trails, Asian or Indian ovens, bedrock mortar station, groundstone and lithic scatter	595-650	58,420	Jackson	Undetermined; recommended for eligibility by Parr 1992	None
Prehistoric/ Historic-Native American Occupation/ Placer Mining	P-S-6	PAR 1992	Two rock formations, earthen pad, depression, two rock dams, five prospect pits, prehistoric artifact scatter	600-700	94,812	Valley Springs	Undetermined; recommended for eligibility by Parr 1992	Noted on 1870 Plat map; map contain subsurface material

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Prehistoric/ Historic-Native American Occupation/ Mining Settlement	CA-AMA-18/H & CA-CAL-968/H	Chavez et al. 1984	Middle Bar Mine and settlement; shafts, adits, ditches, roadbeds, concrete stamp mill foundations, hoisting works ruins, tailing piles, dry-laid stone features (tent, ramada platforms, house and commercial structural foundations), abundant historic artifacts	600-760	1,036,200	Mokelumne Hill and Jackson	Undetermined; probably eligible, see Chavez et al. 1984	Two historical burials recorded: child in Sargent graveyard and adult in the "little graveyard at Middle Bar," California Historical Landmark No. 36. Within the site boundaries are three prehistoric sites: CA-CAL-0969, CA-AMA-18(A), and CA-AMA-18(B)
Prehistoric/ Historic-Native American Occupation	CA-AMA-19/H(B)	Chavez et al. 1984	Dense midden with fire-cracked rock, lithics, faunal bone, historic artifact	560-800	4,710	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	This is a smaller prehistoric site within the larger historic site of CA-AMA-19/H(A)
Prehistoric/ Historic-Native American Occupation/ Ranch	CA-CAL-967/H	Chavez et al. 1984	Garaventa Homestead and Ranch; house foundation and mud-mortared stone walls, dry-laid schist wall (banking oven), placer mining	600-760	196,250	Mokelumne Hill	Undetermined; probably eligible, see Chavez et al. 1984	CA-CAL-103 is within the boundary of CA-CAL-0967

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Mining	DS-1	Pacific Legacy 1997	One shaft, seven prospect pits, one foundation, one tent or cabin pad, one dirt road	540-600	58,5216	Valley Springs	Undetermined; site record indicates integrity of site is substantially impaired	None
Historic	DS-2	Pacific Legacy 1997	Rectangular pad, small level area, fieldstone retaining wall, stacked cement cylinder retaining wall, and a dump	580	1,758	Jackson	Undetermined; site record indicates that integrity is poor	None
Historic-Dump	DS-3	Pacific Legacy 1997	Continuous historic dump situated on in a drainage most likely associated with Pardee Dam construction	445-290 according to site records. Note that USGS maps indicate elev is 445-600.	58,875	Jackson	Undetermined; site record indicates that the site integrity has been retained	None

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Historic-Road System and Structures	DS-4	Pacific Legacy 1997	The northern locus consists of two stacked retaining walls three terraced roads, and a continuous trash scatter. The southern Locus consists of a formed concrete foundation and associated concrete footings, metal chutes, large sections and piles of concrete slurry, and a continuous trash scatter	400-500	9,146	Jackson	Undetermined; site record indicates integrity is impaired	None
Historic-Logging	DS-5	Pacific Legacy 1997	Wooden structure, possible loading dock, associated skid trails, a road, and a section of cement	330	5,417	Jackson	Undetermined; site record indicates that site integrity is impaired	None
Historic-Linear Water Conveyance	DS-6	Pacific Legacy 1997	Ditch, minimally several hundred meters of ditch is supported on the north side by stacked retaining wall	380	Undetermined	Jackson	Undetermined; site record indicates that the overall integrity has been impaired	None

Table E-1: Identified and Potential Cultural Resources: Enlarge Pardee Reservoir (continued)

SITE TYPE / THEME	SITE NO.	REFERENCE	SITE FEATURES	ELEVATION (FEET)	AREA (SQUARE METERS)	QUAD LOCATION	NRHP/CRHR ELIGIBILITY	COMMENTS
Prehistoric-Bedrock Mortar Stations	DS-7	Pacific Legacy 1997	Three bedrock mortar stations with a total of four bedrock mortars	620 (from site map)	5,672	Valley Springs	Undetermined; site record indicates that site integrity has been impaired	None

Notes:

NRHP = National Register of Historic Places; CRHR = California Register of Historical Resources; HAER = Historic American Engineering Record; OHP = Office of Historic Preservation.

Source*: FRWA et al 2003*

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